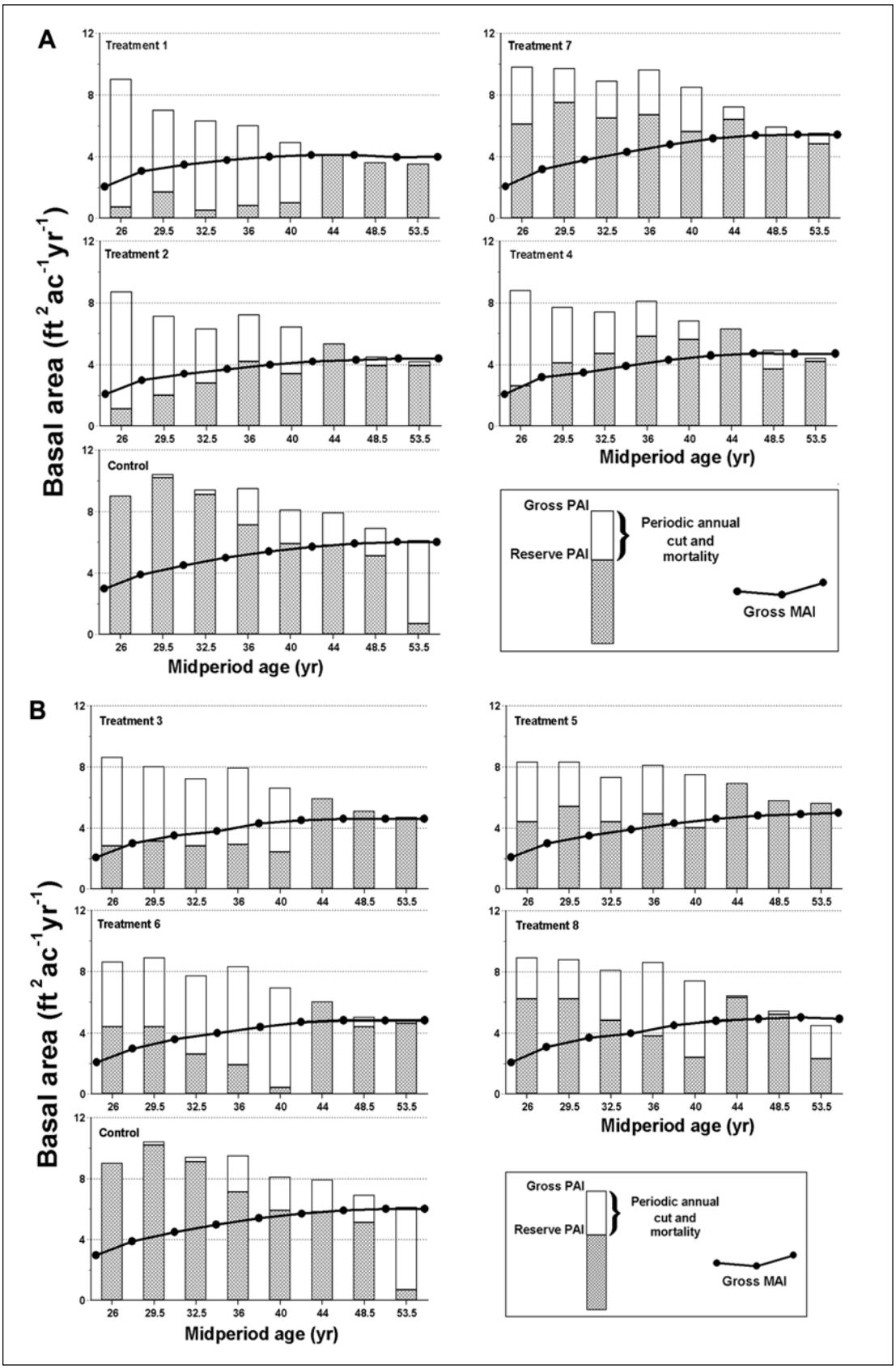

Figure 15—Periodic annual increment (PAI) and gross mean annual increment (MAI) in basal area per acre by treatments for (A) Skykomish treatments 1, 2, 4, and 7; (B) Skykomish treatments 3, 5, 6, and 8. Each bar shows the basal area cut plus mortality and the amount reserved (net); for controls, the mortality and net growth.

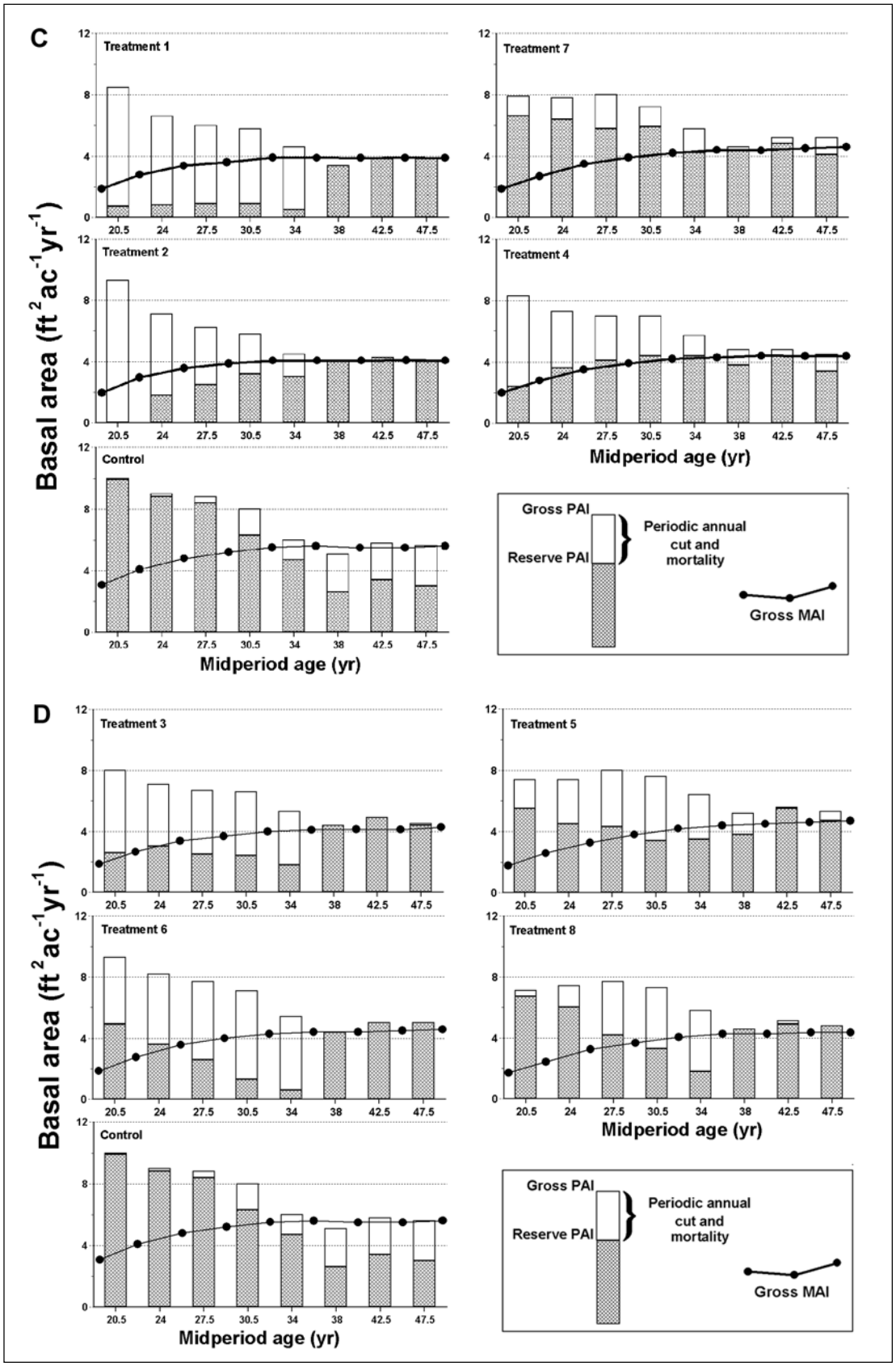

Figure 15 continued—Periodic annual increment (PAI) and gross mean annual increment (MAI) in basal area per acre by treatments for (C) Clemons treatments 1, 2, 4, and 7; (D) Clemons treatments 3, 5, 6, and 8. Each bar shows the basal area cut plus mortality and the amount reserved (net); for controls, the mortality and net growth.

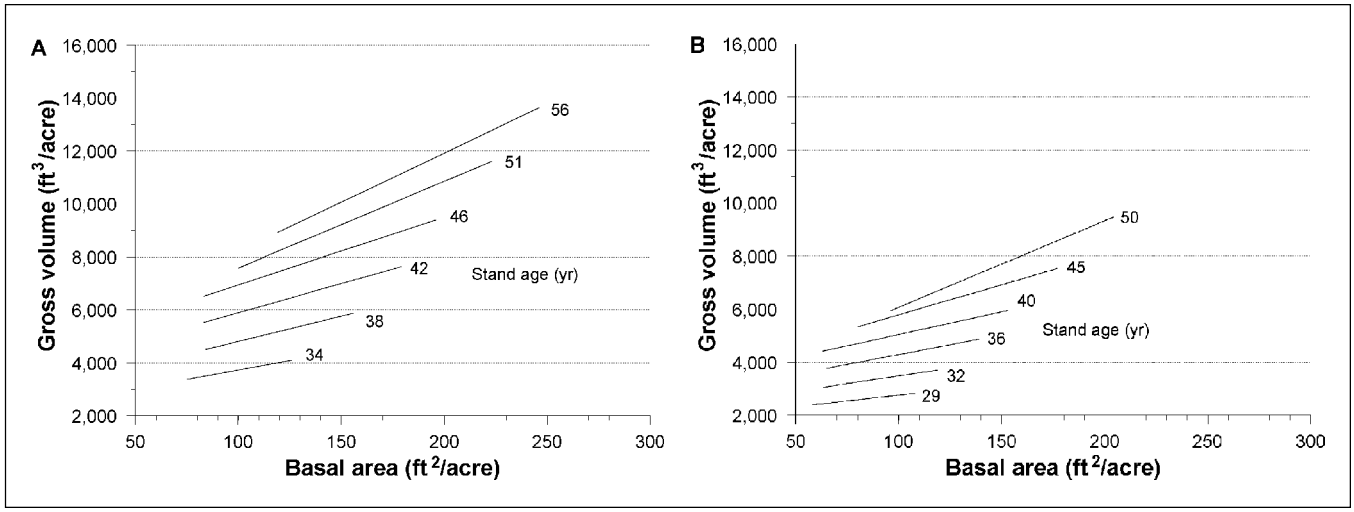

Figure 16—Gross total stem volume production in relation to basal area by stand age for (A) Skykomish and (B) Clemons. Length of regression lines corresponds with increasing growing stock as stands advanced in age.

Total yield—The cumulative gross volume in cubic feet per acre was related to basal area in a series of regressions representing successive growth periods. These relations were based on the yield from all thinning regimes at periodic stand ages (figs. 16A and 16B).

Gross volume includes initial volume at plot establishment plus the increase in reserve volume at each growth period plus the volume cut in thinnings and the volume of mortality. Basal area per acre in the regressions are before thinning to correspond with gross yield. The length of each regression line indicates the total range in basal area at the given age. The first regressions were made at the end of the second thinning period. Earlier periods did not have a wide enough range in basal area to establish a meaningful relation. The lowest line on each chart, age 34 at Skykomish and 29 at Clemons, represents early stages of stand development. At the time, the total range in growing stock was only about 50 square feet per acre in each study area. During successive growth periods, growing stock became a much more important factor in cumulative wood production. During the 22 years shown in figure 16A at Skykomish, growing stock attained levels of 120 to 240 square feet per acre, a range of 120 square feet or about 2.4 times the range at age 34. During the same period, wood production attained levels of 9,000 to 13,500 cubic feet per acre, a range eight times as large as it was at age 34. Changes of about the same magnitude occurred at Clemons over the 21-year period from age 29 to 50 years. Figures 16A and 16B show the wide range in growing stock and volumes of wood produced from a single low level of growing stock (after preparatory thinning) followed by five thinnings in each regime and a holding period of 14 years. The amount of wood produced for a given change in growing stock increased with advancing age. This was a result of the increasing volume-basal area ratios produced by increasing tree size. This is illustrated in table 8 showing the increase in volume for each 10-square-foot addition in basal area on the regression lines in figures 16A and 16B.

These data illustrate the effect of a given increase or decrease in growing stock on production of wood over a wide range of stand ages and thinning regimes. For example, in the Skykomish study area, the indicated gain in volume was 327 cubic feet per acre for every increase of 10 square feet of basal area at stand age 56 years.

Table 8—Increase in gross volume per acre for each 10-square-foot increase in basal area per acre by stand age (figures 16A and 16B)

Skykomish		Clemons	
Stand age	**Increase in volume**	**Stand age**	**Increase in volume**
Years	*Ft^3/acre*	*Years*	*Ft^3/acre*
34	142	29	88
38	191	32	118
42	219	36	149
46	244	40	171
51	328	45	227
56	327	50	326

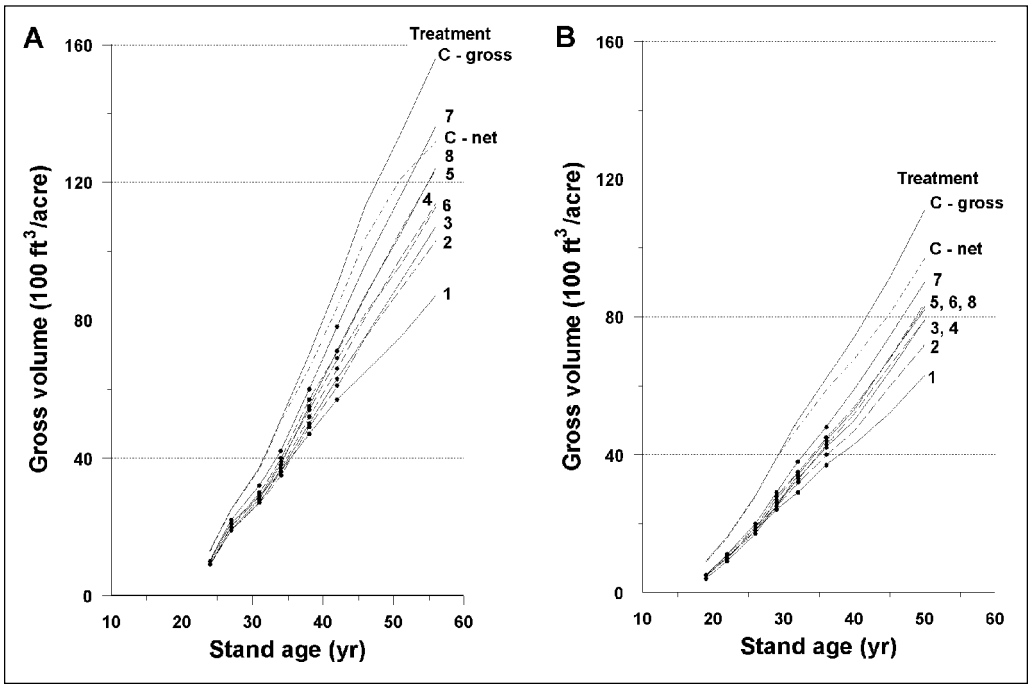

Figure 17—Gross yield of total stem volume by stand age and treatment with net and gross yield of the control for (A) Skykomish and (B) Clemons. Dots indicate time of thinning. Trend lines beyond last thinning show yield during 14-year period after thinning. Net yield (less mortality) also is given for the controls.

These incremental gains in volume per acre illustrate the opportunities for producing higher yields by managing stands at high levels of growing stock in this series of thinning regimes. Conversely, reduced growing stock resulted in less volume production.

The expanding range of gross volume per acre with successive thinnings is shown in the trends of yield in relation to stand age (figs. 17A and 17B). All regimes started with nearly the same volume at age 24 at Skykomish and 19 years at Clemons. The first treatment thinnings at 28 and 22 years for Skykomish and Clemons, respectively, produced a narrow range of volumes when only four levels of growing stock were present. With successive thinnings and advancing age, yields became more divergent,

Table 9—Skykomish: Cumulative yield through last thinning at age 42 with percentages in live stand, cut in thinning, and mortality

	Total stem volume			
Treatment[a]	Gross yield	Live stand	Cut	Dead
Number	*Ft³/acre*	*- - - - - - Percent - - - - - -*		
1	5,660	46	54	<1
2	6,124	63	36	1
3	6,259	60	39	1
4	6,568	77	23	0
5	7,085	74	25	1
8	7,122	70	28	2
7	7,830	80	19	1

[a] Listed according to severity of thinning based on prescribed amount of basal area retained in growing stock: 1, 10 percent; 2, 3, and 6 average 30 percent; 4, 5, and 8 average 50 percent; 7, 70 percent (table 1).

Table 10—Clemons: Cumulative yield through last thinning at age 36 with percentages in live stand, cut in thinning, and mortality

	Total stem volume			
Treatment[a]	Gross yield	Live stand	Cut	Dead
Number	*Ft³/acre*	*- - - - - - Percent - - - - - -*		
1	3,691	41	58	1
2	4,018	60	37	3
3	4,185	59	40	1
6	4,515	56	43	1
4	4,276	72	22	6
5	4,431	71	25	4
8	4,517	73	24	3
7	4,816	86	11	3

[a] Listed according to severity of thinning based on prescribed amount of basal area retained in growing stock: 1, 10 percent; 2, 3, and 6 average 30 percent; 4, 5, and 8 average 50 percent; 7, 70 percent (table 1).

and regimes 1 and 7 were consistently lowest and highest. At age 56, regime 7 at Skykomish produced 56 percent more wood than regime 1. At age 50, regime 7 at Clemons produced 43 percent more than regime 1.

Yield from thinnings—The volumes produced by thinnings were a substantial portion of total wood production and inversely related to levels of growing stock retained. The proportions of gross yield in live growing stock, cut in thinning, and lost to mortality are shown in tables 9 and 10. At the lowest levels of growing stock (treatment 1), thinnings composed 54 and 58 percent of the total yield at Skykomish and Clemons, respectively. At the highest level of growing stock, they were only 19 and 11 percent of the total

yield. Details of the volume lost to mortality are given in a subsequent section of the report. The cumulative volumes of thinnings in relation to stand age are shown in figures 18A and 18B. These trend lines are opposite to the basal area trends in figures 4A and 4B. The constant percentage treatments 1, 3, 5, and 7 (table 1) produced consistently increasing yields of thinnings. The variable treatments produced different trends of yield in early and late thinnings. To illustrate these differences, thinnings yields were summarized for the first and last half of the thinning cycles for each treatment. The first, second, and one-half of the third thinning were included in the first half, the balance in the last half. The percentages of thinning yields were similar within each group of treatments; i.e., constant (treatments 1, 3, 5, and 7), variable increasing (treatments 2 and 4), and variable deceasing (treatment 6 and 8). Also these percentages were nearly the same for comparable treatments at both Skykomish and Clemons. Consequently, they were combined to show the approximate proportions of thinning yields as follows:

	Percentage of thinning yield	
Treatment	**First half of thinning period**	**Last half of thinning period**
1, 3, 5, and 7	44	56
2 and 4	64	36
6 and 8	31	69

These distributions of yield from thinnings have some important implications in stand management, not just because of differences in volume, but also the sizes of trees that were cut in early and late thinnings. At Skykomish the average volume per tree was 4 to 11 cubic feet in the first half of the thinnings, and 9 to 28 in the last half. An exception was treatment 1, which included one thinning with 52 cubic feet per tree where extremely low stocking resulted in removal of large trees. In the younger stands at Clemons, the early and late thinnings averaged 2 to 9 and 7 to 17 cubic feet per tree, with one exception of 29. When wood production is a primary goal of stand management, the choice between 64 percent of thinnings in small trees, or 69 percent in large trees, or a more even distribution of yields could be a major consideration in designing a silvicultural regime.

Gross volume increment—Gross PAI in cubic feet in relation to growing stock by stand age is shown in figures 19A and 19B. The first three growth periods were not included because of the narrow range in basal area and resulting short regression lines. Growth in all periods increased substantially with increases in grow-ing stock. The last two periods when no thinning was done show irregular changes with increasing age: at Skykomish, growth rates were similar, but at Clemons growth was greater than during previous periods. These changes in growth rate are a response to termination of the thinning regimes. Volume increments during the last two periods were 60 to 90 percent more in highest levels of growing stock than in the lowest levels.

Gross PAI and MAI—Gross PAI for each of the eight growth periods in each treatment and control is shown in figures 20A through 20D in relation to stand age. Periodic increments (gross PAI) are the average of three sample plots in each treatment, and consist of the change in volume reserved for growing stock (reserve PAI), cut in thinning, and mortality. Mortality is included with cut when thinning was done. These volumes correspond with similar patterns of basal area reserved as shown in figures 15A and 15B.

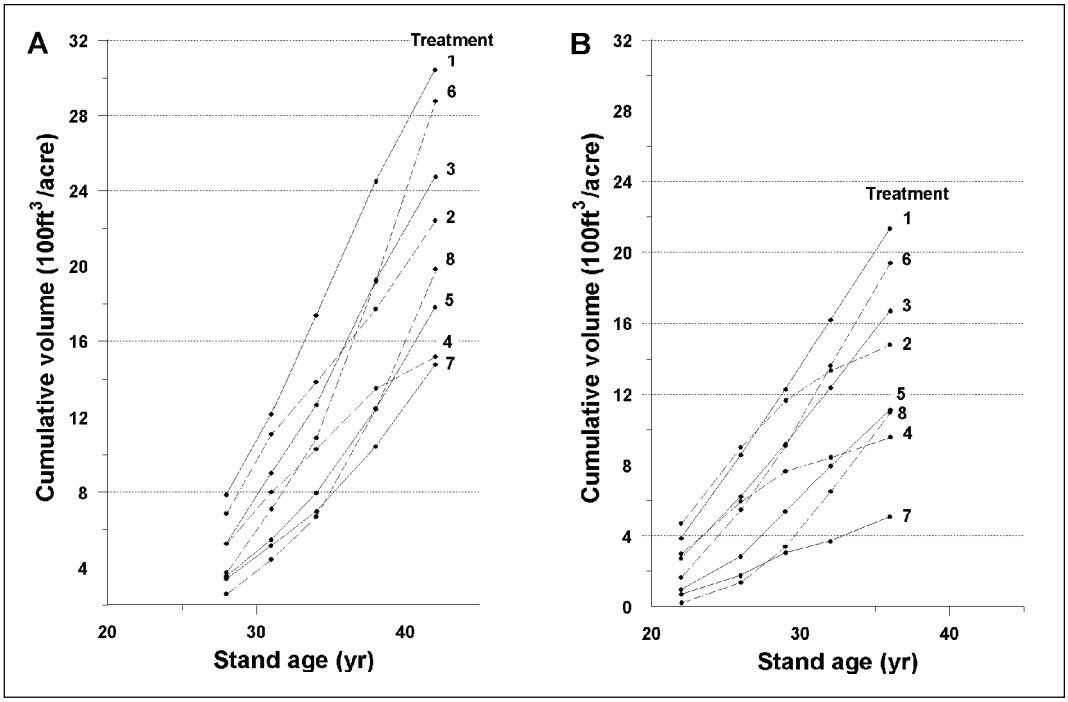

Figure 18—Cumulative total stem volume removed in thinning by stand age and treatment for (A) Skykomish and (B) Clemons. Dots indicate time of thinning.

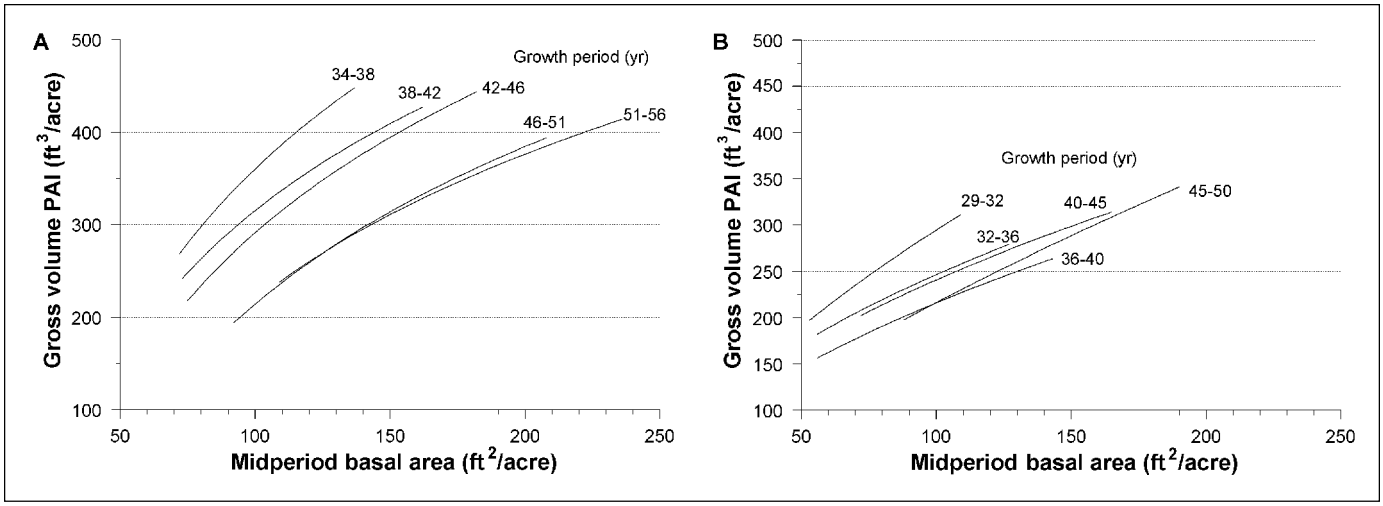

Figure 19—Gross periodic annual increment (PAI) in total stem volume by growth period in relation to midperiod basal area for (A) Skykomish and (B) Clemons. Length of regression lines show range in basal area at each growth period.

Trend lines of gross MAI show steady increases in all treatments and controls through the entire period of study. During the last growth period of 5 years, the increase in MAI ranged from 6 to 11 percent indicating that the maximum growth is several years away. Controls also increased about 7 percent, so currently there is no indication that growth of the managed stands will peak at a different age. The highly variable intensities of thinning had no apparent adverse effect on the stability of gross MAI.

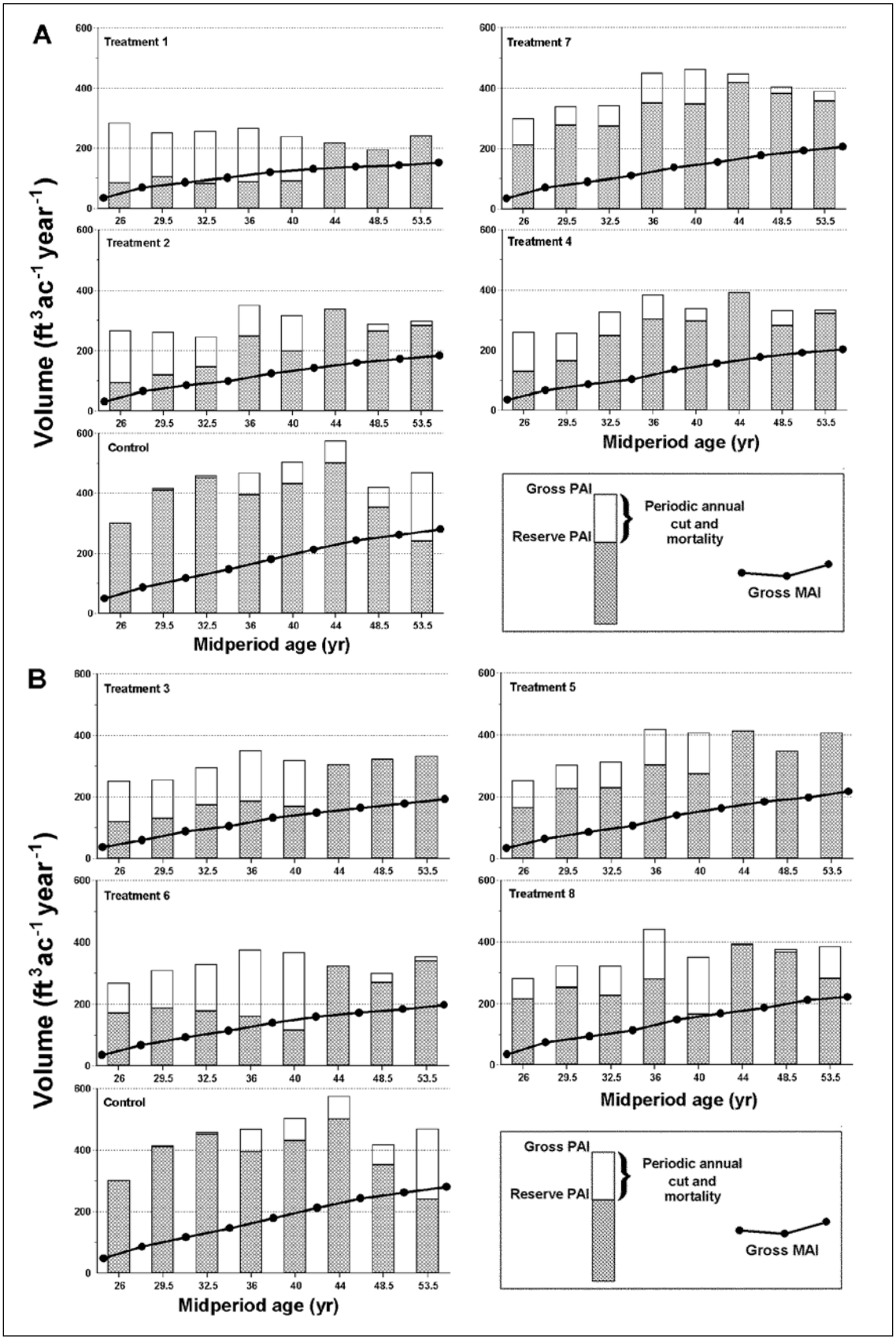

Figure 20—Periodic annual increment (PAI) and gross mean annual increment (MAI) in total stem volume per acre by treatments for (A) Skykomish treatments 1, 2, 4, and 7; (B) Skykomish treatments 3, 5, 6, and 8. Allocation of cut and leave is shown for each thinning. Each bar shows the volume cut, plus mortality and the amount reserved (net); for controls, the mortality and net growth.

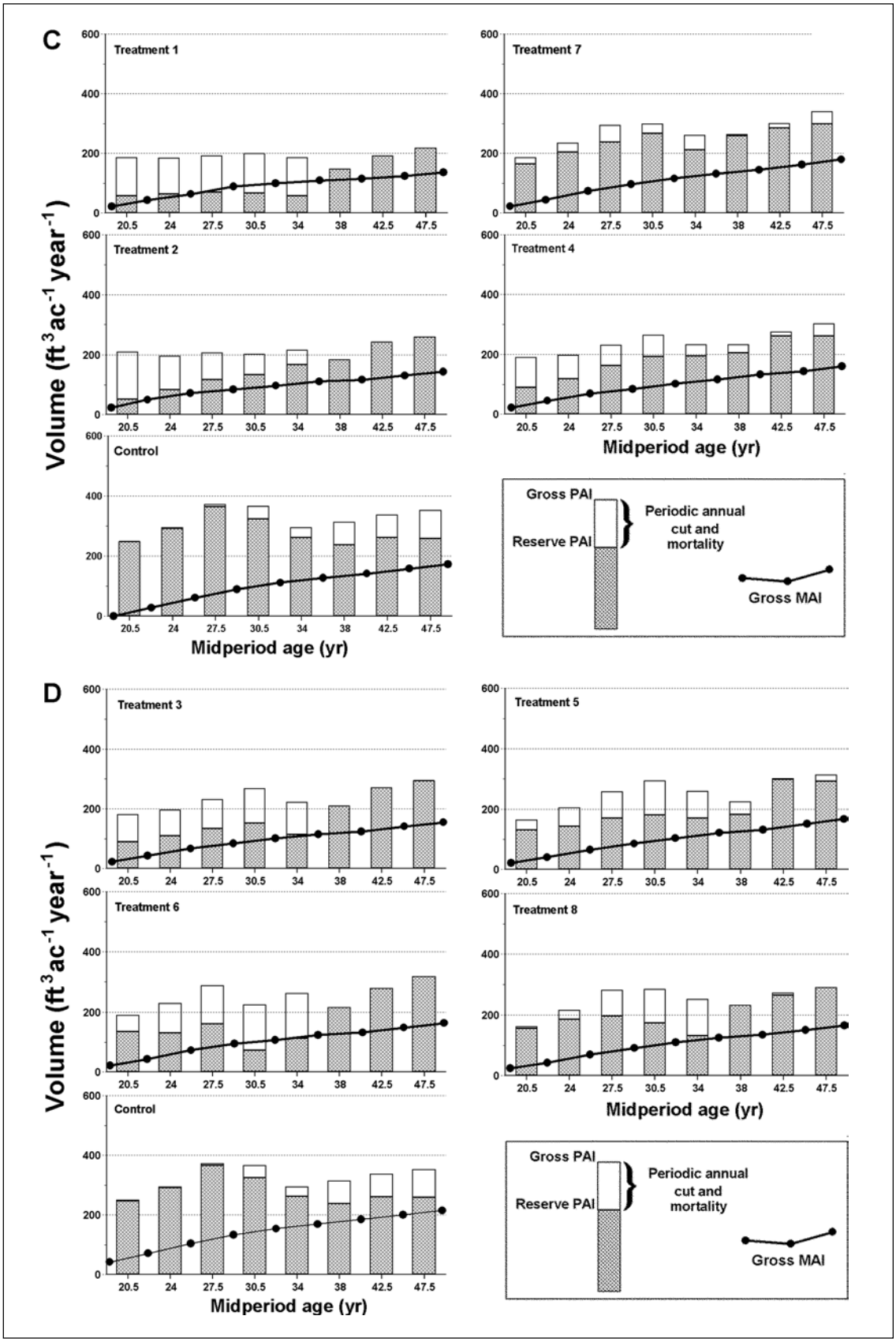

Figure 20 continued—Periodic annual increment (PAI) and gross mean annual increment (MAI) in total stem volume per acre by treatments for (C) Clemons treatments 1, 2, 4, and 7; and (D) Clemons treatments 3, 5, 6, and 8. Allocation of cut and leave is shown for each thinning. Each bar shows the volume cut, plus mortality and the amount reserved (net); for controls, the mortality and net growth.

Tree Size

The second objective of the LOGS studies is to determine how the amount of growing stock in repeatedly thinned stands affects tree size. This analysis included tree size as quadratic mean d.b.h. and volume by d.b.h. classes. Figure 21 shows mean d.b.h. in relation to basal area per acre for the last six growth periods. Earlier measurements did not cover a sufficient range to establish relations. These regressions show consistent reductions in mean d.b.h. as growing stock increases across regimes. These trends are illustrated in figure 22 where mean d.b.h. for each treatment is shown in relation to stand age. Some crossing of trend lines shows a change in relative position of mean d.b.h. among treatments, but after the third thinning when all levels of growing stock were developed, the different trends in tree size were well defined. Mean d.b.h. of the thinned stands showed increasing divergence from the unthinned stands.

The total change in quadratic mean d.b.h. for all regimes is given in table 11 for Skykomish and table 12 for Clemons. At Skykomish after the preparatory thinning at age 24, the mean d.b.h. ranged from 5.0 to 5.5 inches. After five thinnings and 32 years, the smallest mean d.b.h. was 15.4 inches in treatments 5 and 8, and the largest was 21.0 in treatment 1. At Clemons the initial d.b.h. ranged from 4.0 to 4.2 inches, and 31 years later, the smallest was 11.7 in treatment 8 and the largest was 18.1 in treatment 1. These increases in mean d.b.h. consist of the immediate change caused by reducing the numbers of trees at each thinning, plus the net periodic growth; i.e., growth of survivors (Curtis and Marshall 1989). A small amount of mortality subtracted periodically from the stand had virtually no effect on mean d.b.h. The cumulative increase resulting from removal of trees in five thinnings at Skykomish ranged from 0.2 to 2.3 inches and zero to 1.7 inches at Clemons. About one-third of the thinnings did not change the mean d.b.h. of the stands. This was the intended result of the marking guide, which specified that the mean d.b.h. of noncrop trees should be the same before and after thinning (see section on stand treatments). Most thinnings were taken from the noncrop component of the stand, which represented virtually the entire range of diameters. About 70 percent of the thinnings had d/D ratios larger than 0.90, which produced small changes in mean d.b.h., but net periodic growth accounted for practically all of the increase in mean d.b.h. The range of mean annual growth rates among the eight regimes was only 0.30 to 0.42 inch at Skykomish and 0.24 to 0.43 inch at Clemons. The cumulative result was a difference of 5.6 inches between the smallest and largest mean d.b.h. at Skykomish, and 6.4 inches at Clemons.

The long-term effect of thinning on tree size is shown by the range of diameters in each regime (app. tables 42 and 58) compared with the nonthinned stands. In the Skykomish study area, maximum diameters in thinned stands were larger than controls in all regimes except treatment 2, which was 1 inch less than the largest in controls. This regime had a comparatively high proportion of hemlock with most of the trees in the 12- to 18-inch d.b.h. classes. Across all regimes there was no apparent trend in maximum size related to levels of growing stock. A narrower range of diameters was produced at Clemons, probably because the stand is younger than the stand at Skykomish. However, the largest trees in treatment 1 and treatment 2 at 25 inches d.b.h. were equal to the largest in the unthinned stands.

The long-term effect of thinning on tree size is demonstrated further by the distribution of volume by d.b.h. class. The cubic volume per acre in the reserved stand in each regime is shown in figures 23A and 23B for d.b.h. classes 6 to 12 inches, 12 to 18 inches, and 18 inches and larger. These were volumes of the live stands at the last measurement, ages 56 and 50 for Skykomish and Clemons, respectively, and do not include thinnings. These charts also show the trends of increasing total volume with

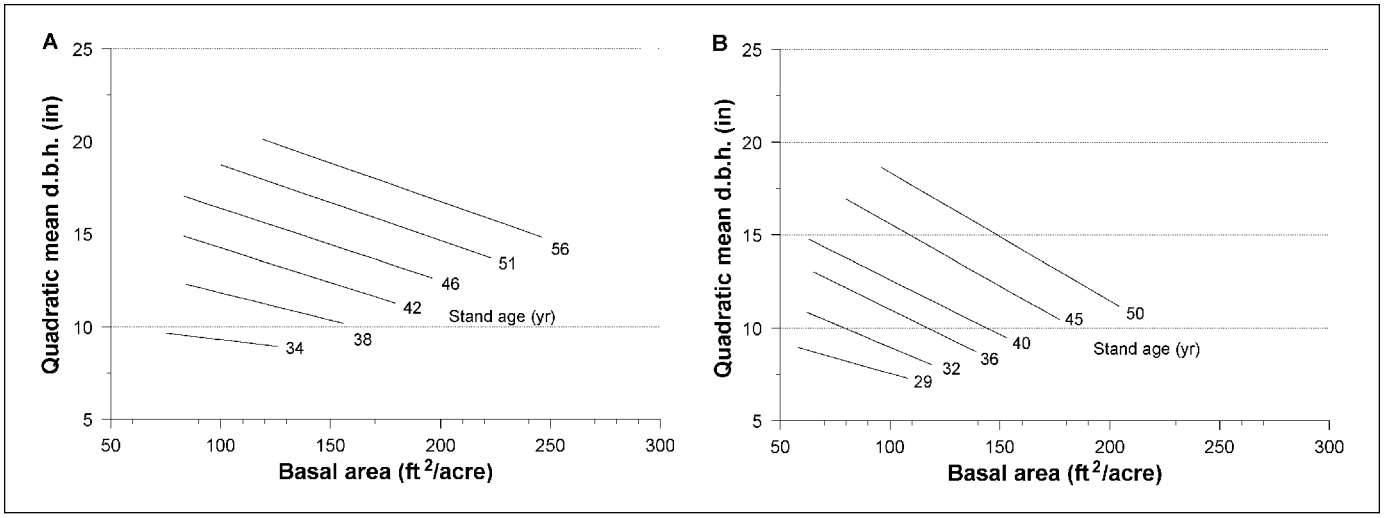

Figure 21—Quadratic mean diameter at breast height (d.b.h.) by stand age in relation to basal area for (A) Skykomish and (B) Clemons. Length of regression line corresponds with range in basal area at each age.

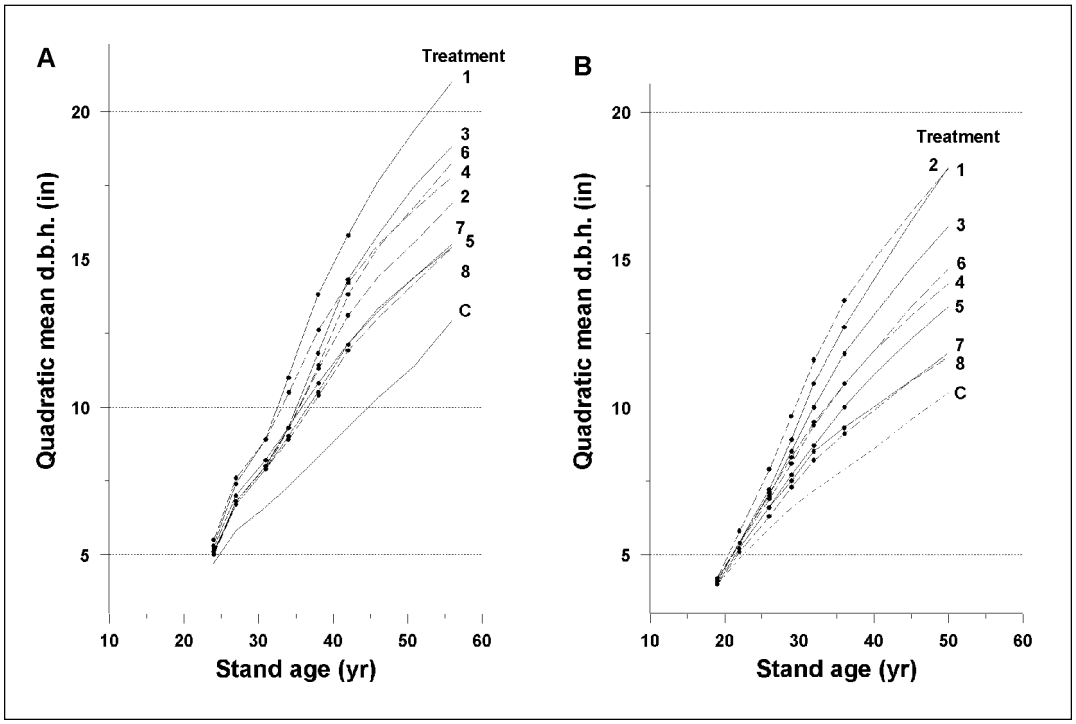

Figure 22—Trends in quadratic mean diameter at breast height (d.b.h.) by treatment and stand age for (A) Skykomish and (B) Clemons. Trend lines beyond last thinning show increases in mean d.b.h. during 14-year period after the last thinning. Dots indicate time of thinning.

Table 11—Skykomish: Increase in quadratic mean diameter at breast height (d.b.h.) in relation to basal area during 32-year period from age 24 to 56 for LOGS treatments and control

	Age 24		Age 56				
Treatment[a]	Basal area	Mean d.b.h.[b]	Basal area	Mean d.b.h.[b]	Increase from thinning[c]	32-year growth[d]	Mean annual growth
Number	*Ft²*	*Inches*	*Ft²*	*Inches*			
1	51	5.3	119	21.0	2.3	13.4	0.42
2	50	5.0	160	16.8	.9	10.9	.34
6	51	5.0	168	18.3	1.9	11.4	.36
3	51	5.0	173	18.8	2.2	11.6	.36
8	51	5.1	196	15.4	.5	9.8	.31
4	51	5.5	199	17.8	1.4	10.9	.34
5	51	5.1	218	15.4	.6	9.7	.30
7	51	5.2	244	15.5	.2	10.1	.32
Control	72	4.7	271	12.9	—	8.2	.26

[a] Listed in order of increasing basal area per acre at age 56. Two groups of treatments (2, 6, 3 and 8, 4, 5) had converging basal area trends in the fifth growth period (see fig. 4).
[b] Mean d.b.h. is the quadratic mean d.b.h.
[c] Cumulative change in quadratic mean d.b.h. resulting from cutting in five thinnings.
[d] Increase in d.b.h. from age 24 to 56 minus change from cutting (i.e., net growth for 32 years).

Table 12—Clemons: Increase in quadratic mean diameter at breast height (d.b.h.) in relation to basal area during 31-year period from age 19 to 50 for LOGS treatments and control

	Age 19		Age 50				
Treatment[a]	Basal area	Mean d.b.h.[b]	Basal area	Mean d.b.h.[b]	Increase from thinning[c]	31-year growth[d]	Mean annual growth
Number	*Ft²*	*Inches*	*Ft²*	*Inches*			
1	37	4.1	101	18.1	0.7	13.3	0.43
2	38	4.2	133	18.0	1.7	12.1	.39
3	36	4.1	142	16.1	1.2	10.8	.35
6	37	4.1	147	14.6	.4	10.1	.33
4	37	4.2	156	14.2	.0	10.0	.32
5	34	4.0	171	13.5	.2	9.3	.30
8	34	4.0	275	11.7	.2	7.5	.24
7	35	4.0	195	11.8	.1	7.7	.25
Control	60	4.0	230	10.5	—	6.5	.21

[a] Listed in order of increasing basal area per acre at age 50. Two groups of treatments (2, 6, 3 and 8, 4, 5) had converging basal area trends in the fifth growth period (see fig. 4).
[b] Mean d.b.h. is the quadratic mean d.b.h.
[c] Cumulative change in quadratic mean d.b.h. resulting from cutting in five thinnings.
[d] Increase in d.b.h. from age 19 to 50 minus change from cutting (i.e., net growth for 31 years).

increasing levels of growing stock. From the standpoint of wood production, however, the more important consideration is the distribution of volume by tree size that would be available for harvest. At Skykomish (fig. 23A), volumes in trees 12 inches and larger increased with increasing levels of growing stock, but in trees 18 inches and larger, the trends were more erratic. Treatment 2 produced the lowest volume in trees 18 inches and larger, which was about equal to the unthinned control. Other regimes produced up to nearly 2,400 cubic feet per acre more (about 50 percent) than the controls in the same large-diameter class. Total volumes of trees in the 18-inch-and-larger class did not show a consistent relation to levels of growing stock. Apparently they developed more as a result of selection in thinning. When the volumes of 12- to 18-inch trees were included, only one thinned stand produced more than the control. That was regime 7, which had the highest level of growing stock. Treatment 5 was close with about 1,000 cubic feet per acre less (about 9 percent) than the unthinned stand. When the volumes of the 6- to 12-inch trees are included, the total live volume in the unthinned stand was about 1,700 cubic feet per acre greater (about 15 percent) than treatment 7. This extra volume in small trees probably is worth much less than the higher volumes in larger trees in the thinned stands. Thinned stands have the advantage of concentrating the volume on fewer trees. Treatment 7 at Skykomish had 188 trees per acre vs. 304 in the unthinned stand (app. table 36).

The distribution of volume in the 18-inch-and-larger d.b.h. class shows different trends in the two study areas. At Skykomish, the low levels of growing stock, treatments 1 and 2, produced less volume than other thinned stands. Conversely, at Clemons the high levels of growing stock, treatments 7 and 8, produced less volume in the 18-inch-and-larger d.b.h. class than other thinned stands (fig. 23B). The current stand structures at Clemons appear to be at a stage of stand development that will become more like the stands at Skykomish as more trees move into larger size classes. At the present stand age of 50, the volume in trees 18 inches and larger shows a downward trend with increasing growing stock. All regimes except treatments 7 and 8, however, have produced more volume than the control in these large-diameter classes. When trees in the 12- to 18-inch classes are included, the total volume increases with increased growing stock in a trend similar to that at Skykomish. Also, the volume in regime 7 is equal to that of the unthinned control. When trees in the 6- to 12-inch classes are included, the total live volume per acre in the control stands exceeds treatment 7 by 1,300 cubic feet, or 16 percent, nearly the same percentage as Skykomish.

The distribution of tree sizes in the total net yield (remaining volume and thinnings) of each regime is shown in figures 24A and 24B for Skykomish and Clemons, respectively. The difference between these charts and those for live stand (figs. 23A and 23B) is the addition of trees that were cut in thinnings.

In both study areas, the long-term effect of thinning on tree size has been a pronounced restructuring and high concentration of volume in large trees. All thinning regimes at Skykomish and six of the eight regimes at Clemons have produced as much or more volume in 18-inch-diameter-and-larger trees than the unthinned controls in similar sizes of trees. In diameter classes of 12 inches and larger, regime 7 in both areas produced about the same as the controls, but with about one-third fewer trees. With larger and fewer trees, the thinned stands in most regimes have the additional advantages of faster growth rates (figs. 20A and 20B) and less future loss from suppression mortality than the dense unthinned stands. The thinned stands have distinctly different structures and growth characteristics than the unthinned stands. Although started from the same stand, the present thinned and unthinned stands have developed into virtually different

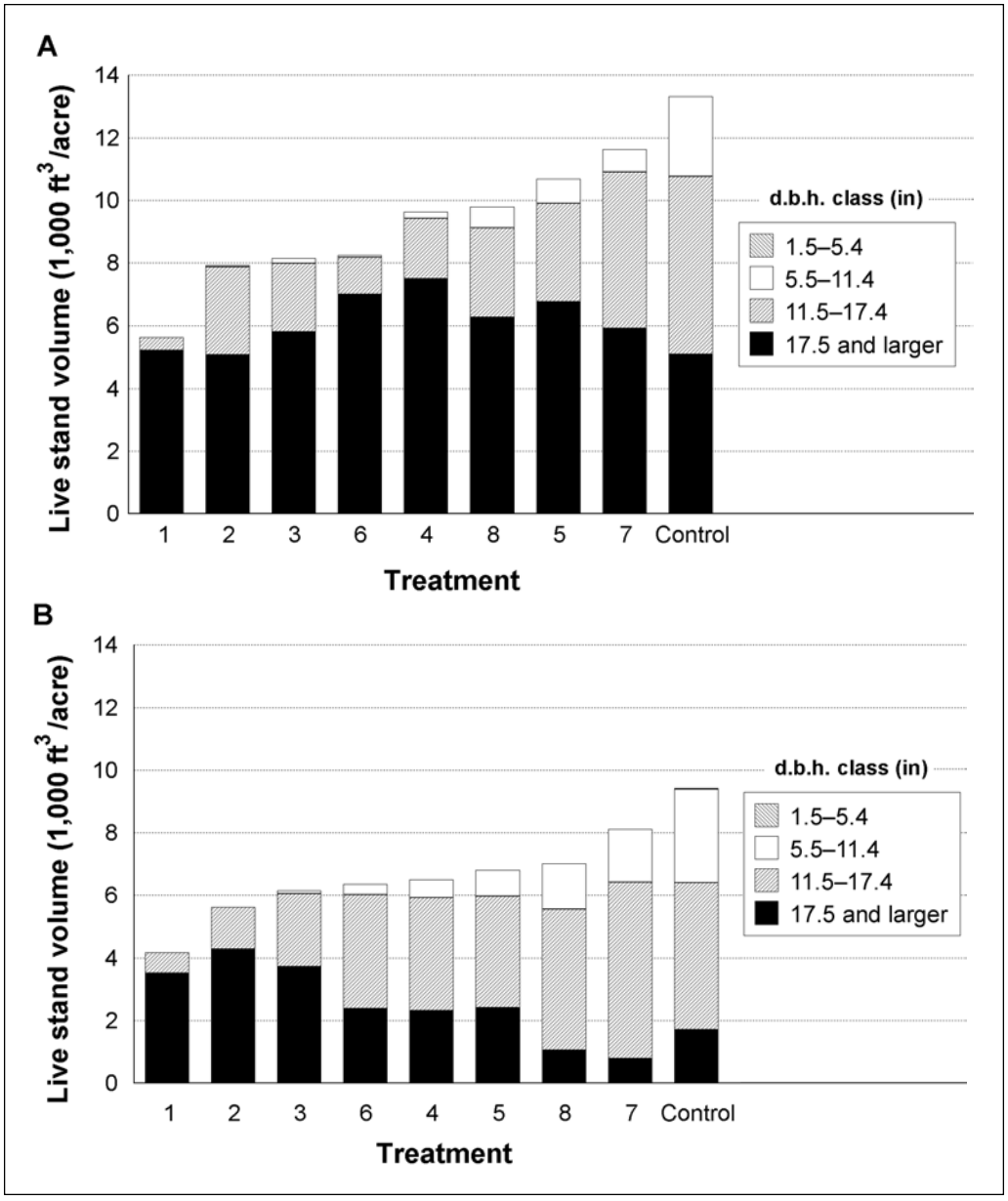

Figure 23—Distribution of total stem volume by tree diameter at breast height (d.b.h.) and stand treatment for live stand for (A) Skykomish at age 56 and (B) Clemons at age 50.

populations of trees. The development of these thinned stands with a wide range in levels of growing stock has demonstrated the opportunities for producing future stands with desired structures and yields for various management objectives.

Growth-Growing Stock Ratios

The third major objective of the LOGS studies is to determine how the amount of growing stock in repeatedly thinned stands affects growth-growing stock ratios. To examine these relations, the growth-growing stock ratios were expressed as net growth percentages, which indicates the relative efficiency of the growing stock. The standard calculation of growth percentages in LOGS is Pressler's formula, the ratio of periodic annual

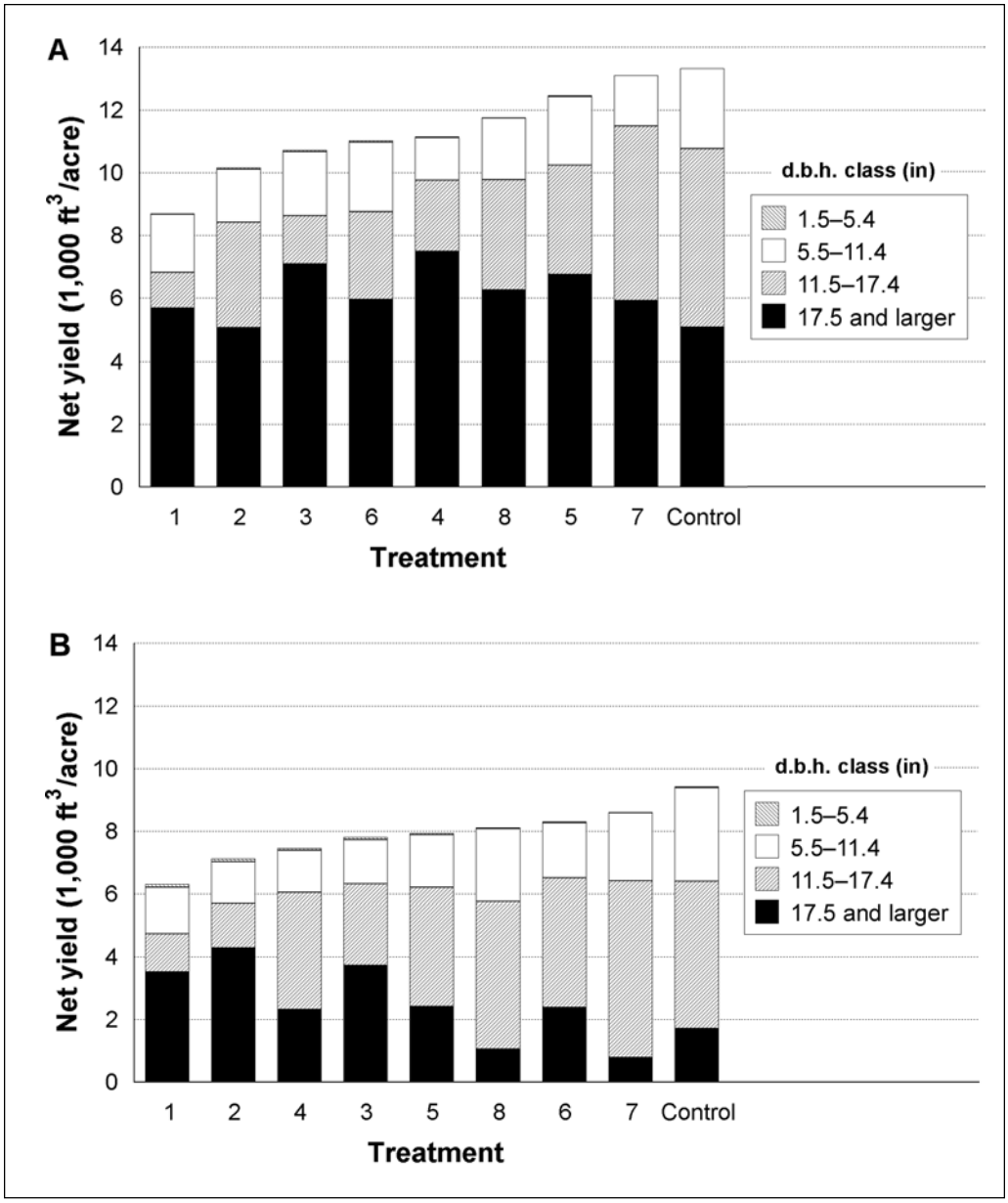

Figure 24—Distribution of total stem volume by tree diameter at breast height (d.b.h.) and stand treatment for net yield (live stand plus thinnings) for (A) Skykomish at age 56 and (B) Clemons at age 50.

volume growth to midperiod volume per acre where midperiod volume is estimated by averaging volumes at the beginning and end of the growth period. (Chapman and Meyer 1949). By this method, growth percentage is less than compound interest by about one percentage point for growth periods up to 5 years. Larger differences occur in longer periods. These growth percentages may be interpreted as periodic annual growth in cubic feet per 100 cubic feet of growing stock; i.e., growth per unit of growing stock. In this context these expressions of growth percentage also are a conservative estimate of interest on capital invested in growing stock, which relates to Staebler's (1967) management objectives.

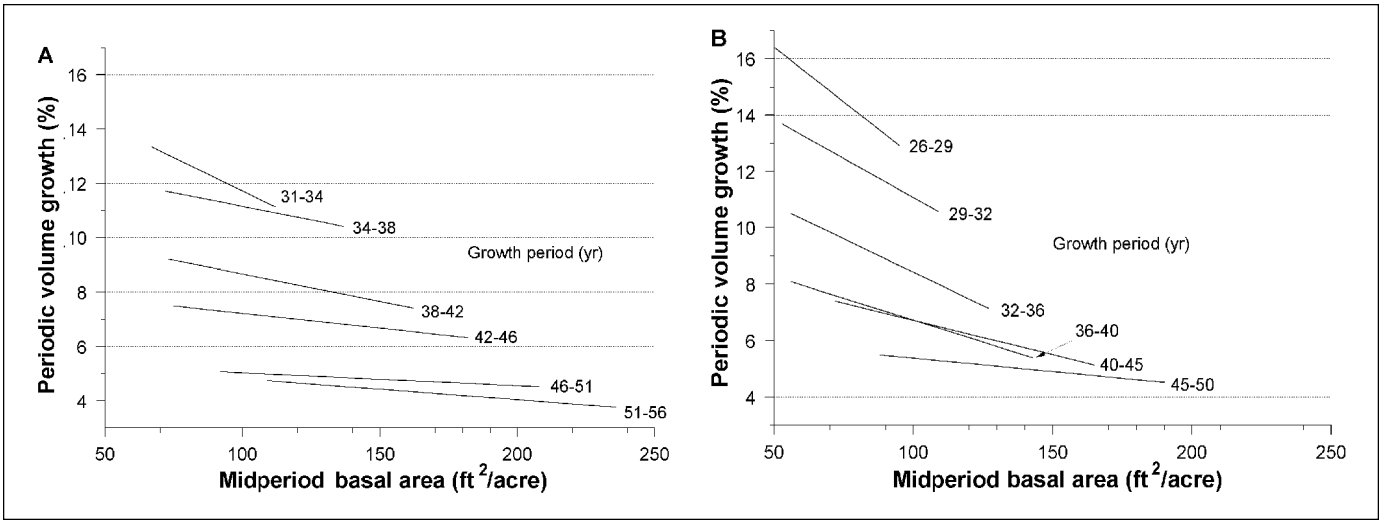

Figure 25—Total stem volume growth percentage by growth period in relation to midperiod basal area for (A) Skykomish and (B) Clemons. Regression lines span the range of basal area at each period of stand age.

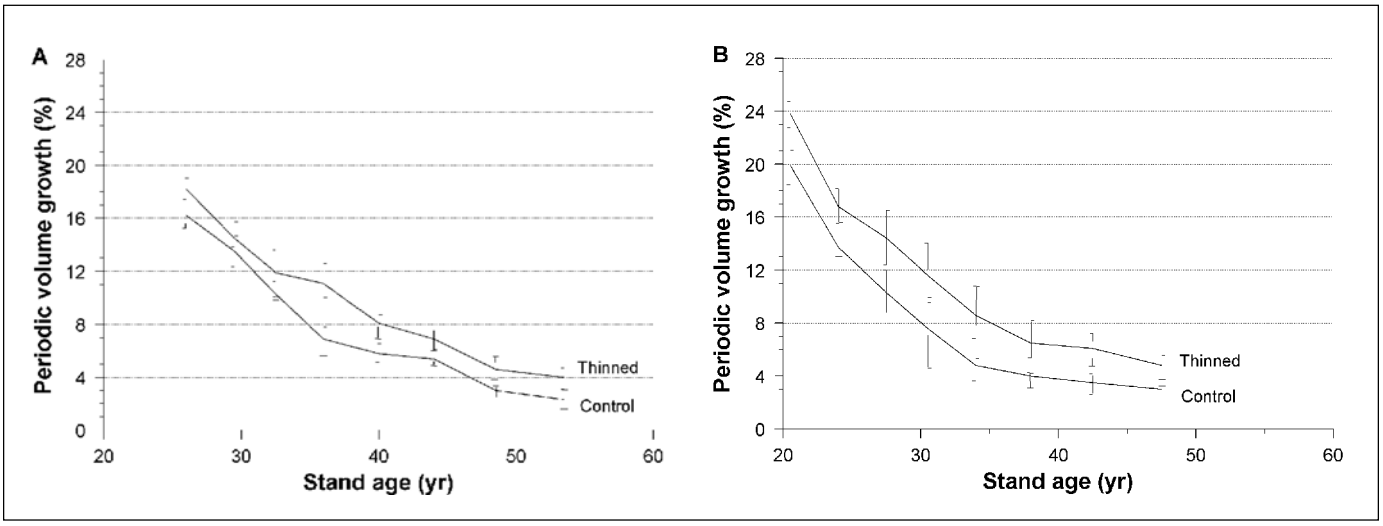

Figure 26—Trends of periodic total stem volume growth percentage by stand age for thinned plots and controls for (A) Skykomish and (B) Clemons. Vertical lines show range of growth percentage for each category of stands.

The relation of volume growth percentage to the amount of growing stock is shown by growth period in figures 25A and 25B. Two distinct trends are evident in all thinned stands: (1) growth percentage was reduced by increases in growing stock in each successive growth period, and (2) growth percentage decreased rapidly with increasing age of stands. The continuous decline in growth percentage is displayed also in figures 26A and 26B showing trends for thinned and unthinned stands. In thinned stands at Skykomish, growth percentage dropped from 17 percent to 4 percent over a period of about 30 years. At Clemons, the change was from about 24 percent to 5 percent. Both types of stands followed nearly parallel trends with unthinned stands at lower levels of growth percentage. These differences indicate that repeated thinning produced higher growth-growing stock ratios by eliminating slower growing trees and releasing better

trees for growth response. The trends of growth percentage in both types of stands illustrate the natural characteristic of stand development where periodic annual growth (PAI) slows as growing stock accumulates. The inevitable result is a gradual reduction in growth-growing stock ratios. Repeated thinning produced more efficient stands with consistently higher ratios than unthinned stands but with similar declining trends.

Further comparisons of thinned and unthinned stands are given in table 13 showing the distribution of growth percentage for a sample of individual trees from each regime. The growth percentages were calculated for the fifth growth period, which was the last period of thinning and the beginning of the postthinning holding period. This period was chosen because the cumulative result of five thinnings should have left reserve stands of the highest quality and most vigorous trees that could be developed from the initial stands. Individual trees in these final stands survived the scrutiny of selection in five thinnings. Therefore they should have uniformly high growth rates and a narrow range of growth percentage compared to the survivors in unthinned stands. These sample trees (table 13) had been measured for total height (not estimated) and represent the range of diameters but not necessarily the frequency of diameters. The mean growth percentage for trees in thinned stands was higher than for those in unthinned stands as shown in figure 26. However, the differences between high and low growth percentages, plus comparatively high variability in thinned stands indicates that several trees with slow growth remained even after five thinnings. This is the unfortunate result of the method of thinning that required a d/D ratio of 1 for both noncrop trees and cut trees evenly distributed across diameter classes (see “Stand Treatments” section in this report). This procedure resulted in uniformity of treatments, but it also restricted selection so that some of the better trees were cut and some poor growers were retained through the entire thinning cycle.

The range and variability of growth percentage (table 13) provides a basis for estimating the possible increase in mean growth percentage that could have been obtained if current growth had been a determining factor in selection of trees to be cut or retained. The importance of current growth of individual trees as a guideline for selection in thinning is illustrated in the following hypothetical example. With the existing difference between high and low growth percentages, an increase of two percentage points in mean growth percentage appears reasonable and achievable over five thinnings. We assume growth percentages in treatments 1, 3, 5, and 7 could have been two percentage points higher in the fifth period. At the same level of growing stock but different stand structures, the increase in average PAI would have been about 86 cubic feet at Skykomish and 55 cubic feet at Clemons. These improvements would have made 24 percent more wood per acre annually in each area during the fifth period. Smaller increases in yield could have occurred during earlier periods as well. An added benefit would have been a higher growth rate during the postthinning holding period. The procedures followed in these studies produced substantial improvements in growth-growing stock ratios, but the yields might have been improved with different methods of thinning.

Postthinning Holding Period

Thinning regimes were completed after 18 years at Skykomish and 17 years at Clemons, which included five thinnings in each area. The reserved stands were held for continued measurements over a period of 14 years. During this postthinning holding period, measurements were made at 4, 9, and 14 years. Including the thinning cycle, the total period of observation was 32 years at Skykomish and 31 years at Clemons.

Table 13—Comparison of thinned and control stands based on total stem volume growth percentage for individual trees in the fifth growth period[a]

Study area	Trees	Volume growth				
		High	Low	Mean	SD[b]	CV[c]
	Number	*- - - - - - - - - - - - - Percent - - - - - - - - - - - - -*				
Skykomish:						
Thinned	52	12.5	5.7	8.4	1.6	19
Control	14	9.7	3.5	6.8	1.9	27
Clemons:						
Thinned	60	12.7	3.9	8.8	2.0	23
Control	25	7.5	2.8	5.5	1.3	24

[a] Fifth growth period was the period of the last thinning; Skykomish stand age 38 to 42, Clemons stand age 32 to 36 years.
[b] SD = standard deviation.
[c] CV = coefficient of variation.

The stands that remained after the last thinning had survived through repeated selections of trees to be cut in the preparatory and five subsequent thinnings. Consequently, these reserved trees should have been the highest quality that could be produced by the LOGS prescriptions in the given initial stands. The long-term benefits of thinning are demonstrated by development of these valuable stands during the postthinning holding period. In both study areas, net PAI during the last 5 years was equal to or greater than controls in all regimes except treatment 1 at Clemons. The largest differences were in treatment 5 at Skykomish and treatment 6 at Clemons where net PAI in the thinned stands exceeded controls by 166 and 57 cubic feet, respectively (figs. 20A and 20B). These excellent growth rates illustrate the advantages of holding these stands to accumulate high-quality wood for several years after thinning regimes are completed.

Stand volume increments were closely related to levels of growing stock that remained after the last thinning; i.e., at the beginning of the hold period. (fig. 27). For example, treatment 1 at Skykomish with 68 square feet of basal area produced 3,050 cubic feet per acre in 14 years. In the same period, treatment 7 with 167 square feet of basal area produced 5,749 cubic feet, or 88 percent more gross increment in the higher level of growing stock. Within each growth period, the volume increment increased with increasing growing stock. When those increments were expressed as percentages of initial volume, however, the percentage increase was virtually the same for all regimes in the first 4-year growth period. As the period of growth after thinning progressed, the amount of added volume in each regime was more variable, but the averages by period provide a close approximation for all regimes (table 14). A holding period of 4 years would have produced about 30 percent additional volume. Extending the holding period to 9 years would have produced about 70 percent additional volume. If the holding period was continued to 14 years, these stands would have produced at least twice the standing volume per acre present after the last thinning.

Although the lowest levels of growing stock produced the least volume during the postthinning holding period, they produced the largest increases in average d.b.h. (fig. 28). At Skykomish, treatment 1 increased from 15.8 to 21 inches, a gain of 5.2 inches in

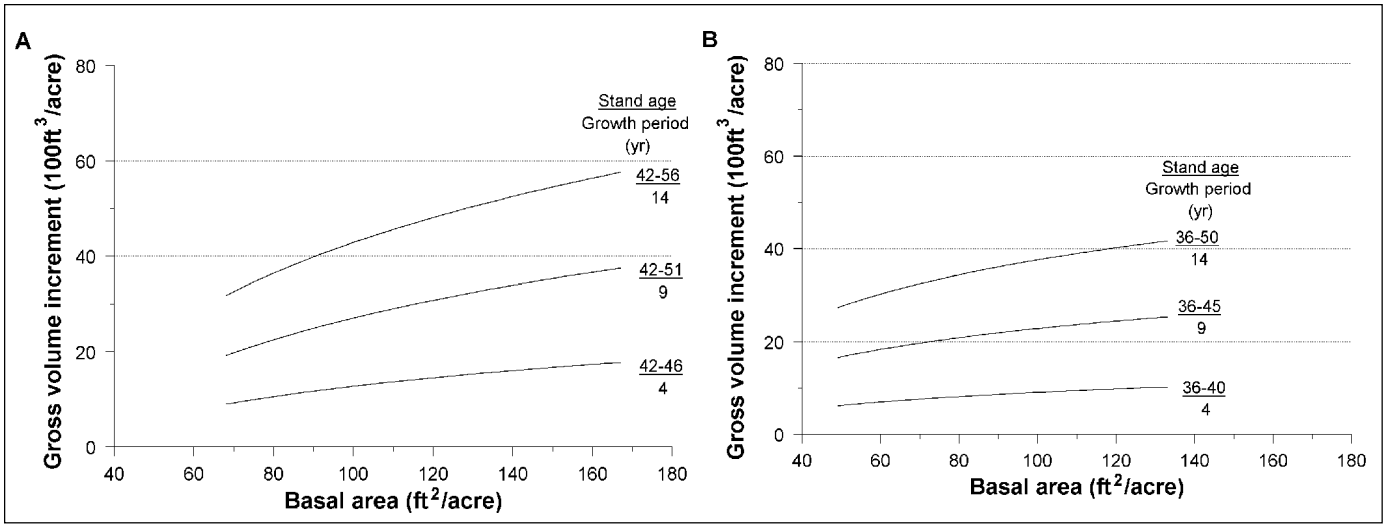

Figure 27—Gross total stem volume increment for 4, 9, and 14 years after the last thinning in relation to basal area after the last thinning for (A) Skykomish and (B) Clemons.

Table 14—Average percentage increase in gross total stem volume per acre by period of growth after last thinning[a]

	Skykomish		Clemons	
Growth period	Increase in volume	Standard deviation	Increase in volume	Standard deviation
Years	*Percent*		*Percent*	
4	32	2	31	4
9	69	5	80	13
14	108	10	134	22

[a] Based on increase in gross total stem cubic-foot volume per acre in 8 regimes in each study area.

quadratic mean d.b.h. in 14 years. In the same period, treatment 7 increased 3.4 inches. At Clemons, comparable gains were 5.4 and 2.5 inches for treatment 1 and treatment 7, respectively.

Along with increases in yield and tree diameters, the average volume per tree increased in roughly the same proportions as volume per acre. The average volume per tree in all thinned stands at Skykomish were at 37 cubic feet at the beginning and 80 cubic feet at the end of the holding period (app. tables 36–39). Comparable volumes per tree at Clemons were 21 and 50 cubic feet (app. tables 52 and 55). Comparisons with unthinned stands show the much larger gains in volumes per tree that resulted from thinning. During the 14-year holding period, average beginning and ending volumes per tree in unthinned stands at Skykomish were 18 and 44 cubic feet. At Clemons they were 11 and 24 cubic feet. In each area the thinned stands produced average tree sizes about twice as large as those in unthinned stands. These differences in tree size could be decisive factors in length of the holding period. Continued stability of the managed stand during the holding period was another long-term benefit of thinning.

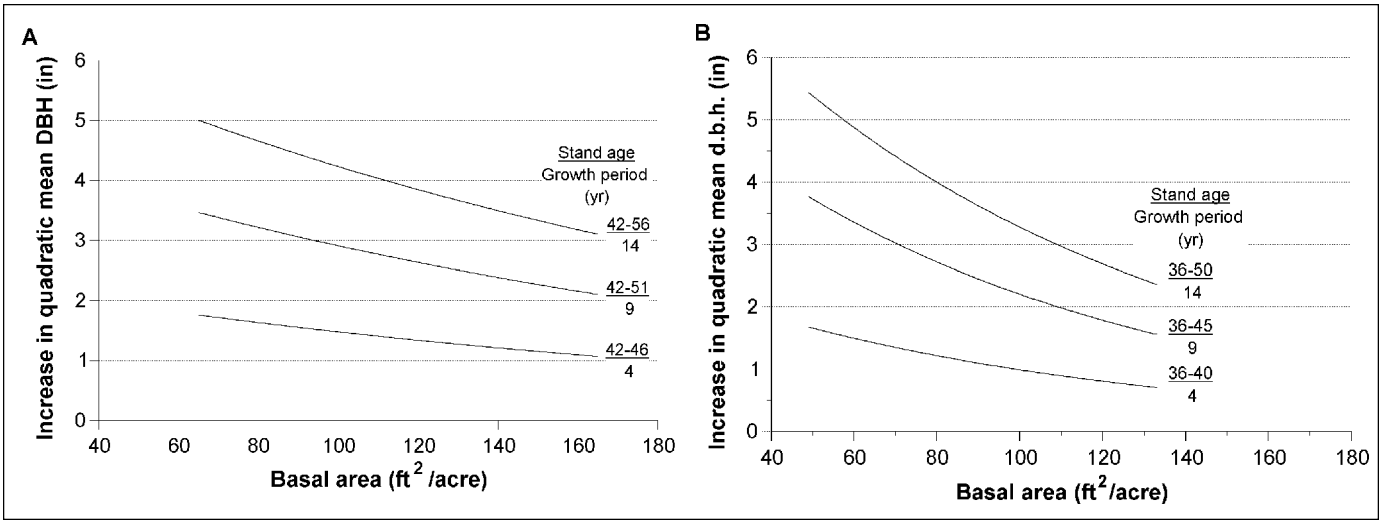

Figure 28—Increase in quadratic mean diameter at breast height (d.b.h.) for 4, 9, and 14 years after the last thinning in relation to basal area after the last thinning for (A) Skykomish and (B) Clemons.

Mortality in unthinned stands during the 14-year holding period was 35 and 31 percent of the trees at Skykomish and Clemons, respectively. In this same period, mortality in each study area was only 6 percent in thinned stands. Among regimes, losses ranged from zero to 13.5 percent. Those with no mortality in 14 years were treatments 1 and 5 at Skykomish and treatments 1, 2, and 6 at Clemons. The heaviest losses were in treatment 6 at Skykomish and treatment 4 at Clemons. With this erratic distribution of mortality by regime, there was no apparent relation of stand stability to levels of growing stock. The total mortality, however, increased slightly as the holding period progressed through the three growth periods from 4 to 14 years. At Skykomish, the losses in successive periods were 1, 2, and 3 percent of the trees remaining after the last thinning. At Clemons, the successive losses were 2, 1, and 3 percent of the remaining trees. These minor increases and overall low mortality show high stand stability and virtually no added losses for up to 14 years after the last thinning.

The large increases in volume per acre and tree size have produced substantial increases in value of these stands. The extra yield enhanced by the high quality of these managed stands makes the length of the holding period after thinning an important factor in scheduling the final harvest.

Mortality

The volume of wood lost to mortality is summarized by stand treatment for the periods of thinning and the postthinning holding periods in tables 15 and 16. The distribution of mortality among thinning regimes shows no relation to levels of growing stock. The total volumes of mortality in thinned stands in each study area were less during the periods of thinning than during the postthinning holding periods. Frequent thinnings and comparatively small size of dead trees during the thinning periods resulted in smaller total losses. Some mortality occurred in all thinned stands in each study area, but all regimes lost less than the unthinned controls. In six regimes at Skykomish and five at Clemons, the volume losses were less than 20 percent of the losses in their respective controls. In the other regimes, the losses ranged from 20 to 44 percent of the controls with the highest in treatment 4 at Clemons.

Table 15—Skykomish: Cumulative mortality total stem volume per acre by period and treatment with percentage of total gross yield lost by age 56 years

Treatment[a]	Thinning period volume (age 24–43)	Holding period volume (age 42–56)	Total volume (age 24–56)	Gross yield
Number	*- - - - - - - - - - - - Ft³/acre - - - - - - - - - - - -*			*Percent*
1	17	0	17	<1
2	50	195	245	2
3	46	12	58	1
6	185	202	387	3
4	0	307	307	3
5	50	0	50	<1
8	161	565	726	6
7	101	378	479	4
Control	622	1,773	2,395	15

[a] Listed according to severity of thinning based on prescribed amount of basal area retained in growing stock: 1, 10 percent; 2, 3, and 6 average 30 percent; 4, 5, and 8 average 50 percent; 7, 70 percent (table 1).

Table 16—Clemons: Cumulative mortality total stem volume per acre by period and treatment with percentage of total gross yield lost by age 50 years

Treatment[a]	Thinning period volume (age 19–36)	Holding period volume (age 36–50)	Total volume (age 19–50)	Gross yield
Number	*- - - - - - - - - - - - Ft³/acre - - - - - - - - - - - -*			*Percent*
1	27	0	27	<1
2	132	0	132	2
3	30	11	41	1
6	50	0	50	1
4	236	393	629	8
5	189	284	473	6
8	117	33	150	2
7	148	310	458	5
Control	289	1,149	1,438	13

[a] Listed according to severity of thinning based on prescribed amount of basal area retained in growing stock: 1, 10 percent; 2, 3, and 6 average 30 percent; 4, 5, and 8 average 50 percent; 7, 70 percent (table 1).

The percentage of loss in cubic feet per acre by period and the cause of loss are summarized in tables 17 and 18. The major cause of mortality in thinned stands was disease, predominately root rot, which was widely distributed among plots in both study areas. Mortality from disease occurred on 11 thinned plots and 2 controls at Skykomish, and 8 thinned plots and 2 controls at Clemons. These plots represented seven regimes at Skykomish and five regimes at Clemons. At Skykomish only 1 to 6

Table 17—Skykomish: Percentage of total stem volume lost to mortality by period and cause for all treatments

Period (stand age)	Disease	Weather	Suppression	Unknown	Total
			Percent		
Thinning (24–42)	19	7	1	2	29
Holding (42–56)	26	33	11	1	71
Total (24–56)	45	40	12	3	100
Unthinned control (24–56)	3	39	55	3	100

Table 18—Clemons: Percentage of total stem volume lost to mortality by period and cause for all treatments

Period (stand age)	Disease	Weather	Animals	Suppression	Unknown	Total
			Percent			
Thinning (19–36)	25	4	20	0	2	51
Holding (36–50)	24	7	0	18	0	49
Total (19–50)	49	11	20	18	2	100
Unthinned control (19–50)	17	17	0	66	0	100

trees per plot died during the 32 years of observation. The number of dead trees per plot was similar at Clemons except for one plot with 11 dead trees and another with 14 during the 31 years of observation. These two concentrations of root rot appear to be foci that probably will expand and result in larger losses as the stands get older.

Additional data on the impact of mortality on total wood production in thinned stands are presented in stand development tables (app. tables 27 to 35 and 43 to 51). The volume per acre lost in each thinning period with total volume and percentage of gross yield are given for each regime. The proportion of gross yield lost during 32 years at Skykomish ranged from none to 6 percent in thinned stands and 15 percent in controls. During 31 years of observation at Clemons, the range was none to 8 percent in thinned stands and 13 percent in controls.

Virtually all the mortality from suppression occurred during the postthinning holding periods in both areas. The loss of suppressed trees was largely preventable. These high-risk trees could have been identified and removed in thinning before they died. This was not done because of the restrictive marking rules that were imposed to maintain control of the stand structure and levels of growing stock. The method of thinning required a d/D ratio of 1 for noncrop trees with cut trees evenly distributed across diameter classes (see “Stand Treatments”). This resulted in leaving some small trees that were suppressed or would become suppressed during the next growth period. Trees in this category that remained after the last thinning were destined to die during the postthinning holding period. To estimate the time that Douglas-fir survived in a suppressed condition, a sample of 44 trees were traced on successive periodic measurements from the time they were classified as suppressed until found dead. Within 4 years, 30 percent were dead, 60 percent were dead in 8 years, and all were dead in

12 years. The early removal of suppressed trees has long been recognized as a high priority in thinning Douglas-fir (Worthington and Staebler 1961). Although incompatible with recommended marking priorities, the procedures in LOGS were necessary to achieve uniform treatments. In application of the LOGS results, the removal of potential mortality should be a high priority in selecting trees for thinning.

Crop Trees

A component of 16 (80 per acre) well-formed, healthy dominant trees were marked as crop trees on each sample plot. They were a common element of the stand in every level of growing stock. The various uses of crop trees and their influence on stand development was a unique feature of the LOGS studies. Specific controls included (1) uniformity of initial stands—if suitable crop trees were not present on a sample plot, the plot was rejected; (2) minimum tree size—the minimum d.b.h. of trees left after the calibration cut was one-half the quadratic mean d.b.h. of crop trees; (3) interval of thinning—time between thinnings was based on an increase of 10 feet in average height of crop trees; (4) site index—a sample of crop trees was selected for measurement of site index; (5) all thinnings were taken from noncrop trees until only crop trees remained, then crop trees were cut only when necessary to comply with the prescribed levels of growing stock; (6) distribution of d.b.h.—cut trees were distributed across the diameter range of noncrop trees so the average d.b.h. of cut trees was about equal to the average d.b.h. of noncrop trees before thinning, i.e., d/D = 1 for noncrop trees. More detailed specifications for the uses of crop trees are given in previous sections of this report on "Plot Establishment and Stand Treatments."

The division of stands into components of crop and noncrop trees provided (1) crop trees with a large proportion of the volume in every regime and (2) thinnings from the noncrop trees such that growth of the total stand could be controlled while favoring the development of the crop trees. These complementary functions could proceed only as long as enough noncrop trees were available to carry out the prescribed thinnings. Where all noncrop trees had been removed, the prescribed thinning was carried out by removing crop trees (item 5 above). In that case, the regime could not be carried out as planned without reducing the final harvest. This damaging condition prevailed in treatment 1 at both Skykomish and Clemons. This prescription removed all the noncrop trees plus 30 crop trees per acre at Skykomish and 27 at Clemons. These missing crop trees would have produced about one-third of the total yield in the final stand. This excessive thinning severely damaged the productivity of the stand. Consequently, treatment 1 must be designated a silvicultural failure. A borderline condition was produced in treatment 2 at Clemons where the stand was reduced to a total of 75 trees per acre with 70 crop trees remaining. Some of the original crop trees were lost in all regimes, but generally suitable replacements were available from the noncrop component. Over the span of 32 years at Skykomish and 31 years at Clemons, crop tree survival in thinned stands excluding treatment 1 was 82 and 77 percent, respectively. Survival in the unthinned stands was 89 to 79 percent. The final allocation of numbers of trees and volumes by crop and noncrop components for all regimes are given in tables 19 and 20. The listed numbers of crop trees are the survivors from the original selections. The proportion of volume per acre in crop trees is less in high levels of growing stock because of the larger numbers of noncrop trees in those regimes. Volumes in crop trees by regime varied from 53 to 88 percent at Skykomish and 43 to 96 percent at Clemons. In the unthinned stands, the crop trees accounted for only 38 and 19 percent of the volume at Skykomish and Clemons, respectively. These large differences between thinned

Table 19–Skykomish: Numbers and total stem volume of crop and noncrop trees per acre at stand age 56 years

Treatment[a]	Trees per acre		Volume per acre		Volume per tree	
	Crop[b]	Noncrop	Crop	Noncrop	Crop	Noncrop
	Number		- - - - - - - - - - - - - Ft^3 - - - - - - - - - - - - -			
1	50	None	5,650	None	113	None
2	73	30	6,361	1,551	87	52
6	70	27	6,469	1,671	92	62
3	73	17	7,210	1,026	99	60
8	78	74	6,380	3,406	82	46
4	75	40	7,428	2,194	99	55
5	78	94	6,877	3,799	88	40
7	75	113	6,175	5,450	82	48
Control	71	233	5,063	8,253	71	35

[a] Listed in order of increasing basal area per acre at stand age 56 years.
[b] Initial number of crop trees in each treatment was 80 per acre at stand age 24 years.

Table 20—Clemons: Numbers and total stem volume of crop and noncrop trees per acre at stand age 50 years

Treatment[a]	Trees per acre		Volume per acre		Volume per tree	
	Crop[b]	Noncrop	Crop	Noncrop	Crop	Noncrop
	Number		- - - - - - - - - - - - - Ft^3 - - - - - - - - - - - - -			
1	53	4	3,961	210	75	52
2	70	5	5,390	246	77	49
3	72	31	4,886	1,259	68	41
6	72	55	4,174	2,182	58	40
4	62	85	3,320	3,182	54	37
5	68	110	3,376	3,427	50	31
8	72	166	3,054	3,954	42	24
7	77	181	3,452	4,656	45	26
Control	63	324	1,830	7,594	29	23

[a] Listed in order of increasing basal area per acre at stand age 50 years.
[b] Initial number of crop trees in each treatment was 80 per acre at stand age 19 years.

and unthinned stands show the favorable effects of thinning on growth of crop trees. Crop trees in thinned stands also gained a substantial advantage in size with 40 to 80 percent greater average volume per tree.

The identification of crop trees when stand ages were only 24 years at Skykomish and 19 years at Clemons was an early age for selection as indicated by the loss of 18 to 23 percent of the trees. Because of restrictions on spacing and distribution, some of the originally chosen crop trees were not the largest or best quality, which probably contributed to some of the loss of original crop trees.

Applications

The formidable task of carrying on the LOGS long-term experiments on nine region-wide installations, all coordinated by a single plan, has produced a superior collection of data on Douglas-fir silviculture with many possible applications. The versatility of these data is indicated by the variety of applications that have been carried out by cooperators and associates. The most extensive application was comparisons of the LOGS data with projections of stand statistics by Curtis (1987). He used the LOGS data from all nine installations for projection periods of 6 to 18 years to compare actual data with estimates calculated by using his Douglas-fir stand simulator (DFSIM) (Curtis and others 1981, 1982). These comparisons, combined with others, indicate some possible modifications to the DFSIM.

Other comparisons of growth-growing stock relations with results of the Langsaeter hypothesis show that Douglas-fir in the LOGS studies does not conform with that hypothesis (Curtis and others 1997). The same conclusion is reported in several progress reports listed in the front of this report. Similar conclusions are evident in the Skykomish and Clemons study results. These repeated observations are substantial evidence that Langsaeter's hypothesis was based on other kinds of stand conditions.

Stand data from the LOGS studies have provided an opportunity to demonstrate the use of relative density as an alternative to basal area for a measure of growing stock. Relations of growth in volume, basal area, and d.b.h. and some guides for stand management and other uses of relative density are shown by Curtis and Marshall (1986) and progress reports 7, 10, 11, 12, and 13 listed in the front of this report.

Stand data from the Hoskins installation has been used to identify stand management implications and financial aspects of thinning young Douglas-fir (Tappeiner and others 1982). They found that "there is considerable flexibility in the timing, intensity, and grade of thinning of young Douglas-fir stands on productive sites." Estimated financial returns indicate that thinning young, rapidly growing Douglas-fir can be profitable and can increase returns compared to unthinned stands.

Eventually the combined data from all nine LOGS installations will provide a basis for many more applications in stand management. In the interim, the data from the Skykomish and Clemons installations provide an opportunity and an obligation to develop more applications for management of young stands of Douglas-fir. These studies have produced eight new thinning regimes from 495 individual plot measurements.

Each regime was developed in two stand conditions: a 24-year-old natural stand of Douglas-fir and western hemlock at Skykomish and a 19-year-old Douglas-fir plantation at Clemons. Because the first thinnings were at different ages, the basal area-age relations and related parameters are different for a given regime in the two study areas. The trends, however, are essentially the same in both areas as shown in figures 3A and 3B and figures 4A and 4B. Any of these regimes may be applied directly in management of young stands or modified to achieve a particular silvicultural objective as anticipated by Staebler (see "Objectives"). These regimes are designed for long-term applications. An abbreviated or otherwise modified regime probably would achieve some benefits, but the outcome would be conjectural. All regimes are defined by the quantitative descriptions in stand development tables (apps. 2, 3, 4, and 5). Regime numbers in stand development tables correspond with treatment numbers in table 1. The key to identification of each regime is the level of growing stock expressed as basal area per acre after thinning at six control points; i.e., the initial stand plus five thinnings. In addition to showing basal area after thinning, the stand development tables show related stand data. They

also are a guide for application of each regime and an estimate of stand conditions that can be produced. Data from other LOGS installations indicate that results from the Clemons study may be conservative for midsite class II stands.

The principal controlling factor when applying these regimes (not including the calibration cut) is basal area per acre after thinning in relation to stand age. This is consistent with the use of basal area as the controlling factor when the regimes were developed according to the prescribed thinning schedules (table 1). The measurement of basal area is a practical and efficient procedure for controlling growing stock in large areas. It also provides a sound basis for defining silvicultural objectives and estimating future yields.

The rigid field procedures used to control regimes in the LOGS studies would not be needed and usually would not be practical in operational thinnings. This does not preclude the application of these regimes if basic principles in the LOGS thinnings are followed. To achieve results comparable to the stand development tables, these thinning regimes should be restricted to stands of Douglas-fir on site class II. There are other basic requirements when applying these regimes: (1) The basal area per acre after each thinning should average within 10 percent of the prescribed level at the given stand age for the chosen regime. The prescribed level for ages not listed in the stand development table may be determined by interpolation. (2) Promote the value and stability of the stand by maintaining d/D ratios that do not exceed 1.0. Higher ratios may be required, however, in an early thinning where removal of large, poor-quality trees (wolf trees) is desirable to improve the structure and quality of stands. (3) Trees to be cut should be selected to prevent mortality in and to favor the best trees for the final crop. To control the quality of stands in these long-term regimes, marking of crop trees may be helpful. Marked trees provide continuity in selection procedures in successive thinnings. Experience in operational thinnings including cable systems and feller-bunchers has shown that distinct marking is needed to protect trees reserved for the final crop (Reiger 1985). (4) The interval and severity of successive thinnings may vary provided the prescribed basal area per acre after thinning is maintained and the cut in a single thinning does not exceed 30 percent of the standing volume. This maximum cut is about equal to the proportion of volume removed in the last two thinnings of treatment 6, which was the highest percentage cut of all regimes. These thinnings removed 32 percent and 29 percent of the standing volume in treatment 6 at Skykomish and Clemons, respectively. If the last two thinnings had been combined, the interval would have been 8 years at Skykomish and 7 years at Clemons. A maximum of 30 percent removal in a single thinning provides flexibility in the thinning cycle that may be advantageous for economic factors. For silvicultural purposes, it provides a controlled release of growing space with stability of the residual stand and continuous use of the site. These guidelines conform with favorable experience in other thinning trials (Johnston and others 1967, King 1986, Reukema 1972).

Regime Comparisons

To facilitate the selection of a regime for a particular application, a comparison of regimes is given in tables 21 through 26. These comparisons show items common to all regimes in three stages of stand development: (1) The initial stand—Basic stand data after the calibration cut are given to indicate the amount of growing stock from which the LOGS regimes were developed. LOGS prescriptions could be applied in stands with less initial stocking provided enough trees are present to complete the chosen thinning regime. (2) The stand after the last thinning—These data define the stands as they were after thinning regimes were completed. This perspective of a regime provides a target to

Table 21—Skykomish: Comparison of regimes with constant 10, 30, 50, and 70 percent of growth retained (table 1)

	Treatment			
	1 (10%)	3 (30%)	5 (50%)	7 (70%)
Initial stand—24 yrs:				
Trees per acre	340	375	363	352
Quadratic mean d.b.h. (in)	5.3	5.0	5.1	5.2
Basal area per acre (ft^2)	51	51	51	51
Volume per acre (ft^3)	981	931	939	964
After last thinning—42 yrs:				
Trees per acre	50	92	172	208
Average spacing (ft)	30	22	16	14
Quadratic mean d.b.h. (in)	15.8	14.3	12.1	12.1
Basal area per acre (ft^2)	68	101	134	167
Volume per acre (ft^3)	2,600	3,740	5,255	6,253
Crop trees per acre—	50	73	78	75
Quadratic mean d.b.h. (in)	15.8	14.8	13.9	14.0
Volume per acre (ft^3)	2,600	3,249	3,265	3,030
Total thinning yield per acre (ft^3)—	3,043	2,472	1,780	1,477
Percent of gross yield	54	39	25	19
End of holding period—56 yrs:				
Trees per acre	50	90	172	188
Quadratic mean d.b.h. (in)	21.0	18.8	15.4	15.5
Basal area per acre (ft^2)	119	173	218	244
Volume per acre (ft^3)	5,650	8,236	10,676	11,625
Average volume per tree (ft^3)	113	92	62	62
PAI (14-yr holding period) (ft^3)	218	321	387	384
D.b.h. range (in)	15–31	10–30	8–28	9–30
Net yield per acre (ft^3)	8,693	10,708	12,456	13,101
Mortality per acre (ft^3)	17	58	50	478
Gross yield per acre (ft^3)	8,710	10,766	12,506	13,579

be achieved in application. (3) Stand at end of 14-year holding period—The comparative yields and sizes of trees produced in each regime indicate the potential to be expected in applications.

The terminology pertaining to thinning schedules in the study plan and first progress report (Williamson and Staebler 1971) is continued here to identify the types of regimes. The terms “constant, or fixed, variable increasing and variable decreasing” pertained to the percentages of growth retained in treatment schedules (table 1). The same terms appear in tables 21 through 26. They do not indicate a specified characteristic of the completed regimes but indicate procedures followed in their development. Regimes with

Table 22—Skykomish: Comparison of regimes with average 30 percent of growth retained in increasing, constant, and decreasing prescriptions (table 1)

	Treatment		
	2 increasing	**3 constant**	**6 decreasing**
Initial stand—24 yrs:			
Trees per acre	368	375	385
Quadratic mean d.b.h. (in)	5.0	5.0	5.0
Basal area per acre (ft^2)	50	51	51
Volume per acre (ft^3)	887	931	963
After last thinning—42 yrs:			
Trees per acre	107	92	100
Average spacing (ft)	20	22	21
Quadratic mean d.b.h. (in)	13.1	14.3	13.8
Basal area per acre (ft^2)	99	101	99
Volume per acre (ft^3)	3,834	3,740	3,825
Crop trees per acre–	77	73	73
Quadratic mean d.b.h. (in)	13.8	14.8	14.1
Volume per acre (ft^3)	3,080	3,249	3,042
Total thinning yield per acre (ft^3)—	2,241	2,472	2,874
Percent of gross yield	37	39	42
End of holding period—56 yrs:			
Trees per acre	103	90	97
Quadratic mean d.b.h. (in)	16.8	18.8	18.3
Basal area per acre (ft^2)	160	173	168
Volume per acre (ft^3)	7,912	8,236	8,140
Average volume per tree (ft^3)	77	92	84
PAI (14-yr holding period)(ft^3)	291	321	308
D.b.h. range (in)	11–25	10–30	8–31
Net yield per acre (ft^3)	10,152	10,708	11,014
Mortality per acre (ft^3)	245	58	388
Gross yield per acre (ft^3)	10,397	10,766	11,402

constant percentages of growth retained (treatments 1, 3, 5, and 7) are listed together in tables 21 and 24. Similarly, regimes with increasing, constant, and decreasing percentages are in two groups: low levels of growing stock (treatments 2, 3, and 6) in tables 22 and 25, and higher levels (treatments 4, 5, and 8) in tables 23 and 26. The constant treatment regimes 3 and 5 are included for comparisons of variable and constant regimes at similar levels of growing stock. The choice of a regime for application would logically include consideration of both types. Following are some observations and recommendations pertaining to specific regimes.

Constant regimes (treatments 1, 3, 5, and 7)—These regimes accumulated growing stock in the residual stands by about equal additions of basal area at each of the five successive thinnings (fig. 4). The average rate of accumulation in treatments 1, 3, 5,

Table 23—Skykomish: Comparison of regimes with average 50 percent of growth retained in increasing, constant, and decreasing prescriptions (table 1)

	Treatment			
	4 increasing	5 constant	8 decreasing	Control unthinned
Initial stand—24 yrs:				
Trees per acre	315	363	360	594
Quadratic mean d.b.h. (in)	5.5	5.1	5.1	4.7
Basal area per acre (ft^2)	51	51	51	72
Volume per acre (ft^3)	909	939	926	1,266
After last thinning—42 yrs:				
Trees per acre	122	172	173	470
Average spacing (ft)	19	16	16	10
Quadratic mean d.b.h. (in)	14.2	12.1	11.9	9.3
Basal area per acre (ft^2)	134	134	134	219
Volume per acre (ft^3)	5,049	5,255	4,990	8,352
Crop trees per acre—	78	78	80	79
Quadratic mean d.b.h. (in)	15.4	13.9	13.6	12.2
Volume per acre (ft^3)	3,865	3,265	3,073	2,544
Total thinning yield per acre (ft^3)—	1,519	1,780	1,971	none
Percent of gross yield	23	25	28	none
End of holding period—56 yrs:				
Trees per acre	115	172	152	304
Quadratic mean d.b.h. (in)	17.8	15.4	15.4	12.9
Basal area per acre (ft^2)	199	218	196	271
Volume per acre (ft^3)	9,622	10,676	9,786	13,316
Average volume per tree (ft^3)	84	62	64	44
PAI (14-yr holding period)(ft^3)	327	387	343	354
D.b.h. range (in)	8–28	8–28	7–27	5–26
Net yield per acre (ft^3)	11,142	12,456	11,756	13,316
Mortality per acre (ft^3)	307	50	726	2,395
Gross yield per acre (ft^3)	11,449	12,506	12,482	15,711

and 7 was 0.9, 2.8, 4.6, and 6.4 square feet annually at Skykomish. The rate of accumulation at Clemons was less than at Skykomish by a fraction of a square foot. The interval between successive regimes at the last thinning was 33 square feet of basal area per acre at Skykomish with a low of 68 in treatment 1 and a high of 167 in treatment 7. At Clemons where the thinning cycle ended at stand age 36, 6 years younger than at Skykomish, the interval between regimes was 28 square feet per acre. The lowest regime, treatment 1, had only 49 square feet, and the highest, treatment 7, had 133 square feet. These regimes provide a wide range of options for application. Their orderly and gradual increases in residual growing stock would be more economical and easier to manage than the fluctuating levels in variable regimes.

Table 24—Clemons: Comparison of regimes with constant 10, 30, 50, and 70 percent of growth retained (table 1)

	Treatment			
	1 (10%)	**3 (30%)**	**5 (50%)**	**7 (70%)**
Initial stand—19 yrs:				
Trees per acre	395	397	395	398
Quadratic mean d.b.h. (in)	4.1	4.1	4.0	4.0
Basal area per acre (ft^2)	37	36	34	35
Volume per acre (ft^3)	479	472	438	495
After last thinning—36 yrs:				
Trees per acre	57	105	200	287
Average spacing (ft)	28	20	15	12
Quadratic mean d.b.h. (in)	12.7	11.8	10.0	9.3
Basal area per acre (ft^2)	49	77	106	133
Volume per acre (ft^3)	1,533	2,488	3,132	4,161
Crop trees per acre—	53	72	75	78
Quadratic mean d.b.h. (in)	12.7	12.4	11.2	10.9
Volume per acre (ft^3)	1,451	1,956	1,567	1,603
Total thinning yield per acre (ft^3)—	2,131	1,666	1,123	507
Percent of gross yield	58	40	21	11
End of holding period—50 yrs:				
Trees per acre	57	103	178	258
Quadratic mean d.b.h. (in)	18.1	16.1	13.5	11.8
Basal area per acre (ft^2)	101	142	171	195
Volume per acre (ft^3)	4,171	6,145	6,803	8,108
Avg. volume per tree (ft^3)	73	60	38	31
PAI (14-yr holding period)(ft^3)	188	261	262	282
D.b.h. range (in)	14–25	8–23	7–24	6–20
Net yield per acre (ft^3)	6,302	7,811	7,926	8,615
Mortality per acre (ft^3)	27	41	471	457
Gross yield per acre (ft^3)	6,329	7,852	8,397	9,072

Regime 1 is a sequence of extremely severe thinnings that left only 50 trees per acre at Skykomish and 57 at Clemons (fig. 3). These stands were reduced almost to the level of some shelterwoods (Williamson 1973). At Skykomish the reserve stand was open enough so an understory of Douglas-fir and hemlock became established during the 14-year holding period (fig. 6B). A dense stand of salal precluded establishment of an understory stand at Clemons. To complete the prescribed thinning, some of the crop trees had to be cut. Consequently, this regime resulted in a substantial sacrifice in yield and poor utilization of the productive capacity of the site. Regime 1 is not recommended for wood production. Nevertheless, this regime can provide some useful guidelines for the forest owner who is satisfied with low yields and wants open stands for other management objectives.

Table 25—Clemons: Comparison of regimes with average 30 percent of growth retained in increasing, constant, and decreasing prescriptions (table 1)

	Treatment		
	2 increasing	**3 constant**	**6 decreasing**
Initial stand—19 yrs:			
Trees per acre	395	397	397
Quadratic mean d.b.h. (in)	4.2	4.1	4.1
Basal area per acre (ft^2)	38	36	37
Volume per acre (ft^3)	516	472	466
After last thinning—36 yrs:			
Trees per acre	75	105	127
Average spacing (ft)	24	20	19
Quadratic mean d.b.h. (in)	13.6	11.8	10.8
Basal area per acre (ft^2)	75	77	80
Volume per acre (ft^3)	2,410	2,488	2,528
Crop trees per acre—	70	72	72
Quadratic mean d.b.h. (in)	13.7	12.4	11.5
Volume per acre (ft^3)	2,295	1,956	1,643
Total thinning yield per acre (ft^3)—	1,475	1,666	1,938
Percent of gross yield	37	40	43
End of holding period—50 yrs:			
Trees per acre	75	103	127
Quadratic mean d.b.h. (in)	18.0	16.1	14.6
Basal area per acre (ft^2)	133	142	147
Volume per acre (ft^3)	5,636	6,145	6,356
Avg. volume per tree (ft^3)	75	60	50
PAI (14-yr holding period)(ft^3)	230	261	273
D.b.h. range (in)	14–25	8–23	8–920
Net yield per acre (ft^3)	7,112	7,811	8,294
Mortality per acre (ft^3)	133	41	49
Gross yield per acre (ft^3)	7,245	7,852	8,343

An important advantage of constant regimes (treatments 3, 5, and 7) is the high growth rates of the reserved stands. During the 14 years after thinning, treatments 5 and 7 at Skykomish and treatments 3, 5, and 7 at Clemons all produced higher PAI than their respective nonthinned stands. Except for treatment 1 where thinning was too severe, the constant regimes treatments 3, 5, and 7 are recommended for general applications.

Variable regimes (treatments 2, 4, 6, and 8)—Variable regimes are distinguished by periodic changes in severity of thinning at each successive level. The sequence of thinning intensities varied from heavy to light treatments 2 and 4. Conversely, treatments 6 and 8 varied from light to heavy. Variable regimes were developed at two average levels of growing stock in each area according to percentages of growth retained in

Table 26–Clemons: Comparison of regimes with average 50 percent of growth retained in increasing, constant, and decreasing prescriptions (table 1)

	Treatment			
	4 increasing	5 constant	8 decreasing	Control unthinned
Initial stand—19 yrs:				
Trees per acre	395	395	397	687
Quadratic mean d.b.h. (in)	4.2	4.0	4.0	4.0
Basal area per acre (ft^2)	37	34	34	60
Volu+me per acre (ft^3)	498	438	470	852
After last thinning—36 yrs:				
Trees per acre	170	200	240	558
Average spacing (ft)	16	15	13	9
Quadratic mean d.b.h. (in)	10.8	10.0	9.1	7.9
Basal area per acre (ft^2)	102	106	108	188
Volume per acre (ft^3)	3,084	3,132	3,307	5,873
Crop trees per acre–	70	75	73	78
Quadratic mean d.b.h. (in)	11.7	11.2	10.5	9.1
Volume per acre (ft^3)	1,597	1,567	1,396	1127
Total thinning yield per acre (ft^3)—	955	1123	1,094	none
Percent of gross yield	22	21	24	none
End of holding period—50 yrs:				
Trees per acre	147	178	238	387
Quadratic mean d.b.h. (in)	14.2	13.5	11.7	10.5
Basal area per acre (ft^2)	156	171	175	230
Volume per acre (ft^3)	6,502	6,803	7,008	9,424
Avg. volume per tree (ft^3)	44	38	29	24
PAI (14-yr holding period)(ft^3)	244	262	264	254
D.b.h. range (in)	6–23	7–24	6–22	5–25
Net yield per acre (ft^3)	7,457	7926	8,103	9,424
Mortality per acre (ft^3)	629	471	148	1438
Gross yield per acre (ft^3)	8,086	8,397	8,251	10,862

the thinning schedule in table 1. The lower level (treatments 2 and 6) had an average of 30 percent retained and the higher level (treatments 4 and 8) an average of 50 percent retained. A more detailed description is given in a previous section, “Levels of Growing Stock.” Comparisons of variable regimes along with constant regime treatments 3 and 5 are given in tables 22 and 23 for Skykomish and tables 25 and 26 for Clemons. These sequences of variable thinning intensity produced different results that are important in choosing a regime for application. Comparisons of treatment 2 with 6 and treatment 4 with 8 show that (1) regimes 6 and 8 produced 15 to 31 percent more yield from thinnings, (2) treatments 6 and 8 also produced 7 to 19 percent more total volume increment (including volume from thinnings but excluding negligible mortality volume)

during the thinning cycle (at the time of the last thinning), and (3) the same treatments produced 2 to 15 percent more total gross yield than treatments 2 and 4 at the end of the postthinnning period.

In other characteristics, none of the variable regimes were consistently predominant. When growth of thinned stands was compared with the control stands, during the 14-year holding period only two of the variable regimes exceeded the nonthinned stands. These regimes were treatments 6 and 8 at Clemons, which produced 4 to 7 percent more PAI than the nonthinned stand. The other variable regimes at Clemons (treatments 2 and 4) and all variable regimes at Skykomish produced 3 to 18 percent less PAI than their respective controls. The largest average d.b.h. was produced by heavy/light regimes in three of the four comparisons (treatments 2 versus 6 and 4 versus 8 at both installations), whereas the light/heavy (treatment 6) at Skykomish was larger than the contrasting regime (treatment 2).

Comparisons of the two types of variable regimes show only one outstanding difference in terms of wood production: the higher yield from thinnings produced by the light/heavy regime treatments 6 and 8 (see discussion under ”Wood Production”). In application, the small differences in other characteristics probably would be obscured by variations in quality control of operational thinnings. Consequently, a choice between the two types of variable regimes should be based on thinning yield or other factors pertaining to some specific objectives of stand management. Comparisons between variable regimes and constant regimes show that constant regime treatments 3 and 5 are within 3 to 16 percent of the light/heavy regime treatments 6 and 8 in both thinning yield and total yield. Constant regimes are generally closer to the light/heavy regime treatments 6 and 8 than to the contrasting heavy/light regime treatments 2 and 4. Except for slightly higher thinning yields in the light/heavy regimes, these comparisons show no outstanding advantages of variable regimes over constant regimes. Application of variable regimes would require detailed long-term inventory records for control of changing thinning intensities. These studies have shown no apparent reasons for using variable regimes that would justify additional complications and costs in managing thinning operations. Therefore, the constant regime treatments 3, 5, and 7 are recommended for general applications.

The prescribed thinnings were completed at age 42 in the Skykomish study and age 36 at Clemons. Beyond those ages the stands were free to grow in the postthinning holding period. Data for these periods are given in stand development tables and in tables comparing regimes (tables 21 through 26). The stand data after the last thinning show that in most regimes the growing stock in noncrop trees was sufficient to make additional thinnings. Where stand management objectives require later thinnings, these data can provide the basis for planning extensions of the current regimes.

An inevitable result when the LOGS regimes are applied in stand management is the difference in yields between the study areas and the managed stands. Differences in yield between research plots and managed forests were analyzed by Bruce (1977). Generally yields per acre in the managed forest are less than yields in research plots. These differences, which may be called “falldown,” cannot be forecast accurately because of the many variables that affect yields. Some of the reasons for differences in yield that may apply to the LOGS studies follow:

1. The sample plots have uniform stands, whereas large areas include small nonproductive areas such as streams and openings too small to exclude in forest mapping.

2. Large areas are more variable than sample plots in stocking, stand structure, and stand composition.
3. Damaged trees are present throughout large stands but usually excluded from experimental plots.
4. There may be less quality control in operations.
5. Inadequate stand descriptions, particularly incorrect age classification, can result in mismatched prescriptions and misleading yield calculations.

Bruce (1977) concluded that the scientist and the forest manager both have responsibilities in research applications. The scientist's interpretations should include opinions about practical application. The manager should understand the research results and be sufficiently familiar with the forest to apply new knowledge. These precautions regarding expected yield should be observed when applying all LOGS regimes.

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Metric Equivalents

1 inch = 2.54 centimeters
1 foot = 0.3048 meter
1 acre = 0.405 hectare
1 square foot = 0.09290 square meter
1 cubic foot = 0.02832 cubic meter
1 square foot per acre = 0.2293 square meter per hectare
1 cubic foot per acre = 0.06997 cubic meter per hectare
1 tree per acre = 2.471 trees per hectare

(°F-32)/1.8 = °C

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Appendix 1: Historical Note

Origin of the LOGS studies[1]

In 2002, the Pacific Northwest levels-of-growing-stock (LOGS) cooperative will be 40 years old. All cooperators have faithfully maintained the project since 1962. The purpose of this note is to document the origin of the LOGS cooperative. A complete history of the project is planned in addition to a comprehensive technical analysis when all individual studies are complete.

Before initiation of the LOGS studies, an application of the thinning schedule was tested by Staebler in a commercial thinning study on the St. Helen's Tree Farm of Weyerhaeuser Company (King 1986, Oliver and Murray 1983, Staebler 1967). This study was started in 1959 in an area of 125 acres where a precommercial thinning study had been established in 1953. In that thinning, the original stand was reduced to about 500 to 800 trees per acre. The commercial thinning study included four regimes that were the same as the treatment schedules prescribed later for the LOGS studies. They were the constant or fixed thinning intensities where 10, 30, 50, and 70 percent of gross increments on control plots were allowed to accumulate in the reserved stands. Controls of thinning interval and selection of trees to cut were also the same as prescribed later for the LOGS studies. Treatments with variable thinning intensities were added to the schedule when the LOGS project was started. These trials demonstrated the workability of the growing stock as the control factor for thinning in young stands of Douglas-fir.

In the same year, Staebler (1960) presented his views on the importance of desirable levels of growing stock at the Society of American Foresters convention. His discussion included an example of the low growth per unit of growing stock in high-volume natural stands, which would not be a satisfactory return if expressed as a percentage of the value of the growing stock. He suggested that "this undesirable situation probably exists in most unmanaged stands from comparatively young ages." In the context of a forest business, "growth is the return on the invested growing stock, and for good business much too much growing stock is commonly held for maximum or near maximum growth." Staebler gave a conceptual illustration of growth with increasing levels of growing stock by using the hypothetical relation postulated by Langsaeter (Hawley and Smith 1954, Smith 1962). There was no evidence that the Langsaeter curve is valid for Douglas-fir, but it was a reasonable basis for illustration of probable growth-growing stock relations. Staebler concluded that these hypothetical relations provide an encouraging beginning, but the problem of achieving desirable levels of growing stock in stand management required a lot more research.

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[1] Personal note by James E. King: This account of the origin of the LOGS studies is based on my recollections of working with George Staebler, the project files, and his publications that related to levels of growing stock. We worked together at the Weyerhaeuser Forestry Research Center when he was responsible for the silviculture project, and my responsibilities included growth and yield, and pilot management studies. The latter were small-scale operational trials of thinning. Because of the overlapping scope of our projects, we often discussed Douglas-fir silviculture and the needs for new information in timber management.

The next major event leading to the LOGS cooperative project was the establishment of the Skykomish study in September 1961. The basic plan had been completed earlier, but experience with this installation provided some additional details.[2] The first page of the plan (attached exhibit 1) provides a background to this study, which was a prototype for the LOGS cooperative. Observations of this installation by foresters both inside and outside of Weyerhaeuser Company indicated that Staebler's experiment could produce much-needed information and should be replicated on a wide range of sites. It was obvious, however, that a long-term project of this size would require the cooperation of several research organizations, and to function efficiently, a central coordinating agency would be necessary. The USDA Forest Service, Pacific Northwest (PNW) Forest and Range Experiment Station, accepted this responsibility. To explore the feasibility of a regional cooperative research project, George Meagher, representing the Station, and George Staebler organized a meeting of foresters held at the Weyerhaeuser mill in Everett, Washington, on July 24, 1962. R.W. Cowlin, Director of the PNW Station, was chairman of the morning session, which was attended by 31 foresters representing 13 organizations. A summary of this meeting in the original format with a list of the participants is attached (exhibit 2). The afternoon session included a tour of the Skykomish study area with explanation by George Staebler. This ended with a summary by George Allen, Director of the Weyerhaeuser Forestry Research Center, in which he asked for an expression of interest in a cooperative research project. Representatives of 11 agencies gave a positive response. With this encouraging response, Meagher promised to form a working committee to start the project. He named Richard L. Williamson as the Station representative on the working committee. Staebler and Williamson prepared a more detailed work plan for these studies, which was never published in original format but was described later in publications by Williamson and Staebler (1965, 1971). The original cooperators in the LOGS project were the USDA Forest Service, Weyerhaeuser Company, Oregon State University, and the Washington State Department of Natural Resources. All had one or more installations completed in 1963. The Canadian Forest Service became a cooperator with an installation in 1969. In 1970, the final installation was established providing nine installations spread from southern Oregon to Vancouver Island. In 1999, the British Columbia Ministry of Forests became a member of the cooperative to work with the Canadian Forest Service to ensure the two installations on Vancouver Island were carried through the final treatment period.

Williamson was the first secretary of the LOGS committee and served in that position until his retirement in 1983. Staebler was the first chairman of the committee and served in that position until 1973.

LOGS is not only an acronym of levels of growing stock but as suggested by Charles Peterson, PNW Research Station, it also stands for Legacy Of George Staebler.

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[2] Staebler, George R. 1962. Plan for a level of growing stock study in Douglas-fir. Unpublished report. On file with: Forestry Research Center, Weyerhaeuser Company, Tacoma, WA 98477.

EXHIBIT 1 [3]

July 9, 1962

Plan for a Level-of-Growing-Stock Study in Douglas-Fir

by George R. Staebler

Forestry Research Center, Weyerhaeuser Co.

Introduction

As forestry in the Douglas-fir region becomes more intensive, cultural and commercial thinnings are becoming commonplace practices on both public and private forest lands. Foresters, in turn, are seeking with increased urgency better information on (1) spacing guides and stocking schedules for optimum production, and (2) estimates of possible yields in intensively managed stands. Some leads are available from older thinning, spacing, and yield studies, but definitive information of regionwide application is not available now nor will it be provided through existing studies.

New long-term field studies will apparently be required to provide such information. These will entail the periodic measurements of stands repeatedly thinned to a wide range of growing stock levels. The following plan has been prepared for an experiment in levels of growing stock for Douglas-fir. One study has been established on the Skykomish Tree Farm, and the plan is believed adaptable to installations at other locations and sites.

Briefly, young stands 20 to 40 feet tall will first be given a preparatory thinning to create study plots that are fairly uniform in numbers of crop trees, spacing, and tree density. Then following a calibration period, study plots will be thinned back periodically to several different levels of stocking. The study will be continued until the trees have reached a height of 80 to 100 feet and the critical developmental period of the stand has been passed.

Two features of this plan merit introductory attention because they are original and have not been used in levels-of-growing-stock studies in other regions or for other species:

1. Levels of growing stock to be tested will be based on the gross increment of the unthinned plots which are an integral part of the study but not one of the recognized treatments. In this way, the “levels” will be keyed to growth conditions on the study area and will not be dependent on yield tables or other artificial criteria.
2. The interval between thinnings will be based on height growth of the stand rather than on an arbitrary number of years. This seems biologically sound.

Objective

The objective is to determine how the amount of growing stock retained in repeatedly thinned stands of Douglas-fir affects cumulative wood production, tree size, and growth-growing stock ratios. The treatments are planned to cover a broad enough range in growing stock levels so that the findings will tell how to produce any combination of factors deemed optimum from a management standpoint.

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[3] Reproduced, as closely as possible, from the original.

EXHIBIT 2 [4]

Portland, Oregon

August 10, 1962

Résumé of Level-of-Growing-Stock Research Conference for Douglas-Fir

Everett, Washington, July 24, 1962

The meeting was opened at 8:30 a.m. in the conference room at Weyerhaeuser's Mill "B." A list of the 31 attendees is attached.

George Meagher introduced R.W. Cowlin who acted as chairman of the morning session. Cowlin stated the aim of the meeting was to explore needs for level-of-growing-stock information in Douglas-fir to meet increasing pressures for more intensive management efforts. He indicated the group would attempt to determine these needs and the followup action that might be required to meet them. He characterized Staebler's study plan as a means of getting information on levels of growing stock and posed these questions:

1. What are the needs for this kind of information?
2. What kinds of study will obtain this information?
3. What are the opportunities for cooperative effort?

George Staebler discussed the background of the problem and defined "optimum growing stock" as that which is developed through thinning to alter growth and yield, size of tree, or growth-percent. Any one or combinations of the three factors may be used by foresters to accomplish objectives necessary for a given operation according to the aims of management. Details of Staebler's ensuing remarks are contained in the paper he presented at the SAF meeting in San Francisco,[5] copies of which were distributed at the conference.

Meagher then listed some reasons for interest in the type of study explained by Staebler. These included increasing demand for information on levels of growing stock for use in planning regeneration, precommercial thinning and commercial thinning schedules, and in management planning (initial spacing of plantations, type of thinning regime, rotation age, products attainable by manipulation of the stand, and decisions for special-use areas).

Comments from the group were:

Hicks—National Forest administration requires such knowledge to use in calculating allowable cut and establishing future production. Hopes also that such studies will cover lower sites as well as more productive lands.

Fety—Bureau of Land Management is beginning an intensive young-growth management program on 56,000 acres of site II and III land in Tillamook, Oregon, area.

Schroeder—Crown Zellerback Corporation is considering the possibility of early and continued crops to reduce capital investment costs. As much as 95 percent of basal

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[4] See footnote 3.

[5] Staebler, George R. 1959. Optimum levels of growing stock for managed stands. Proceedings of the Society of American Foresters.

area might be cut, including dominants, to realize the earliest possible return on the minimum capital investment.

Warrack—Most research effort by the British Columbia Forest Service is in regeneration studies. Thus, it is not certain this organization could cooperate in the proposed study.

Boe—In California, regeneration research is also the major effort. There is, however, a need for thinning studies.

Dahms—The proposed study plan might be equally applicable to lodgepole pine and other species in central Oregon.

Scott—University of Washington is interested in fundamental aspects of growth. Controlled range of conditions and regimes will give valuable information. Is desirous of cooperating in such a study.

Smith—University of British Columbia does not have pure Douglas-fir stands in which to work but similar studies might be conducted in mixtures containing Douglas-fir. Feels we already have information on maximum growth in open stands, especially in British Columbia where plantation stocking ranges between 200-600 trees per acre.

Cowlin next asked for expressions of opinion on whether short-term studies or permanent growth plots were the most effective method for developing the information we seek.

Staebler—Feels the single-tree approach is nebulous and that the sample plot technique is most productive.

Smith—We can make progress with individual tree studies. Long-term studies are also necessary, but no work of this type is contemplated until single-tree studies involving 200 stem analyses of three species are completed.

Reukema—Feels that single-tree studies should be supported by plot measurements. Crown development studies should give good preliminary information on what to expect after thinning but even at 40 years of age, there is no very clear relation between crown and stem development.

Barnes—Expressed hesitation about becoming involved with long-term studies because objectives may change and study plots might no longer serve our needs.

Scott—Believes stem analyses are valuable but that we cannot reproduce or interpret the past environment of the tree.

Petzold—The aim of Staebler's study is to provide basic information that can be applied to individual situations.

Berg—Cautioned not to forget ecological aspects and questioned whether small plots adequately reflect ecological conditions.

George Staebler then explained in some detail the plan he developed for levels-of-growing-stock studies. He stressed that this is a test of thinning regimes rather than of a thinning. Variables that determine growth were indicated as (1) frequency of thinning, (2) kind of thinning, and (3) amount of growing stock left on the ground. Size of tree we wish to work with in this type of study is 3–6 inches d.b.h. and 20–40 feet in height. Each person at the meeting was previously supplied with a copy of the study plan, so further details of Staebler's presentation are omitted.

Floyd Johnson discussed the variables and methods of analysis. Jim King discussed machine analysis of the data, explained three forms used for data recording and processing, and estimated costs of data processing.

After lunch, the group traveled to the Skykomish Tree Farm where an on-the-plot discussion was held for several hours. At the end of this part of the session, George Allen summarized briefly the day's meeting and indicated again the desire of the Weyerhaeuser Company to cooperate with other organizations to further levels-of-growing-stock studies. He asked for an expression of interest in exploring further the possibilities of cooperative installation of study plots similar to those developed by Staebler. Of 13 agencies or companies represented at the meeting, representatives from 8 expressed a probable interest and an additional 3 indicated a possible interest.

George Meagher promised he would contact interested agencies and companies soon with the idea of developing a working committee to prepare plans for getting studies underway. He named Dick Williamson, mensurationist in the Douglas-fir silviculture project at Olympia, as the Station's representative in the working committee and as coordinator for future cooperative efforts.

PARTICIPANTS

British Columbia Forest Service
George Warrack

Bureau of Land Management
Rod Fety

Crown Zellerback Corporation
George Schroeder

Oregon State University
George Barnes
John Bell
Alan Berg
Rudy Kangur

Port Blakely Mill Co.
William Cummings

Simpson Timber Company
Al Petzold

University of British Columbia
Harry Smith

University of Washington
Dave Scott

USDA Forest Service, Pacific Northwest Forest & Range Experiment Station
Dave Bruce, Portland
R.W. Cowlin, Portland
W. Dahms, Bend
Floyd Johnson, Portland
G.S. Meagher, Portland
D. Reukema, Olympia
Bob Tarrant, Portland
R. Williamson, Olympia
N.P. Worthington, Olympia

USDA Forest Service, Pacific Southwest Forest & Range Experiment Station
Ken Boe

USDA Forest Service, R-6
Otto Hanell—Olympic N.F.
Vern Hicks—R.O.
Art Mason—Snoqualmie N.F.

Washington State Department of Natural Resources
Gene Little

Weyerhaeuser Company
George Allen
Carl Garey
Nels Jeffers
Reid Kenady
Jim King
George Staebler

Table 27—Skykomish: Stand development for treatment 1, per-acre basis (plots 6010, 6022, and 6034)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*Ft³*		*No.*	*Inches*	*Ft²*	*Ft³*					*No.*	*Inches*	*Ft²*	*Ft³*	
1961	24	48	8.2	340	5.3	51.0	981	200	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	63	10.4	185	7.4	53.8	1,325	613	153	6.3	33.2	786	225	5.1	3.4	.92	2	4.3	.2	4	0
1968	31	70	11.6	138	8.9	59.0	1,637	1,075	43	8.1	15.7	427	240	9.9	6.0	.94	3	5.4	.5	13	0
1971	34	79	13.1	93	11.0	60.6	1,885	1,545	45	8.4	17.4	522	314	11.6	7.0	.83	0	.0	.0	0	0
1975	38	90	15.2	62	13.8	63.7	2,236	2,052	32	11.0	20.9	715	591	22.3	18.5	.86	0	.0	.0	0	0
1979	42	100	17.0	50	15.8	67.7	2,600	2,444	12	15.5	15.3	593	556	49.4	46.3	.99	0	.0	.0	0	0
1983	46	107	18.3	50	17.6	84.1	3,468	3,292	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1988	51	115	20.2	50	19.4	101.9	4,443	4,239	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1993	56	127	21.9	50	21.0	119.4	5,650	5,403	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*Ft³*				*Inches*		*Ft²*		*Ft³*							
1961	24	981	981	200	200	0.00	0.00	0.0	0.0	0	41	0	8	0	41	0	8
1965	28	2,112	2,116	837	837	.41	.41	9.0	9.0	283	75	159	30	284	76	159	30
1968	31	2,850	2,867	1,539	1,539	.46	.45	7.0	7.1	246	92	234	50	250	92	234	50
1971	34	3,620	3,637	2,323	2,323	.44	.44	6.3	6.3	257	106	262	68	257	107	262	68
1975	38	4,686	4,703	3,421	3,421	.50	.50	6.0	6.0	267	123	274	90	267	124	274	90
1979	42	5,643	5,660	4,369	4,369	.49	.49	4.8	4.8	239	134	237	104	239	135	237	104
1983	46	6,511	6,528	5,217	5,217	.45	.45	4.1	4.1	217	142	212	113	217	142	212	113
1988	51	7,486	7,503	6,164	6,164	.35	.35	3.6	3.6	195	147	189	121	195	147	189	121
1993	56	8,693	8,709	7,328	7,328	.32	.32	3.5	3.5	241	155	233	131	241	156	233	131

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 3,043 cubic feet (54 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 17 cubic feet (<1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 28—Skykomish: Stand development for treatment 2, per-acre basis (plots 6005, 6012, and 6026)

		After thinning							Removed in thinning								Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume							Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	Ft	Inches	No.	Inches	Ft^2	---- Ft^3 ----		No.	Inches	Ft^2	-------- Ft^3 --------					No.	Inches	Ft^2	--- Ft^3 ---	
1961	24	47	7.4	368	5.0	50.3	887	114	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	59	9.5	220	6.8	5.7	1,260	445	148	6.1	30.3	688	194	4.6	3.7	.94	0	.0	.0	0	0
1968	31	67	10.6	175	8.0	60.7	1,614	877	43	8.1	15.4	420	231	9.8	6.2	1.01	2	5.6	.3	7	0
1971	34	73	11.6	147	9.3	69.1	2,053	1,451	27	8.2	9.9	277	160	10.3	5.9	.90	2	9.0	.7	20	13
1975	38	87	13.7	123	11.3	85.7	3,043	2,568	22	9.8	11.3	387	288	17.6	13.1	.88	2	9.0	.7	23	16
1979	42	96	15.4	107	13.1	99.1	3,834	3,452	17	11.7	12.4	469	407	27.6	23.9	.91	0	.0	.0	0	0
1983	46	107	17.1	107	14.4	120.4	5,187	4,784	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1988	51	118	18.6	105	15.6	140.1	6,503	6,083	0	.0	.0	0	0	.0	.0	.00	2	17.0	2.6	119	113
1993	56	127	20.1	103	16.8	159.8	7,912	7,464	0	.0	.0	0	0	.0	.0	.00	2	12.8	1.5	76	69

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- Ft^3 ----------				--- Inches ---		--- Ft^2 ---		---------- Ft^3 ----------							
1961	24	887	887	114	114	0.00	0.00	0.0	0.0	0	37	0	5	0	37	0	5
1965	28	1,948	1,948	639	639	.37	.37	8.7	8.7	265	70	131	23	265	70	131	23
1968	31	2,722	2,729	1,301	1,301	.42	.41	7.2	7.3	258	88	221	42	261	88	221	42
1971	34	3,438	3,465	2,035	2,048	.39	.39	6.1	6.3	239	101	245	60	245	102	249	60
1975	38	4,815	4,865	3,440	3,469	.44	.44	7.0	7.2	344	127	351	91	350	128	355	91
1979	42	6,075	6,124	4,730	4,759	.40	.40	6.5	6.5	315	145	323	113	315	146	323	113
1983	46	7,427	7,477	6,063	6,092	.33	.33	5.3	5.3	338	161	333	132	338	163	333	132
1988	51	8,743	8,912	7,362	7,504	.25	.26	3.9	4.5	263	171	260	144	287	175	283	147
1993	56	10,152	10,397	8,743	8,955	.24	.23	3.9	4.2	282	181	276	156	297	186	290	160

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 2,241 cubic feet (37 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 245 cubic feet (2 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 29—Skykomish: Stand development for treatment 3, per-acre basis (plots 6016, 6031, and 6036)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*- - - - Ft³ - - - -*		*No.*	*Inches*	*Ft²*	*- - - - - - - - Ft³ - - - - - - - -*					*No.*	*Inches*	*Ft²*	*- - - Ft³ - - -*	
1961	24	47	8.1	375	5.0	50.7	931	161	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	59	10.3	248	6.8	61.7	1,407	554	127	5.8	23.5	524	113	4.1	3.2	.90	0	.0	.0	0	0
1968	31	67	11.6	205	8.0	70.9	1,798	984	43	8.0	14.9	376	221	8.7	6.9	1.00	0	.0	.0	0	0
1971	34	75	12.8	165	9.4	79.4	2,321	1,643	40	7.7	13.0	362	177	9.1	4.8	.85	0	.0	.0	0	0
1975	38	88	14.9	120	11.8	91.0	3,065	2,629	45	9.1	0.2	657	453	14.6	10.1	.82	0	.0	.0	0	0
1979	42	97	16.9	92	14.3	100.8	3,740	3,434	27	10.2	15.1	553	432	20.5	16.0	.76	2	12.2	1.4	46	42
1983	46	106	18.7	92	15.8	124.3	4,964	4,639	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1988	51	119	20.5	90	17.5	149.5	6,572	6,213	0	.0	.0	0	0	.0	.0	.00	2	7.0	.4	12	4
1993	56	130	22.2	90	18.8	173.2	8,236	7,823	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - Ft³ - - - - - - - - - -*				*- - - Inches - - -*		*- - - Ft² - - -*		*- Ft³ -*							
1961	24	931	931	161	161	0.00	0.00	0.0	0.0	0	39	0	7	0	39	0	7
1965	28	1,932	1,932	667	667	.37	.37	8.6	8.6	250	69	127	24	250	69	127	24
1968	31	2,698	2,698	1,318	1,318	.40	.40	8.0	8.0	256	87	217	43	256	87	217	43
1971	34	3,583	3,583	2,153	2,153	.38	.38	7.2	7.2	295	105	279	63	295	105	279	63
1975	38	4,984	4,984	3,592	3,592	.43	.43	7.9	7.9	350	131	360	95	350	131	360	95
1979	42	6,213	6,259	4,829	4,871	.41	.41	6.2	6.6	307	148	309	115	319	149	320	116
1983	46	7,436	7,483	6,034	6,075	.39	.39	5.9	5.9	306	162	301	131	306	163	301	132
1988	51	9,044	9,103	7,608	7,653	.33	.31	5.0	5.1	322	177	315	149	324	178	316	150
1993	56	10,708	10,767	9,218	9,263	.27	.27	4.7	4.7	333	191	322	165	333	192	322	165

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 2,472 cubic feet (39 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 58 cubic feet (1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 30—Skykomish: Stand development for treatment 4, per-acre basis (plots 6001, 6023, and 6035)

		After thinning							Removed in thinning								Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume							Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	Ft	Inches	No.	Inches	Ft^2	---- Ft^3 ----		No.	Inches	Ft^2	-------- Ft^3 --------					No.	Inches	Ft^2	--- Ft^3 ---	
1961	24	48	8.5	315	5.5	51.2	909	226	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	62	10.8	197	7.6	61.6	1,419	743	118	6.2	24.8	523	148	4.4	3.3	.87	0	.0	.0	0	0
1968	31	69	12.3	170	8.9	74.0	1,910	1,288	27	8.6	10.8	277	178	10.3	7.1	.97	0	.0	.0	0	0
1971	34	79	13.7	148	10.5	88.2	2,658	2,111	22	8.3	8.1	229	132	10.4	6.0	.81	0	.0	.0	0	0
1975	38	91	15.8	130	12.6	111.3	3,866	3,407	18	9.7	9.3	323	241	17.9	13.4	.79	0	.0	.0	0	0
1979	42	100	17.6	122	14.2	133.9	5,049	4,630	8	10.0	4.5	167	130	20.9	18.6	.71	0	.0	.0	0	0
1983	46	111	19.3	122	15.5	159.3	6,613	6,158	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1988	51	122	20.8	117	16.7	177.9	8,018	7,536	0	.0	.0	0	0	.0	.0	.00	5	14.6	5.8	251	234
1993	56	132	22.1	113	17.7	194.9	9,437	8,914	0	.0	.0	0	0	.0	.0	.00	2	11.5	1.2	56	49

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- Ft^3 ----------				--- Inches ---		--- Ft^2 ---		---------- Ft^3 ----------							
1961	24	909	909	226	226	0.00	0.00	0.0	0.0	0	38	0	9	0	38	0	9
1965	28	1,943	1,943	891	891	.41	.41	8.8	8.8	259	69	166	32	259	69	166	32
1968	31	2,711	2,711	1,614	1,614	.44	.44	7.7	7.7	256	87	241	52	256	87	241	52
1971	34	3,688	3,688	2,569	2,569	.42	.42	7.4	7.4	326	108	318	76	326	108	318	76
1975	38	5,218	5,218	4,106	4,106	.44	.44	8.1	8.1	383	137	384	108	383	137	384	108
1979	42	6,568	6,568	5,459	5,459	.36	.36	6.8	6.8	338	156	338	130	338	156	338	130
1983	46	8,132	8,132	6,987	6,987	.32	.32	6.3	6.3	391	177	382	152	391	177	382	152
1988	51	9,538	9,789	8,364	8,598	.24	.24	3.7	4.9	281	187	276	164	331	192	322	169
1993	56	10,957	11,264	9,743	10,025	.20	.19	3.4	3.6	284	196	276	174	295	201	285	179

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,519 cubic feet (23 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 307 cubic feet (3 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 31—Skykomish: Stand development for treatment 5, per-acre basis (plots 6009, 6011, and 6028)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*Ft³*		*No.*	*Inches*	*Ft²*	*Ft³*					*No.*	*Inches*	*Ft²*	*Ft³*	
1961	24	48	7.9	363	5.1	51.3	939	163	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	60	9.9	283	6.7	68.7	1,592	607	78	6.1	15.7	351	78	4.5	2.8	.93	2	3.5	.1	2	0
1968	31	68	11.3	253	7.9	84.9	2,270	1,212	25	7.4	7.4	195	99	7.8	6.6	.95	5	6.7	1.2	31	9
1971	34	76	12.5	227	9.0	98.2	2,953	1,956	25	7.9	8.5	249	130	10.0	5.7	.90	2	4.8	.2	5	0
1975	38	90	14.3	198	10.5	117.7	4,164	3,265	27	9.3	12.6	446	316	16.5	12.6	.90	2	6.4	.4	12	2
1979	42	100	16.1	172	12.1	133.9	5,255	4,493	27	9.7	13.7	539	405	20.0	15.0	.83	0	.0	.0	0	0
1983	46	110	17.8	172	13.3	161.5	6,904	6,125	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1988	51	120	19.6	172	14.4	190.6	8,646	7,862	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1993	56	131	21.2	172	15.4	218.5	10,676	9,841	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*Ft³*				*Inches*		*Ft²*		*Ft³*							
1961	24	939	939	163	163	0.00	0.00	0.0	0.0	0	39	0	7	0	39	0	7
1965	28	1,943	1,945	685	685	.36	.36	8.3	8.3	251	69	130	24	252	69	130	24
1968	31	2,816	2,850	1,389	1,398	.38	.38	7.9	8.3	291	91	235	45	302	92	238	45
1971	34	3,748	3,787	2,264	2,273	.33	.32	7.3	7.3	311	110	292	67	312	111	292	67
1975	38	5,406	5,456	3,888	3,899	.35	.35	8.0	8.1	414	142	406	102	417	144	406	103
1979	42	7,035	7,085	5,521	5,532	.31	.31	7.5	7.5	407	167	408	131	407	169	408	132
1983	46	8,684	8,734	7,153	7,164	.30	.30	6.9	6.9	412	189	408	156	412	190	408	156
1988	51	10,426	10,476	8,891	8,901	.23	.23	5.8	5.8	348	204	347	174	348	205	347	175
1993	56	12,456	12,507	10,869	10,880	.20	.20	5.6	5.6	406	222	396	194	406	223	396	194

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,780 cubic feet (25 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 50 cubic feet (<1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 32—Skykomish: Stand development for treatment 6, per-acre basis (plots 6007, 6015, and 6033)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*Ft³*		*No.*	*Inches*	*Ft²*	*Ft³*					*No.*	*Inches*	*Ft²*	*Ft³*	
1961	24	49	7.7	385	5.0	51.1	963	170	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	63	9.8	292	6.7	68.6	1,641	584	88	5.8	16.1	370	85	4.2	3.1	.90	5	5.2	.7	15	1
1968	31	70	11.2	247	7.9	81.9	2,199	1,164	38	7.7	12.5	341	175	9.0	5.8	.99	7	5.2	1.0	21	0
1971	34	77	12.5	200	9.3	89.8	2,729	1,856	42	7.5	12.7	376	175	9.0	5.0	.85	5	9.8	2.6	74	57
1975	38	90	14.6	143	11.4	97.4	3,365	2,795	53	9.2	24.8	838	592	15.8	11.4	.86	3	6.6	.8	23	7
1979	42	101	16.4	100	13.8	98.9	3,825	3,456	42	10.4	24.7	949	752	22.6	17.9	.82	2	12.0	1.3	52	46
1983	46	109	18.3	100	15.4	123.0	5,108	4,722	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1988	51	119	20.2	98	16.8	145.1	6,451	6,038	0	.0	.0	0	0	.0	.0	.00	2	18.4	3.1	136	130
1993	56	132	22.0	97	18.3	167.9	8,140	7,679	0	.0	.0	0	0	.0	.0	.00	2	12.1	1.3	66	59

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*Ft³*				*Inches*		*Ft²*		*Ft³*							
1961	24	963	963	170	170	0.00	0.00	0.0	0.0	0	40	0	7	0	40	0	7
1965	28	2,010	2,025	669	670	.37	.37	8.4	8.6	262	72	125	24	266	72	125	24
1968	31	2,909	2,945	1,424	1,424	.41	.40	8.6	8.9	300	94	252	46	307	95	252	46
1971	34	3,816	3,926	2,291	2,348	.34	.36	6.9	7.7	302	112	289	67	327	115	308	69
1975	38	5,289	5,423	3,822	3,887	.41	.40	8.1	8.3	368	139	383	101	374	143	385	102
1979	42	6,699	6,884	5,235	5,346	.37	.38	6.6	6.9	352	160	353	125	365	164	365	127
1983	46	7,983	8,168	6,501	6,612	.40	.40	6.0	6.0	321	174	317	141	321	178	317	144
1988	51	9,325	9,646	7,817	8,058	.29	.30	4.4	5.0	268	183	263	153	296	189	289	158
1993	56	11,014	11,402	9,458	9,758	.29	.27	4.6	4.8	338	197	328	169	351	204	340	174

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 2,874 cubic feet (42 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 388 cubic feet (3 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 33—Skykomish: Stand development for treatment 7, per-acre basis (plots 6021, 6027, and 6030)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*- - - - Ft³ - - - -*		*No.*	*Inches*	*Ft²*	*- - - - - - - - Ft³ - - - - - - - -*					*No.*	*Inches*	*Ft²*	*- - - Ft³ - - -*	
1961	24	48	8.1	352	5.2	51.1	964	175	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	60	10.5	285	7.0	75.6	1,807	706	63	6.4	14.1	338	103	5.4	3.8	.93	3	5.4	.5	12	0
1968	31	68	12.0	267	8.2	98.0	2,637	1,492	17	8.3	6.3	176	105	10.4	8.1 1	.01	2	5.5	.3	7	0
1971	34	75	13.3	248	9.3	117.6	3,458	2,407	17	8.3	6.2	182	102	10.7	6.0	.89	2	9.2	.8	24	17
1975	38	87	15.3	227	10.8	144.5	4,863	3,939	20	9.8	10.4	346	260	17.3	13.0	.91	2	11.6	1.2	43	38
1979	42	98	17.1	208	12.1	166.9	6,253	5,405	17	11.1	11.2	433	366	25.5	21.5	.92	2	6.7	.4	15	3
1983	46	108	18.8	202	13.3	192.6	7,929	7,080	0	.0	.0	0	0	.0	.0	.00	7	9.0	3.0	111	77
1988	51	119	20.5	195	14.4	219.4	9,840	8,984	0	.0	.0	0	0	.0	.0	.00	7	8.6	2.7	103	65
1993	56	129	22.1	188	15.5	243.5	11,625	10,758	0	.0	.0	0	0	.0	.0	.00	7	9.7	3.4	164	123

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - Ft³ - - - - - - - - - -*				*- - - Inches - - -*		*- - - Ft² - - -*		*- Ft³ -*							
1961	24	964	964	175	175	0.00	0.00	0.0	0.0	0	40	0	7	0	40	0	7
1965	28	2,146	2,158	809	809	.43	.43	9.7	9.8	295	77	158	29	298	77	158	29
1968	31	3,152	3,171	1,701	1,701	.41	.41	9.5	9.6	335	102	297	55	338	102	297	55
1971	34	4,154	4,197	2,718	2,734	.35	.35	8.6	8.9	334	122	339	80	342	123	344	80
1975	38	5,906	5,992	4,510	4,564	.35	.36	9.3	9.6	438	155	448	119	449	158	457	120
1979	42	7,729	7,830	6,341	6,399	.31	.30	8.4	8.5	456	184	458	151	459	186	459	152
1983	46	9,406	9,617	8,016	8,151	.28	.26	6.4	7.2	419	204	419	174	447	209	438	177
1988	51	11,316	11,630	9,921	10,120	.23	.20	5.4	5.9	382	222	381	195	403	228	394	198
1993	56	13,101	13,579	11,694	12,016	.21	.18	4.8	5.5	357	234	355	209	390	242	379	215

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,477 cubic feet (19 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 478 cubic feet (4 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 34—Skykomish: Stand development for treatment 8, per-acre basis (plots 6008, 6025, and 6037)

		After thinning							Removed in thinning								Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume							Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*Ft³*		*No.*	*Inches*	*Ft²*	*Ft³*					*No.*	*Inches*	*Ft²*	*Ft³*	
1961	24	46	8.2	360	5.1	51.2	926	169	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	59	10.5	308	6.7	75.9	1,785	683	50	6.3	10.9	258	85	5.2	4.3	.95	2	3.6	.1	2	0
1968	31	70	11.7	280	7.9	94.4	2,542	1,401	23	7.4	7.0	184	84	8.0	4.9	.95	5	5.9	1.0	24	1
1971	34	76	12.9	252	8.9	108.8	3,221	2,131	20	8.4	7.8	228	136	11.4	7.6	.95	8	6.7	2.0	53	25
1975	38	90	14.7	210	10.4	124.2	4,329	3,403	35	9.3	16.7	576	418	16.5	13.1	.91	7	8.1	2.4	77	41
1979	42	98	16.4	173	11.9	133.7	4,990	4,278	35	10.2	19.8	725	571	20.7	16.3	.88	2	4.7	.2	5	0
1983	46	108	18.0	172	13.0	158.9	6,550	5,797	0	.0	.0	0	0	.0	.0	.00	2	6.2	.3	11	1
1988	51	122	19.6	168	14.2	185.0	8,382	7,624	0	.0	.0	0	0	.0	.0	.00	3	7.9	1.1	40	20
1993	56	135	20.8	152	15.4	196.3	9,786	9,047	0	.0	.0	0	0	.0	.0	.00	17	11.0	11.1	514	429

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*Ft³*				*Inches*		*Ft²*		*Ft³*							
1961	24	926	926	169	169	0.00	0.00	0.0	0.0	0	39	0	7	0	39	0	7
1965	28	2,043	2,045	768	768	.39	.39	8.9	8.9	279	73	150	27	280	73	150	27
1968	31	2,984	3,011	1,570	1,571	.37	.37	8.5	8.8	314	96	267	51	322	97	268	51
1971	34	3,892	3,971	2,435	2,461	.34	.33	7.4	8.1	302	114	289	72	320	117	297	72
1975	38	5,575	5,731	4,125	4,193	.34	.34	8.0	8.6	421	147	422	109	440	151	433	110
1979	42	6,961	7,122	5,571	5,638	.30	.29	7.3	7.4	346	166	361	133	348	170	361	134
1983	46	8,521	8,694	7,090	7,158	.28	.27	6.3	6.4	390	185	380	154	393	189	380	156
1988	51	10,353	10,565	8,917	9,005	.23	.22	5.2	5.4	366	203	365	175	374	207	369	177
1993	56	11,756	12,482	10,339	10,856	.25	.18	2.3	4.5	281	210	285	185	383	223	370	194

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,971 cubic feet (28 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 726 cubic feet (6 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 35—Skykomish: Stand development for control, per-acre basis (plots 6002, 6014, 6038, and 6039)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*- - - - Ft³ - - - -*		*No.*	*Inches*	*Ft²*	*- - - - - - - - Ft³ - - - - - - - -*					*No.*	*Inches*	*Ft²*	*- - - Ft³ - - -*	
1961	24	45	8.1	594	4.7	72.5	1,266	177	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1965	28	57	9.9	594	5.8	18.7	2,471	653	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1968	31	67	11.1	589	6.6	139.3	3,700	1,404	0	.0	.0	0	0	.0	.0	.00	5	5.0	.7	17	0
1971	34	77	12.2	581	7.3	166.7	5,051	2,415	0	.0	.0	0	0	.0	.0	.00	8	4.7	.9	24	3
1975	38	89	13.8	526	8.3	195.1	6,627	4,097	0	.0	.0	0	0	.0	.0	.00	55	5.7	9.7	293	85
1979	42	101	15.3	470	9.3	218.7	8,352	5,912	0	.0	.0	0	0	.0	.0	.00	56	5.4	8.9	288	44
1983	46	112	16.8	424	10.3	242.1	10,352	7,998	0	.0	.0	0	0	.0	.0	.00	46	5.7	8.3	301	39
1988	51	123	18.4	385	11.4	267.5	12,118	10,068	0	.0	.0	0	0	.0	.0	.00	39	6.5	8.9	324	95
1993	56	133	19.9	304	12.9	271.0	13,316	11,719	0	.0	.0	0	0	.0	.0	.00	81	7.8	27.0	1148	620

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - Ft³ - - - - - - - - - -*				*- - - Inches - - -*		*- - - Ft² - - -*		*- Ft³ -*							
1961	24	1,266	1,266	177	177	0.00	0.00	0.0	0.0	0	53	0	7	0	53	0	7
1965	28	2,471	2,471	653	653	.27	.27	9.1	9.1	301	88	119	23	301	88	119	23
1968	31	3,700	3,717	1,404	1,404	.27	.27	10.2	10.4	410	119	251	45	415	120	251	45
1971	34	5,051	5,092	2,415	2,418	.22	.22	9.1	9.4	450	149	337	71	458	150	338	71
1975	38	6,627	6,961	4,097	4,184	.25	.22	7.1	9.5	394	174	420	108	467	183	442	110
1979	42	8,352	8,975	5,912	6,043	.26	.18	5.9	8.2	431	199	454	141	504	214	465	144
1983	46	10,352	11,276	7,998	8,169	.25	.18	5.8	7.9	500	225	522	174	575	245	531	178
1988	51	12,118	13,365	10,068	10,334	.22	.15	5.1	6.9	353	238	414	197	418	262	433	203
1993	56	13,316	15,711	11,719	12,605	.31	.15	.7	6.1	240	238	330	209	469	281	454	225

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) in mortality = 2,395 cubic feet (15 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 36—Skykomish: Trees per acre, 1961–1993, by treatment, plot, and period

Treatment	Plot	Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
		24	28	28	31	31	34	34	38	38	42	42	46	46	51	51	56
		Number of trees per acre															
1	6010	410	405	225	215	165	165	105	105	60	60	50	50	50	50	50	50
	6022	290	290	160	160	120	120	75	75	55	55	45	45	45	45	45	45
	6034	320	320	170	170	130	130	100	100	70	70	55	55	55	55	55	55
	Avg.	340	338	185	182	138	138	93	93	62	62	50	50	50	50	50	50
2	6005	375	375	235	235	185	180	160	155	130	130	115	115	115	110	110	105
	6012	340	340	210	210	170	170	145	145	115	115	100	100	100	100	100	100
	6026	390	390	215	210	170	170	135	135	125	125	105	105	105	105	105	105
	Avg.	368	368	220	218	175	173	147	145	123	123	107	107	107	105	105	103
3	6016	410	410	255	255	205	205	160	160	115	115	85	85	85	85	85	85
	6031	340	340	215	215	185	185	150	150	110	105	85	85	85	85	85	85
	6036	375	375	275	275	225	225	185	185	135	135	105	105	105	100	100	100
	Avg.	375	375	248	248	205	205	165	165	120	118	92	92	92	90	90	90
4	6001	330	330	200	200	170	170	140	140	125	125	115	115	115	115	115	115
	6023	315	315	185	185	160	160	140	140	120	120	115	115	115	115	115	115
	6035	300	300	205	205	180	180	165	165	145	145	135	135	135	120	120	110
	Avg.	315	315	197	197	170	170	148	148	130	130	122	122	122	117	117	113
5	6009	420	415	335	320	300	295	275	275	240	240	210	210	210	210	210	210
	6011	340	340	280	280	250	250	220	220	195	195	165	165	165	165	165	165
	6028	330	330	235	235	210	210	185	180	160	160	140	140	140	140	140	140
	Avg.	363	362	283	278	253	252	227	225	198	198	172	172	172	172	172	172
6	6007	320	320	255	255	215	205	180	180	135	135	100	100	100	95	95	90
	6015	350	345	250	245	200	200	155	150	105	105	70	70	70	70	70	70
	6033	485	475	370	355	325	320	265	260	190	185	130	130	130	130	130	130
	Avg.	385	380	292	285	247	242	200	197	143	142	100	100	100	98	98	97
7	6021	330	325	270	270	250	250	230	230	210	205	190	180	180	180	180	170
	6027	375	375	310	310	290	290	270	265	250	250	230	225	225	225	225	215
	6030	350	345	275	270	260	255	245	245	220	220	205	200	200	180	180	180
	Avg.	352	348	285	283	267	265	248	247	227	225	208	202	202	195	195	188
8	6008	340	340	300	300	270	265	240	230	200	200	170	170	170	170	170	170
	6025	365	360	300	285	275	265	245	245	205	205	170	165	165	165	165	140
	6037	375	375	325	325	295	285	270	260	225	220	180	180	180	170	170	145
	Avg.	360	358	308	303	280	272	252	245	210	208	173	172	172	168	168	152
Control	6002	785	785	785	775	775	755	755	655	655	585	585	515	515	470	470	380
	6014	530	530	530	530	530	520	520	515	515	455	455	415	415	395	395	325
	6038	425	425	425	425	425	425	425	375	375	330	330	315	315	280	280	245
	6039	635	635	635	625	625	625	625	560	560	510	510	450	450	395	395	265
	Avg.	594	594	594	589	589	581	581	526	526	470	470	424	424	385	385	304

[a] Columns are measurements after treatment and just before next treatment.

Table 37—Skykomish: Basal area per acre, 1961–1993, by treatment, plot, and period

Treatment	Plot	Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
		24	28	28	31	31	34	34	38	38	42	42	46	46	51	51	56
		Square feet per acre															
1	6010	51.1	89.3	53.9	75.7	59.5	81.0	60.6	86.3	62.9	83.3	67.6	85.1	85.1	104.0	104.0	119.6
	6022	51.4	84.7	54.5	75.3	59.0	77.4	60.5	83.6	64.5	82.6	68.1	84.2	84.2	101.5	101.5	120.2
	6034	50.6	86.9	52.9	72.9	58.4	75.6	60.6	83.9	63.8	83.3	67.5	83.0	83.0	100.2	100.2	118.5
	Avg.	51.0	87.0	53.8	74.6	59.0	78.0	60.6	84.6	63.7	83.0	67.7	84.1	84.1	101.9	101.9	119.4
2	6005	49.9	80.0	55.3	76.3	60.3	75.8	69.4	96.3	84.7	111.9	101.0	123.7	123.7	138.3	138.3	157.7
	6012	49.6	81.9	54.5	76.4	59.9	78.5	69.0	97.4	84.6	108.1	95.8	116.4	116.4	137.7	137.7	155.1
	6026	51.3	93.2	54.3	75.8	62.0	82.6	69.0	97.4	87.8	114.5	100.5	121.3	121.3	144.3	144.3	166.5
	Avg.	50.3	85.0	54.7	76.2	60.7	79.0	69.1	97.0	85.7	111.5	99.1	120.4	120.4	140.1	140.1	159.8
3	6016	50.0	89.7	61.9	88.7	71.3	93.0	79.4	110.9	90.6	116.8	101.0	123.9	123.9	149.0	149.0	172.9
	6031	51.3	85.6	61.4	83.8	70.9	91.6	79.4	109.5	91.1	111.9	100.3	122.8	122.8	147.1	147.1	168.0
	6036	50.8	80.3	61.9	85.0	70.4	92.8	79.4	113.2	91.3	119.1	101.1	126.3	126.3	152.3	152.3	178.7
	Avg.	50.7	85.2	61.7	85.8	70.9	92.5	79.4	111.2	91.0	115.9	100.8	124.3	124.3	149.5	149.5	173.2
4	6001	51.4	85.8	61.6	85.2	74.3	97.0	88.1	118.8	111.2	140.0	134.5	159.9	159.9	185.7	185.7	208.7
	6023	51.0	89.9	61.5	85.7	73.9	96.6	88.4	120.5	111.3	136.7	133.2	159.3	159.3	184.1	184.1	203.2
	6035	51.2	83.5	61.8	83.7	73.9	95.3	88.2	122.4	111.3	138.5	133.9	158.6	158.6	163.8	163.8	172.9
	Avg.	51.2	86.4	61.6	84.8	74.0	96.3	88.2	120.6	111.3	138.4	133.9	159.3	159.3	177.9	177.9	194.9
5	6009	49.7	82.2	68.4	89.7	84.7	105.8	98.4	131.6	117.7	147.8	133.8	161.6	161.6	190.9	190.9	219.0
	6011	51.5	80.8	68.7	92.9	84.7	106.7	97.7	129.9	117.7	149.4	134.0	162.9	162.9	193.1	193.1	220.8
	6028	52.6	89.9	68.8	94.5	85.3	107.7	98.4	129.4	117.6	145.3	133.9	160.0	160.0	187.9	187.9	215.8
	Avg.	51.3	84.3	68.7	92.4	84.9	106.7	98.2	130.3	117.7	147.5	133.9	161.5	161.5	190.6	190.6	218.5
6	6007	51.4	82.0	69.0	95.3	81.6	97.4	89.7	120.9	97.7	124.1	100.9	123.1	123.1	136.0	136.0	152.9
	6015	51.5	87.8	70.1	97.8	81.8	105.8	89.8	120.5	97.4	123.7	98.9	123.0	123.0	148.7	148.7	173.4
	6033	50.4	84.3	66.8	90.2	82.4	104.2	89.8	125.2	97.0	123.0	97.0	123.0	123.0	150.4	150.4	177.4
	Avg.	51.1	84.7	68.6	94.5	81.9	102.5	89.8	122.2	97.4	123.6	98.9	123.0	123.0	145.1	145.1	167.9
7	6021	51.4	90.7	75.8	106.3	98.7	125.9	117.5	156.4	144.6	178.1	166.7	189.9	189.9	221.3	221.3	245.8
	6027	50.4	89.1	75.9	104.6	97.8	124.3	117.6	152.1	144.5	178.8	166.9	193.9	193.9	223.4	223.4	245.9
	6030	51.4	89.4	75.1	101.8	97.4	121.1	117.6	156.2	144.4	177.3	167.0	194.0	194.0	213.5	213.5	238.9
	Avg.	51.1	89.7	75.6	104.2	98.0	123.8	117.6	154.9	144.5	178.1	166.9	192.6	192.6	219.4	219.4	243.5
8	6008	52.1	86.9	76.1	104.1	95.1	117.3	108.8	142.6	124.3	154.3	133.6	158.9	158.9	184.4	184.4	209.2
	6025	51.7	87.6	75.5	98.1	94.7	118.6	108.9	142.6	124.1	154.2	133.9	159.3	159.3	188.6	188.6	202.6
	6037	49.7	85.9	76.0	102.0	93.2	113.8	108.8	137.5	124.2	151.9	133.5	158.4	158.4	181.9	181.9	177.3
	Avg.	51.2	86.8	75.9	101.4	94.4	116.6	108.8	140.9	124.2	153.5	133.7	158.9	158.9	185.0	185.0	196.3
Control	6002	87.6	125.9	125.9	157.6	157.6	185.3	185.3	208.1	208.1	226.3	226.3	244.6	244.6	265.5	265.5	265.9
	6014	62.4	99.1	99.1	129.4	129.4	155.2	155.2	190.3	190.3	214.5	214.5	233.5	233.5	260.1	260.1	269.6
	6038	54.5	85.4	85.4	112.7	112.7	138.9	138.9	167.0	167.0	194.0	194.0	223.0	223.0	246.6	246.6	266.8
	6039	85.5	124.6	124.6	157.7	157.7	187.3	187.3	215.0	215.0	240.1	240.1	267.5	267.5	297.9	297.9	281.5
	Avg.	72.5	108.7	108.7	139.3	139.3	166.7	166.7	195.1	195.1	218.7	218.7	242.1	242.1	267.5	267.5	271.0

[a] Columns are measurements after treatment and just before next treatment.

Table 38—Skykomish: Quadratic mean diameter, 1961–1993, by treatment, plot, and period

		Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
Treatment	**Plot**	**24**	**28**	**28**	**31**	**31**	**34**	**34**	**38**	**38**	**42**	**42**	**46**	**46**	**51**	**51**	**56**
									Inches								
1	6010	4.8	6.4	6.6	8.0	8.1	9.5	10.3	12.3	13.9	16.0	15.7	17.7	17.7	19.5	19.5	20.9
	6022	5.7	7.3	7.9	9.3	9.5	10.9	12.2	14.3	14.7	16.6	16.7	18.5	18.5	20.3	20.3	22.1
	6034	5.4	7.1	7.6	8.9	9.1	10.3	10.5	12.4	12.9	14.8	15.0	16.6	16.6	18.3	18.3	19.9
	Avg.	5.3	6.9	7.4	8.7	8.9	10.2	11.0	13.0	13.8	15.8	15.8	17.6	17.6	19.4	19.4	21.0
2	6005	4.9	6.3	6.6	7.7	7.7	8.8	8.9	10.7	10.9	12.6	12.7	14.0	14.0	15.2	15.2	16.6
	6012	5.2	6.6	6.9	8.2	8.0	9.2	9.3	11.1	11.6	13.1	13.3	14.6	14.6	15.9	15.9	16.9
	6026	4.9	6.6	6.8	8.1	8.2	9.4	9.7	11.5	11.3	13.0	13.2	14.6	14.6	15.9	15.9	17.1
	Avg.	5.0	6.5	6.8	8.0	8.0	9.1	9.3	11.1	11.3	12.9	13.1	14.4	14.4	15.6	15.6	16.8
3	6016	4.7	6.3	6.7	8.0	8.0	9.1	9.5	11.3	12.0	13.6	14.8	16.3	16.3	17.9	17.9	19.3
	6031	5.3	6.8	7.2	8.5	8.4	9.5	9.9	11.6	12.3	14.0	14.7	16.3	16.3	17.8	17.8	19.0
	6036	5.0	6.3	6.4	7.5	7.6	8.7	8.9	10.6	11.1	12.7	13.3	14.9	14.9	16.7	16.7	18.1
	Avg.	5.0	6.5	6.8	8.0	8.0	9.1	9.4	11.1	11.8	13.4	14.3	15.8	15.8	17.5	17.5	18.8
4	6001	5.3	6.9	7.5	8.8	9.0	10.2	10.7	12.5	12.8	14.3	14.6	16.0	16.0	17.2	17.2	18.2
	6023	5.4	7.2	7.8	9.2	9.2	10.5	10.8	12.6	13.0	14.5	14.6	15.9	15.9	17.1	17.1	18.0
	6035	5.6	7.1	7.4	8.7	8.7	9.9	9.9	11.7	11.9	13.2	13.5	14.7	14.7	15.8	15.8	17.0
	Avg.	5.5	7.1	7.6	8.9	8.9	10.2	10.5	12.2	12.6	14.0	14.2	15.5	15.5	16.7	16.7	17.7
5	6009	4.7	6.0	6.1	7.2	7.2	8.1	8.1	9.4	9.5	10.6	10.8	11.9	11.9	12.9	12.9	13.8
	6011	5.3	6.6	6.7	7.8	7.9	8.8	9.0	10.4	10.5	11.9	12.2	13.5	13.5	14.6	14.6	15.7
	6028	5.4	7.1	7.3	8.6	8.6	9.7	9.9	11.5	11.6	12.9	13.2	14.5	14.5	15.7	15.7	16.8
	Avg.	5.1	6.6	6.7	7.9	7.9	8.9	9.0	10.4	10.5	11.8	12.1	13.3	13.3	14.4	14.4	15.4
6	6007	5.4	6.9	7.0	8.3	8.3	9.3	9.6	11.1	11.5	13.0	13.6	15.0	15.0	16.2	16.2	17.7
	6015	5.2	6.8	7.2	8.6	8.7	9.8	10.3	12.1	13.0	14.7	16.1	17.9	17.9	19.7	19.7	21.3
	6033	4.4	5.7	5.8	6.8	6.8	7.7	7.9	9.4	9.7	11.0	11.7	13.2	13.2	14.6	14.6	15.8
	Avg.	5.0	6.5	6.7	7.9	7.9	9.0	9.3	10.9	11.4	12.9	13.8	15.4	15.4	16.8	16.8	18.3
7	6021	5.3	7.2	7.2	8.5	8.5	9.6	9.7	11.2	11.2	12.6	12.7	13.9	13.9	15.0	15.0	16.3
	6027	5.0	6.6	6.7	7.9	7.9	8.9	8.9	10.3	10.3	11.5	11.5	12.6	12.6	13.5	13.5	14.5
	6030	5.2	6.9	7.1	8.3	8.3	9.3	9.4	10.8	11.0	12.2	12.2	13.3	13.3	14.7	14.7	15.6
	Avg.	5.2	6.9	7.0	8.2	8.2	9.3	9.3	10.7	10.8	12.1	12.1	13.3	13.3	14.4	14.4	15.5
8	6008	5.3	6.8	6.8	8.0	8.0	9.0	9.1	10.7	10.7	11.9	12.0	13.1	13.1	14.1	14.1	15.0
	6025	5.1	6.7	6.8	7.9	7.9	9.1	9.0	10.3	10.5	11.7	12.0	13.3	13.3	14.5	14.5	16.3
	6037	4.9	6.5	6.5	7.6	7.6	8.6	8.6	9.8	10.1	11.3	11.7	12.7	12.7	14.0	14.0	15.0
	Avg.	5.1	6.7	6.7	7.8	7.9	8.9	8.9	10.3	10.4	11.6	11.9	13.0	13.0	14.2	14.2	15.4
Control	6002	4.5	5.4	5.4	6.1	6.1	6.7	6.7	7.6	7.6	8.4	8.4	9.3	9.3	10.2	10.2	11.3
	6014	4.6	5.9	5.9	6.7	6.7	7.4	7.4	8.2	8.2	9.3	9.3	10.2	10.2	11.0	11.0	12.3
	6038	4.9	6.1	6.1	7.0	7.0	7.7	7.7	9.0	9.0	10.4	10.4	11.4	11.4	12.7	12.7	14.1
	6039	5.0	6.0	6.0	6.8	6.8	7.4	7.4	8.4	8.4	9.3	9.3	10.4	10.4	11.8	11.8	14.0
	Avg.	4.7	5.8	5.8	6.6	6.6	7.3	7.3	8.3	8.3	9.3	9.3	10.3	10.3	11.4	11.4	12.9

[a] Columns are measurements after treatment and just before next treatment.

Table 39—Skykomish: Total stem volume per acre, 1961–1993, by treatment, plot, and period

		Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
Treatment	**Plot**	**24**	**28**	**28**	**31**	**31**	**34**	**34**	**38**	**38**	**42**	**42**	**46**	**46**	**51**	**51**	**56**
		Cubic feet per acre															
1	6010	981	2,140	1,294	2,040	1,599	2,441	1,843	2,963	2,165	3,142	2,532	3,429	3,429	4,436	4,436	5,606
	6022	1,012	2,133	1,403	2,142	1,692	2,449	1,942	2,983	2,310	3,209	2,647	3,510	3,510	4,477	4,477	5,704
	6034	951	2,062	1,279	2,007	1,619	2,329	1,869	2,908	2,234	3,227	2,621	3,464	3,464	4,417	4,417	5,638
	Avg.	981	2,112	1,325	2,063	1,637	2,406	1,885	2,951	2,236	3,193	2,600	3,468	3,468	4,443	4,443	5,650
2	6005	858	1,776	1,242	1,981	1,557	2,169	1,993	3,313	2,929	4,245	3,848	5,221	5,221	6,359	6,359	7,741
	6012	893	1,881	1,254	2,038	1,582	2,302	2,040	3,411	2,973	4,092	3,624	4,885	4,885	6,208	6,208	7,524
	6026	911	2,185	1,283	2,085	1,704	2,519	2,125	3,566	3,228	4,572	4,031	5,453	5,453	6,941	6,941	8,469
	Avg.	887	1,948	1,260	2,034	1,614	2,330	2,053	3,430	3,043	4,303	3,834	5,187	5,187	6,503	6,503	7,912
3	6016	920	2,040	1,425	2,301	1,849	2,746	2,358	3,776	3,085	4,374	3,776	4,946	4,946	6,567	6,567	8,170
	6031	950	1,980	1,424	2,193	1,840	2,709	2,368	3,729	3,116	4,220	3,767	5,021	5,021	6,591	6,591	8,160
	6036	922	1,774	1,373	2,028	1,704	2,594	2,237	3,662	2,995	4,287	3,677	4,925	4,925	6,559	6,559	8,379
	Avg.	931	1,932	1,407	2,174	1,798	2,683	2,321	3,722	3,065	4,294	3,740	4,964	4,964	6,572	6,572	8,236
4	6001	905	1,914	1,403	2,157	1,884	2,863	2,620	4,062	3,795	5,182	4,976	6,559	6,559	8,185	8,185	9,864
	6023	917	2,064	1,456	2,261	1,951	2,950	2,709	4,180	3,862	5,170	5,037	6,588	6,588	8,355	8,355	9,876
	6035	905	1,850	1,399	2,145	1,896	2,849	2,646	4,324	3,940	5,296	5,134	6,691	6,691	7,514	7,514	8,572
	Avg.	909	1,943	1,419	2,188	1,910	2,887	2,658	4,188	3,866	5,216	5,049	6,613	6,613	8,018	8,018	9,437
5	6009	882	1,849	1,543	2,339	2,216	3,123	2,909	4,621	4,137	5,825	5,268	6,928	6,928	8,666	8,666	10,746
	6011	954	1,859	1,595	2,482	2,267	3,216	2,962	4,636	4,197	5,856	5,241	6,932	6,932	8,728	8,728	10,689
	6028	980	2,121	1,638	2,574	2,327	3,266	2,987	4,574	4,160	5,700	5,255	6,851	6,851	8,544	8,544	10,593
	Avg.	939	1,943	1,592	2,465	2,270	3,202	2,953	4,610	4,164	5,794	5,255	6,904	6,904	8,646	8,646	10,676
6	6007	1,006	2,000	1,702	2,649	2,262	3,045	2,808	4,256	3,458	4,891	3,987	5,218	5,218	6,162	6,162	7,557
	6015	989	2,131	1,714	2,648	2,214	3,190	2,719	4,166	3,371	4,778	3,815	5,026	5,026	6,505	6,505	8,256
	6033	893	1,899	1,506	2,322	2,121	3,083	2,661	4,186	3,265	4,654	3,673	5,081	5,081	6,685	6,685	8,606
	Avg.	963	2,010	1,641	2,540	2,199	3,106	2,729	4,203	3,365	4,774	3,825	5,108	5,108	6,451	6,451	8,140
7	6021	1,002	2,201	1,841	2,918	2,703	3,753	3,500	5,331	4,944	6,809	6,362	7,880	7,880	9,965	9,965	11,761
	6027	928	2,114	1,802	2,795	2,606	3,634	3,440	5,077	4,820	6,644	6,179	7,917	7,917	9,958	9,958	11,718
	6030	963	2,122	1,779	2,727	2,603	3,532	3,433	5,221	4,825	6,605	6,216	7,991	7,991	9,596	9,596	11,395
	Avg.	964	2,146	1,807	2,813	2,637	3,640	3,458	5,210	4,863	6,686	6,253	7,929	7,929	9,840	9,840	11,625
8	6008	953	2,072	1,825	2,847	2,607	3,540	3,276	5,063	4,423	5,791	5,027	6,589	6,589	8,361	8,361	10,397
	6025	933	2,057	1,760	2,632	2,540	3,466	3,184	4,902	4,268	5,694	4,930	6,481	6,481	8,454	8,454	10,093
	6037	891	2,001	1,771	2,701	2,480	3,342	3,204	4,750	4,297	5,660	5,014	6,582	6,582	8,332	8,332	8,867
	Avg.	926	2,043	1,785	2,727	2,542	3,449	3,221	4,905	4,329	5,715	4,990	6,550	6,550	8,382	8,382	9,786
Control	6002	1,533	2,886	2,886	4,188	4,188	5,654	5,654	7,039	7,039	8,671	8,671	10,622	10,622	12,042	12,042	13,083
	6014	1,080	2,253	2,253	3,445	3,445	4,703	4,703	6,454	6,454	8,187	8,187	9,960	9,960	11,725	11,725	13,177
	6038	938	1,897	1,897	2,957	2,957	4,156	4,156	5,686	5,686	7,393	7,393	9,400	9,400	11,149	11,149	13,076
	6039	1,513	2,847	2,847	4,209	4,209	5,690	5,690	7,328	7,328	9,159	9,159	11,427	11,427	13,555	13,555	13,929
	Avg.	1,266	2,471	2,471	3,700	3,700	5,051	5,051	6,627	6,627	8,352	8,352	10,352	10,352	12,118	12,118	13,316

[a] Columns are measurements after treatment and just before next treatment.

Table 40—Skykomish: Merchantable volume per acre, 1961–1993, by treatment, plot, and period

Treatment	Plot	Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
		24	28	28	31	31	34	34	38	38	42	42	46	46	51	51	56
		Cubic feet to a 6-inch top per acre															
1	6010	95	562	409	1,094	880	1,736	1,429	2,593	1,985	2,956	2,377	3,255	3,255	4,234	4,234	5,363
	6022	319	1,027	808	1,514	1,229	1,991	1,697	2,753	2,146	3,032	2,500	3,338	3,338	4,274	4,274	5,457
	6034	186	923	621	1,335	1,115	1,851	1,509	2,583	2,023	3,011	2,455	3,283	3,283	4,209	4,209	5,389
	Avg.	200	837	613	1,314	1,075	1,859	1,545	2,643	2,052	3,000	2,444	3,292	3,292	4,239	4,239	5,403
2	6005	112	535	429	1,000	796	1,412	1,327	2,675	2,404	3,753	3,410	4,776	4,776	5,913	5,913	7,287
	6012	164	675	497	1,150	864	1,597	1,440	2,832	2,542	3,684	3,271	4,504	4,504	5,799	5,799	7,078
	6026	66	706	409	1,172	969	1,823	1,585	3,062	2,758	4,138	3,674	5,072	5,072	6,537	6,537	8,028
	Avg.	114	639	445	1,107	877	1,610	1,451	2,856	2,568	3,858	3,452	4,784	4,784	6,083	6,083	7,464
3	6016	131	703	563	1,271	1,013	1,854	1,686	3,140	2,662	3,962	3,506	4,660	4,660	6,237	6,237	7,789
	6031	226	766	653	1,328	1,094	1,936	1,751	3,152	2,719	3,840	3,477	4,709	4,709	6,236	6,236	7,755
	6036	127	533	447	1,014	845	1,669	1,492	2,952	2,505	3,797	3,320	4,548	4,548	6,165	6,165	7,925
	Avg.	161	667	554	1,205	984	1,820	1,643	3,081	2,629	3,866	3,434	4,639	4,639	6,213	6,213	7,823
4	6001	228	816	719	1,417	1,264	2,207	2,109	3,557	3,358	4,743	4,583	6,122	6,122	7,703	7,703	9,319
	6023	249	998	803	1,577	1,355	2,340	2,187	3,664	3,441	4,746	4,631	6,142	6,142	7,857	7,857	9,329
	6035	201	858	707	1,405	1,246	2,182	2,036	3,721	3,422	4,792	4,677	6,210	6,210	7,047	7,047	8,095
	Avg.	226	891	743	1,466	1,288	2,243	2,111	3,648	3,407	4,760	4,630	6,158	6,158	7,536	7,536	8,914
5	6009	113	506	461	1,031	958	1,745	1,624	3,225	2,933	4,634	4,239	5,904	5,904	7,676	7,676	9,727
	6011	184	656	603	1,293	1,208	2,111	2,000	3,653	3,333	4,996	4,530	6,188	6,188	7,964	7,964	9,863
	6028	193	891	756	1,609	1,470	2,404	2,245	3,862	3,528	5,063	4,709	6,283	6,283	7,947	7,947	9,933
	Avg.	163	685	607	1,311	1,212	2,087	1,956	3,580	3,265	4,898	4,493	6,125	6,125	7,862	7,862	9,841
6	6007	249	821	712	1,563	1,345	2,147	2,045	3,539	2,953	4,390	3,637	4,850	4,850	5,782	5,782	7,146
	6015	254	902	815	1,643	1,401	2,356	2,094	3,604	3,004	4,386	3,590	4,771	4,771	6,203	6,203	7,891
	6033	8	284	226	812	744	1,589	1,428	3,018	2,428	3,848	3,140	4,544	4,544	6,128	6,128	7,999
	Avg.	170	669	584	1,339	1,164	2,031	1,856	3,387	2,795	4,208	3,456	4,722	4,722	6,038	6,038	7,679
7	6021	209	949	782	1,778	1,652	2,710	2,551	4,409	4,103	5,987	5,594	7,133	7,133	9,172	9,172	10,965
	6027	132	688	616	1,447	1,341	2,362	2,266	3,951	3,759	5,593	5,218	6,936	6,936	8,940	8,940	10,705
	6030	185	790	720	1,568	1,484	2,455	2,404	4,236	3,954	5,731	5,403	7,171	7,171	8,841	8,841	10,603
	Avg.	175	809	706	1,598	1,492	2,509	2,407	4,199	3,939	5,770	5,405	7,080	7,080	8,984	8,984	10,758
8	6008	199	865	729	1,596	1,486	2,356	2,216	4,042	3,523	4,950	4,312	5,823	5,823	7,567	7,567	9,540
	6025	139	750	692	1,502	1,454	2,363	2,167	3,856	3,399	4,881	4,268	5,795	5,795	7,739	7,739	9,446
	6037	170	688	628	1,357	1,264	2,081	2,011	3,565	3,287	4,716	4,255	5,775	5,775	7,565	7,565	8,154
	Avg.	169	768	683	1,485	1,401	2,267	2,131	3,821	3,403	4,849	4,278	5,797	5,797	7,624	7,624	9,047
Control	6002	209	641	641	1,232	1,232	2,119	2,119	3,711	3,711	5,376	5,376	7,480	7,480	9,343	9,343	10,931
	6014	98	495	495	1,257	1,257	2,297	2,297	4,024	4,024	5,894	5,894	7,741	7,741	9,660	9,660	11,519
	6038	148	599	599	1,341	1,341	2,314	2,314	3,985	3,985	5,812	5,812	7,807	7,807	9,774	9,774	11,844
	6039	252	876	876	1,788	1,788	2,929	2,929	4,666	4,666	6,565	6,565	8,963	8,963	11,494	11,494	12,582
	Avg.	177	653	653	1,404	1,404	2,415	2,415	4,097	4,097	5,912	5,912	7,998	7,998	10,068	10,068	11,719

[a] Columns are measurements after treatment and just before next treatment.

Table 41—Skykomish: Scribner board-foot volume (6-inch top and 32-foot logs) per acre, 1961–1993, by treatment, plot, and period

		Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
Treatment	**Plot**	**24**	**28**	**28**	**31**	**31**	**34**	**34**	**38**	**38**	**42**	**42**	**46**	**46**	**51**	**51**	**56**
		Scribner board feet per acre															
1	6010	181	1,414	1,039	4,267	3,155	7,305	5,750	10,090	7,682	12,264	9,937	13,608	13,608	19,126	19,126	25,136
	6022	831	3,375	2,618	5,556	4,447	7,840	6,561	10,665	8,250	12,663	10,552	15,286	15,286	19,865	19,865	27,151
	6034	475	3,132	2,151	5,046	4,138	6,978	5,522	10,102	7,854	12,158	9,850	13,833	13,833	18,276	18,276	25,162
	Avg.	495	2,640	1,936	4,956	3,913	7,374	5,944	10,286	7,929	12,362	10,113	14,242	14,242	19,089	19,089	25,816
2	6005	112	1,787	1,494	3,181	2,743	5,084	4,772	11,287	10,031	15,861	14,436	20,245	20,245	26,969	26,969	34,034
	6012	169	2,261	1,687	4,368	3,173	5,764	5,112	12,286	10,812	15,450	13,647	19,058	19,058	25,903	25,903	33,144
	6026	0	2,518	1,418	4,627	3,778	7,322	6,378	12,432	11,237	17,370	15,352	22,183	22,183	28,485	28,485	36,413
	Avg.	94	2,189	1,533	4,059	3,231	6,057	5,421	12,002	10,693	16,227	14,478	20,495	20,495	27,119	27,119	34,530
3	6016	269	2,230	1,849	4,466	3,472	7,219	6,393	12,734	10,668	16,322	14,202	19,445	19,445	27,198	27,198	36,867
	6031	512	2,137	1,885	4,456	3,543	7,684	6,939	12,423	10,436	15,751	14,133	20,810	20,810	28,832	28,832	37,353
	6036	144	1,463	1,200	3,220	2,808	6,117	5,343	11,397	9,554	15,480	13,530	18,924	18,924	28,109	28,109	37,784
	Avg.	308	1,943	1,645	4,047	3,274	7,007	6,225	12,185	10,219	15,851	13,955	19,726	19,726	28,046	28,046	37,335
4	6001	606	2,268	2,012	4,260	3,692	8,715	8,240	14,236	13,382	18,562	17,834	26,957	26,957	35,418	35,418	44,280
	6023	525	2,951	2,364	5,223	4,539	8,805	8,092	13,807	12,830	18,699	18,222	25,704	25,704	35,708	35,708	43,504
	6035	200	2,747	2,410	4,814	4,206	8,303	7,664	15,872	14,629	20,845	20,343	27,207	27,207	32,022	32,022	38,590
	Avg.	443	2,655	2,262	4,766	4,146	8,608	7,999	14,638	13,614	19,369	18,800	26,623	26,623	34,383	34,383	42,125
5	6009	169	1,520	1,395	3,847	3,596	7,352	6,814	14,370	13,030	20,803	19,017	26,292	26,292	34,593	34,593	45,160
	6011	331	2,106	2,000	5,134	4,710	8,357	7,875	15,747	14,269	21,199	19,113	27,838	27,838	37,035	37,035	46,567
	6028	281	3,001	2,464	5,614	4,934	9,313	8,517	16,182	15,003	21,539	19,962	27,091	27,091	36,022	36,022	47,023
	Avg.	260	2,209	1,953	4,865	4,413	8,341	7,735	15,433	14,101	21,181	19,364	27,074	27,074	35,883	35,883	46,250
6	6007	625	2,897	2,454	5,766	4,790	8,872	8,304	14,089	11,749	18,528	15,290	21,306	21,306	26,187	26,187	34,747
	6015	443	2,810	2,559	6,024	4,990	9,093	7,841	14,587	12,147	18,493	14,985	21,124	21,124	29,050	29,050	39,252
	6033	0	537	412	3,170	2,902	6,486	5,642	13,070	10,356	16,746	13,568	19,080	19,080	27,993	27,993	37,434
	Avg.	356	2,081	1,808	4,987	4,227	8,150	7,262	13,915	11,417	17,922	14,614	20,504	20,504	27,743	27,743	37,144
7	6021	418	3,251	2,631	6,718	6,055	10,388	9,781	17,612	16,465	25,543	23,795	31,148	31,148	42,533	42,533	51,612
	6027	250	2,064	1,776	5,032	4,625	9,389	9,138	16,084	15,229	23,885	22,196	31,089	31,089	41,729	41,729	51,519
	6030	375	2,062	1,900	5,411	5,159	9,807	9,625	17,110	15,913	23,457	22,124	31,427	31,427	40,002	40,002	49,310
	Avg.	348	2,459	2,103	5,720	5,280	9,861	9,515	16,935	15,869	24,295	22,705	31,221	31,221	41,421	41,421	50,814
8	6008	362	2,818	2,418	6,333	5,956	9,150	8,456	17,024	14,861	21,188	18,431	25,759	25,759	35,148	35,148	44,967
	6025	200	2,261	2,148	5,572	5,410	8,955	8,135	15,988	14,206	19,984	17,316	24,449	24,449	34,750	34,750	44,016
	6037	400	2,059	1,896	4,505	4,254	8,047	7,753	15,352	14,096	20,127	18,012	25,516	25,516	35,214	35,214	38,636
	Avg.	321	2,379	2,154	5,470	5,207	8,717	8,115	16,121	14,388	20,433	17,920	25,241	25,241	35,037	35,037	42,540
Control	6002	343	2,075	2,075	4,491	4,491	8,264	8,264	16,807	16,807	24,567	24,567	36,320	36,320	45,339	45,339	52,301
	6014	0	1,343	1,343	4,405	4,405	9,277	9,277	18,191	18,191	27,067	27,067	36,974	36,974	45,618	45,618	54,788
	6038	262	1,531	1,531	4,714	4,714	9,033	9,033	16,899	16,899	24,769	24,769	36,732	36,732	46,259	46,259	57,470
	6039	112	2,785	2,785	6,670	6,670	10,749	10,749	20,703	20,703	30,068	30,068	41,545	41,545	54,410	54,410	59,549
	Avg.	180	1,934	1,934	5,070	5,070	9,331	9,331	18,150	18,150	26,618	26,618	37,893	37,893	47,907	47,907	56,027

[a] Columns are measurements after treatment and just before next treatment.

Table 42—Skykomish: Trees per acre by 1-inch diameter at breast height (d.b.h.) classes, after calibration (1961) and after thinnings (1993), by treatment (age in parentheses)

	Treatment 1		Treatment 3		Treatment 5		Treatment 7		Treatment 2		Treatment 4		Treatment 6		Treatment 8		Control	
D.b.h. class	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)	1961 (24 yr)	1993 (56 yr)
								Trees per acre										
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
4	38	0	37	0	65	0	15	0	40	0	43	0	18	0	62	0	139	0
5	125	0	147	0	148	0	108	0	157	0	187	0	152	0	128	0	231	1
6	83	0	93	0	87	0	97	0	80	0	80	0	102	0	78	0	128	1
7	50	0	52	0	35	0	37	0	38	0	37	0	35	0	45	2	44	6
8	22	0	27	0	13	0	27	2	28	5	13	2	25	0	23	2	20	25
9	7	0	10	0	17	0	15	2	13	8	13	2	10	5	12	7	26	21
10	7	0	2	0	2	2	10	3	3	8	7	3	5	8	7	13	3	41
11	3	0	0	2	8	2	5	3	0	17	5	2	2	18	3	12	4	40
12	5	0	2	10	0	3	2	2	3	22	0	3	3	25	0	15	0	34
13	0	0	0	3	0	2	0	5	0	17	0	5	0	15	2	10	0	21
14	0	0	0	12	0	7	0	7	0	15	0	7	0	25	0	12	0	21
15	0	2	0	10	0	3	0	15	0	5	0	8	0	20	0	7	0	13
16	0	2	0	2	0	8	0	5	0	10	0	10	0	15	0	5	0	19
17	0	3	0	15	0	0	0	5	0	3	0	7	0	7	0	10	0	11
18	0	5	0	12	0	10	0	15	0	8	0	8	0	2	0	12	0	6
19	0	3	0	10	0	10	0	10	0	12	0	3	0	8	0	7	0	13
20	0	10	0	8	0	7	0	3	0	7	0	8	0	7	0	17	0	10
21	0	5	0	8	0	10	0	7	0	10	0	3	0	8	0	3	0	6
22	0	2	0	0	0	8	0	12	0	12	0	5	0	7	0	7	0	8
23	0	5	0	5	0	7	0	3	0	5	0	5	0	5	0	8	0	3
24	0	2	0	5	0	3	0	3	0	3	0	8	0	3	0	2	0	3
25	0	5	0	2	0	3	0	3	0	2	0	2	0	0	0	0	0	0
26	0	2	0	0	0	0	0	3	0	0	0	0	0	3	0	0	0	1
27	0	0	0	0	0	2	0	2	0	2	0	0	0	3	0	3	0	0
28	0	0	0	0	0	0	0	3	0	2	0	0	0	2	0	0	0	0
29	0	3	0	0	0	2	0	0	0	0	0	2	0	0	0	0	0	0
30	0	0	0	0	0	2	0	0	0	0	0	2	0	2	0	0	0	0
31	0	2	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0
Total	340	50	368	103	375	90	315	113	363	172	385	97	352	188	360	152	594	304

Table 43—Clemons: Stand development for treatment 1, per-acre basis (plots 63, 64, and 69)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*- - - - Ft³ - - - -*		*No.*	*Inches*	*Ft²*	*- - - - - - - - Ft³ - - - - - - - -*					*No.*	*Inches*	*Ft²*	*- - - Ft³ - - -*	
1963	19	31	5.8	395	4.1	36.6	479	3	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	42	7.4	242	5.4	38.8	651	68	153	5.3	23.2	384	52	2.5	1.2	.98	0	.0	.0	0	0
1970	26	54	9.1	150	7.2	42.2	901	374	85	6.9	22.3	471	181	5.5	3.3	.98	7	4.9	.9	17	1
1973	29	62	10.4	105	8.9	44.8	1,107	731	45	7.9	15.3	371	204	8.2	5.5	.92	0	.0	.0	0	0
1976	32	70	12.1	75	10.8	47.5	1,305	1,077	28	9.6	14.2	388	286	13.9	10.2	.92	2	6.6	.4	10	2
1980	36	80	13.8	57	12.7	49.4	1,533	1,380	18	12.7	16.3	516	462	28.7	25.7	1.01	0	.0	.0	0	0
1984	40	87	15.0	57	14.3	63.2	2,126	1,976	0	0	0	0	0	.0	.0	0	0	.0	.0	0	0
1989	45	99	17.2	57	16.3	82.0	3,082	2,915	0	0	0	0	0	.0	.0	0	0	.0	.0	0	0
1994	50	111	19.1	57	18.1	100.9	4,171	3,973	0	0	.0	0	0	.0	.0	0	0	.0	.0	0	0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - Ft³ - - - - - - - - - -*				*- - - Inches - - -*		*- - - Ft² - - -*		*- Ft³ -*							
1963	19	479	479	3	3	0.00	0.00	0.0	0.0	0	25	0	0	0	25	0	0
1966	22	1,035	1,035	120	120	.41	.41	8.4	8.4	185	47	39	5	185	47	39	5
1970	26	1,757	1,773	606	607	.42	.42	6.4	6.6	180	68	122	23	185	68	122	23
1973	29	2,334	2,350	1,168	1,168	.47	.47	6.0	6.0	192	80	187	40	192	81	187	40
1976	32	2,920	2,947	1,799	1,802	.54	.53	5.6	5.8	196	91	211	56	199	92	211	56
1980	36	3,664	3,691	2,565	2,568	.47	.47	4.5	4.5	186	102	191	71	186	103	191	71
1984	40	4,257	4,284	3,161	3,164	.41	.41	3.4	3.4	148	106	149	79	148	107	149	79
1989	45	5,213	5,240	4,100	4,103	.40	.40	3.8	3.8	191	116	188	91	191	116	188	91
1994	50	6,302	6,329	5,158	5,161	.35	.35	3.8	3.8	218	126	212	103	218	127	212	103

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 2,131 cubic feet (58 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 27 cubic feet (< 1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 44—Clemons: Stand development for treatment 2, per-acre basis (plots 81, 87, and 90)

		After thinning							Removed in thinning								Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*Ft³*		*No.*	*Inches*	*Ft²*	*Ft³*					*No.*	*Inches*	*Ft²*	*Ft³*	
1963	19	35	5.9	395	4.2	38.4	516	9	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	45	7.6	213	5.8	38.4	669	119	180	5.3	27.4	469	49	2.6	1.1	.95	2	6.3	.4	6	1
1970	26	56	9.7	137	7.9	45.8	1,000	531	73	7.0	19.8	430	171	5.9	3.6	.93	3	7.2	1.0	21	12
1973	29	65	11.4	105	9.7	53.4	1,347	1,002	30	8.0	10.5	264	144	8.8	5.3	.86	2	6.7	.4	11	2
1976	32	72	13.1	87	11.6	63.1	1,747	1,499	17	8.4	6.5	171	106	10.1	7.1	.76	2	11.8	1.3	35	31
1980	36	83	14.9	75	13.6	75.2	2,410	2,208	10	8.7	4.2	142	92	14.2	9.2	.67	2	13.5	1.7	59	54
1984	40	91	16.4	75	15.0	91.2	3,141	2,936	0	0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1989	45	104	18.2	75	16.6	112.7	4,347	4,115	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1994	50	115	19.8	75	18.0	132.8	5,636	5,365	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*Ft³*				*Inches*		*Ft²*		*Ft³*							
1963	19	516	516	9	9	0.00	0.00	0.0	0.0	0	27	0	0	0	27	0	0
1966	22	1,139	1,145	168	168	.44	.44	9.1	9.2	208	52	53	8	210	52	53	8
1970	26	1,899	1,926	750	763	.46	.46	6.8	7.0	190	73	146	29	195	74	149	29
1973	29	2,509	2,548	1,365	1,380	.49	.49	6.0	6.2	204	87	205	47	207	88	206	48
1976	32	3,081	3,154	1,968	2,014	.49	.50	5.4	5.8	190	96	201	62	202	99	211	63
1980	36	3,885	4,018	2,769	2,870	.39	.40	4.1	4.5	201	108	200	77	216	112	214	80
1984	40	4,617	4,749	3,497	3,598	.34	.34	4.0	4.0	183	115	182	87	183	119	182	90
1989	45	5,822	5,954	4,675	4,776	.33	.33	4.3	4.3	241	129	236	104	241	132	236	106
1994	50	7,112	7,244	5,926	6,027	.28	.28	4.0	4.0	258	142	250	119	258	145	250	121

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,475 cubic feet (37 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 133 cubic feet (2 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 45—Clemons: Stand development for treatment 3, per-acre basis (plots 67, 71, and 78)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	Ft	Inches	No.	Inches	Ft^2	Ft^3		No.	Inches	Ft^2	Ft^3					No.	Inches	Ft^2	Ft^3	
1963	19	33	5.7	397	4.1	35.9	472	4	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	44	7.1	282	5.4	43.6	739	83	115	5.1	16.3	273	28	2.4	1.1	.97	0	.0	.0	0	0
1970	26	54	8.9	208	7.0	55.4	1,176	496	73	6.5	16.7	347	109	4.8	2.6	.94	0	.0	.0	0	0
1973	29	64	10.3	165	8.5	63.0	1,575	968	43	7.2	12.4	296	148	6.9	5.5	.89	0	.0	.0	0	0
1976	32	75	11.7	132	10.0	70.2	2,031	1,562	32	8.2	11.7	319	190	10.0	6.8	.86	2	10.6	1.0	30	25
1980	36	83	13.4	105	11.8	77.4	2,488	2,146	27	9.8	14.1	431	327	16.0	12.1	.87	0	.0	.0	0	0
1984	40	92	14.9	105	13.1	94.8	3,325	2,984	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1989	45	104	16.9	105	14.7	119.5	4,680	4,326	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1994	50	118	18.4	103	16.1	141.6	6,145	5,772	0	.0	.0	0	0	.0	.0	.00	2	6.6	.4	11	2

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	Ft^3				Inches		Ft^2		Ft^3							
1963	19	472	472	4	4	0.00	0.00	0.0	0.0	0	25	0	0	0	25	0	0
1966	22	1,012	1,012	111	111	.39	.39	8.0	8.0	180	46	36	5	180	46	36	5
1970	26	1,796	1,796	633	633	.39	.39	7.1	7.1	196	69	130	24	196	69	130	24
1973	29	2,491	2,491	1,253	1,253	.39	.39	6.7	6.7	231	86	207	43	231	86	207	43
1976	32	3,266	3,296	2,037	2,062	.41	.42	6.3	6.6	258	102	261	64	269	103	270	64
1980	36	4,154	4,185	2,948	2,973	.35	.35	5.3	5.3	222	115	228	82	222	116	228	83
1984	40	4,991	5,021	3,786	3,811	.32	.32	4.4	4.4	209	125	210	95	209	126	210	95
1989	45	6,346	6,377	5,128	5,153	.32	.32	4.9	4.9	271	141	268	114	271	142	268	115
1994	50	7,811	7,852	6,574	6,601	.28	.27	4.4	4.5	293	156	289	131	295	157	290	132

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,666 cubic feet (40 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 41 cubic feet (1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 46—Clemons: Stand development for treatment 4, per-acre basis (plots 66, 74, and 91)

		After thinning							Removed in thinning								Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume							Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	Ft	Inches	No.	Inches	Ft^2	Ft^3		No.	Inches	Ft^2	Ft^3					No.	Inches	Ft^2	Ft^3	
1963	19	34	6.0	395	4.2	37.4	498	12	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	45	7.5	283	5.4	44.7	767	97	110	5.4	17.4	298	44	2.7	1.9	1.00	2	5.6	.3	5	0
1970	26	55	9.2	223	7.1	59.0	1,244	499	53	7.0	14.1	295	125	5.6	3.8	1.00	7	4.9	.9	16	0
1973	29	64	10.4	198	8.3	71.2	1,729	1,008	20	8.0	7.0	171	102	8.6	6.8	.99	5	7.8	1.7	41	26
1976	32	72	11.8	180	9.5	84.5	2,309	1,647	7	8.9	2.9	77	51	11.0	7.3	.96	12	8.6	4.7	131	86
1980	36	81	13.3	170	10.8	102.1	3,084	2,484	7	10.2	3.8	114	90	16.3	12.9	.97	3	9.2	1.5	43	30
1984	40	88	14.6	162	11.9	117.4	3,904	3,325	0	.0	.0	0	0	.0	.0	.00	8	9.0	3.7	111	76
1989	45	101	16.2	157	13.1	139.3	5,204	4,637	0	.0	.0	0	0	.0	.0	.00	5	9.0	2.2	71	49
1994	50	113	17.7	147	14.2	156.4	6,502	5,946	0	.0	.0	0	0	.0	.0	.00	10	10.0	5.5	211	165

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	Ft^3				Inches		Ft^2		Ft^3							
1963	19	498	498	12	12	0.00	0.00	0.0	0.0	0	26	0	1	0	26	0	1
1966	22	1,064	1,069	141	141	.40	.40	8.2	8.3	189	48	43	6	190	49	43	6
1970	26	1,836	1,858	668	668	.41	.40	7.1	7.3	193	71	132	26	197	71	132	26
1973	29	2,493	2,555	1,279	1,305	.39	.40	6.4	6.9	219	86	204	44	232	88	212	45
1976	32	3,150	3,343	1,969	2,081	.40	.41	5.4	7.0	219	98	230	62	263	104	259	65
1980	36	4,039	4,276	2,897	3,039	.30	.31	5.3	5.7	222	112	232	80	233	119	239	84
1984	40	4,859	5,206	3,738	3,955	.27	.25	3.8	4.7	205	121	210	93	233	130	229	99
1989	45	6,160	6,577	5,050	5,317	.24	.24	4.4	4.8	260	137	263	112	274	146	272	118
1994	50	7,457	8,086	6,359	6,790	.23	.21	3.4	4.5	260	149	262	127	302	162	295	136

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 955 cubic feet (22 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 629 cubic feet (8 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 47—Clemons: Stand development for treatment 5, per-acre basis (plots 60, 61, and 70)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*- - - - Ft³ - - - -*		*No.*	*Inches*	*Ft²*	*- - - - - - - - Ft³ - - - - - - - -*					*No.*	*Inches*	*Ft²*	*- - - Ft³ - - -*	
1963	19	34	5.7	395	4.0	34.1	438	7	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	44	7.2	350	5.2	50.5	831	83	43	5.0	5.8	94	7	2.2	.9	.97	2	3.8	.1	2	0
1970	26	54	9.1	295	6.6	68.5	1,402	462	37	6.8	9.2	189	69	5.1	2.8	1.03	18	5.6	3.1	61	5
1973	29	61	10.3	257	7.7	81.4	1,912	978	33	7.7	10.7	253	131	7.7	5.2	1.01	5	4.4	.5	10	0
1976	32	70	11.7	227	8.7	91.6	2,452	1,584	23	8.7	9.6	256	165	11.1	7.5	1.01	7	9.1	3.0	81	56
1980	36	79	13.1	200	10.0	105.5	3,132	2,379	22	9.5	10.6	319	236	14.5	13.1	.97	5	6.9	1.3	35	13
1984	40	85	14.4	187	11.1	120.5	3,856	3,175	2	7.0	.4	13	4	6.5	2.0	.65	12	9.1	5.3	159	108
1989	45	96	16.0	185	12.3	148.0	5,341	4,656	0	.0	.0	0	0	.0	.0	.00	2	8.7	.7	20	13
1994	50	107	17.4	178	13.5	171.4	6,803	6,126	0	.0	.0	0	0	.0	.0	.00	7	8.9	2.9	105	80

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - Ft³ - - - - - - - - - -*				*- - - Inches - - -*		*- - - Ft² - - -*		*- Ft³ -*							
1963	19	438	438	7	7	0.00	0.00	0.0	0.0	0	23	0	0	0	23	0	0
1966	22	925	927	90	90	.38	.38	7.4	7.4	162	42	28	4	163	42	28	4
1970	26	1,685	1,748	538	543	.36	.36	6.8	7.6	190	65	112	21	205	67	113	21
1973	29	2,448	2,520	1,185	1,190	.37	.36	7.8	8.0	254	84	216	41	258	87	216	41
1976	32	3,244	3,398	1,955	2,017	.34	.35	6.6	7.6	265	101	257	61	293	106	275	63
1980	36	4,243	4,431	2,986	3,060	.30	.29	6.1	6.5	250	118	258	83	258	123	261	85
1984	40	4,979	5,326	3,786	3,968	.27	.25	3.9	5.2	184	124	200	95	224	133	227	99
1989	45	6,464	6,831	5,267	5,462	.25	.25	5.5	5.6	297	144	296	117	301	152	299	121
1994	50	7,926	8,398	6,737	7,012	.23	.22	4.7	5.3	292	159	294	135	313	168	310	140

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,123 cubic feet (21 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 471 cubic feet (6 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 48—Clemons: Stand development for treatment 6, per-acre basis (plots 62, 85, and 88)

		After thinning							Removed in thinning								Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume							Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*Ft³*		*No.*	*Inches*	*Ft²*	*Ft³*					*No.*	*Inches*	*Ft²*	*Ft³*	
1963	19	34	5.7	397	4.1	36.6	466	4	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	45	7.3	330	5.4	51.3	867	98	65	5.2	9.7	164	16	2.5	1.3	.98	2	3.6	.1	2	0
1970	26	56	9.1	253	6.9	65.5	,386	522	72	6.8	18.1	382	147	5.3	3.3	.99	5	4.7	.6	11	0
1973	29	66	10.4	205	8.1	73.4	1,869	1,079	45	7.7	14.4	361	182	8.0	4.9	.95	3	6.0	.7	15	2
1976	32	70	11.6	163	9.4	77.4	2,085	1,496	40	8.9	17.1	454	302	11.4	7.9	.96	2	4.2	.2	3	0
1980	36	81	13.0	127	10.8	80.0	2,528	2,076	35	9.8	18.5	579	435	16.5	13.6	.93	2	9.0	.7	19	13
1984	40	90	14.1	127	11.9	97.6	3,389	2,952	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1989	45	103	16.0	127	13.4	122.6	4,776	4,335	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1994	50	116	17.7	127	14.6	147.4	6,356	5,886	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*Ft³*				*Inches*		*Ft²*		*Ft³*							
1963	19	466	466	4	4	0.00	0.00	0.0	0.0	0	25	0	0	0	25	0	0
1966	22	1,031	1,032	114	114	.40	.40	8.1	8.2	188	47	37	5	189	47	37	5
1970	26	1,931	1,944	685	685	.38	.38	8.1	8.2	225	74	143	26	228	75	143	26
1973	29	2,775	2,803	1,425	1,427	.38	.38	7.4	7.6	281	96	247	49	286	97	247	49
1976	32	3,445	3,475	2,143	2,145	.38	.37	7.0	7.1	223	108	239	67	224	109	239	67
1980	36	4,466	4,515	3,158	3,173	.31	.31	5.3	5.5	255	124	254	88	260	125	257	88
1984	40	5,327	5,376	4,034	4,049	.28	.28	4.4	4.4	215	133	219	101	215	134	219	101
1989	45	6,714	6,763	5,417	5,433	.29	.29	5.0	5.0	277	149	277	120	277	150	277	121
1994	50	8,294	8,343	6,968	6,984	.26	.26	5.0	5.0	316	166	310	139	316	167	310	140

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,938 cubic feet (43 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 49 cubic feet (1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 49—Clemons: Stand development for treatment 7, per-acre basis (plots 75, 82, and 86)

Year	Stand age	After thinning: 40 largest[a] Ht	After thinning: 40 largest[a] D.b.h.	After thinning: Trees	After thinning: QMD[b]	After thinning: Basal area	After thinning: Volume[c] CVTS	After thinning: Volume[c] CV6	Removed in thinning: Trees	Removed in thinning: QMD[b]	Removed in thinning: Basal area	Removed in thinning: Volume CVTS	Removed in thinning: Volume CV6	Removed in thinning: Avg. volume CVTS	Removed in thinning: Avg. volume CV6	Mortality: d/D[d]	Mortality: Trees	Mortality: QMD[b]	Mortality: Basal area	Mortality: Volume CVTS	Mortality: Volume CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*Ft³*	*Ft³*	*No.*	*Inches*	*Ft²*	*Ft³*	*Ft³*	*Ft³*	*Ft³*		*No.*	*Inches*	*Ft²*	*Ft³*	*Ft³*
1963	19	36	5.7	398	4.0	35.4	495	8	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	46	7.2	373	5.2	55.3	986	89	25	5.2	3.7	67	20	2.7	4.0	1.00	0	.0	.0	0	0
1970	26	58	8.8	347	6.6	80.7	1,800	580	22	6.5	4.9	109	33	5.0	2.8	.99	5	5.6	.9	18	1
1973	29	67	10.1	322	7.5	98.1	2,513	1,238	17	7.4	5.0	128	67	7.5	5.6	.99	8	6.2	1.7	41	14
1976	32	73	11.2	303	8.5	115.9	3,313	2,047	10	6.7	2.4	65	19	6.5	3.8	.80	8	5.3	1.3	32	0
1980	36	80	12.4	287	9.3	132.8	4,161	2,951	12	8.4	4.5	139	89	11.6	8.9	.91	5	8.2	1.9	57	37
1984	40	90	13.4	283	10.0	150.4	5,196	3,988	0	.0	.0	0	0	.0	.0	.00	3	6.2	.7	21	7
1989	45	101	14.6	275	10.9	174.2	6,617	5,452	0	.0	.0	0	0	.0	.0	.00	8	7.3	2.4	81	44
1994	50	111	15.9	258	11.8	194.6	8,108	6,999	0	.0	.0	0	0	.0	.0	.00	17	7.9	5.6	208	122

Year	Stand age	Cumulative yield[e] Net CVTS	Cumulative yield[e] Gross CVTS	Cumulative yield[e] Net CV6	Cumulative yield[e] Gross CV6	QMD growth[f] Net	QMD growth[f] Survivor	Basal area growth Net	Basal area growth Gross	Net volume growth[g] CVTS PAI	Net volume growth[g] CVTS MAI	Net volume growth[g] CV6 PAI	Net volume growth[g] CV6 MAI	Gross volume growth CVTS PAI	Gross volume growth CVTS MAI	Gross volume growth CV6 PAI	Gross volume growth CV6 MAI
	Years	*Ft³*	*Ft³*	*Ft³*	*Ft³*	*Inches*	*Inches*	*Ft²*	*Ft²*	*Ft³*	*Ft³*	*Ft³*	*Ft³*	*Ft³*	*Ft³*	*Ft³*	*Ft³*
1963	19	495	495	8	8	0.00	0.00	0.0	0.0	0	26	0	0	0	26	0	0
1966	22	1,054	1,054	108	108	.39	.39	7.8	7.8	186	48	33	5	186	48	33	5
1970	26	1,976	1,994	632	633	.33	.33	7.6	7.8	231	76	131	24	235	77	131	24
1973	29	2,816	2,875	1,358	1,372	.31	.31	7.4	8.0	280	97	242	47	294	99	246	47
1976	32	3,681	3,772	2,186	2,200	.29	.27	6.7	7.2	288	115	276	68	299	118	276	69
1980	36	4,668	4,816	3,179	3,230	.21	.21	5.3	5.8	247	130	248	88	261	134	258	90
1984	40	5,703	5,872	4,215	4,274	.16	.16	4.4	4.6	259	143	259	105	264	147	261	107
1989	45	7,124	7,374	5,680	5,782	.18	.17	4.8	5.2	284	158	293	126	300	164	302	128
1994	50	8,615	9,072	7,227	7,452	.19	.16	4.1	5.2	298	172	309	145	340	181	334	149

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 507 cubic feet (11 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 457 cubic feet (5 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 50—Clemons: Stand development for treatment 8, per-acre basis (plots 59, 72, and 73)

		After thinning							Removed in thinning								Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume							Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	Ft	Inches	No.	Inches	Ft^2	Ft^3		No.	Inches	Ft^2	Ft^3					No.	Inches	Ft^2	Ft^3	
1963	19	36	5.7	397	4.0	34.1	470	5	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	45	7.1	387	5.1	54.3	936	83	10	4.6	1.2	19	0	1.9	.0	.91	0	.0	.0	0	0
1970	26	57	8.8	360	6.3	78.1	1,677	474	23	6.5	5.4	117	35	5.1	2.7	1.03	3	4.3	.3	6	0
1973	29	67	10.0	318	7.3	90.8	2,264	1,024	32	6.9	8.2	202	84	6.3	3.7	.95	10	6.4	2.2	54	16
1976	32	73	11.1	280	8.2	100.6	2,785	1,630	37	7.6	11.6	312	148	8.4	4.6	.95	2	7.9	.6	16	8
1980	36	82	12.4	240	9.1	107.6	3,307	2,290	32	9.1	14.4	445	315	13.9	12.6	1.01	8	5.8	1.6	41	8
1984	40	90	13.3	240	9.9	126.0	4,235	3,216	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0
1989	45	101	14.8	238	10.9	150.6	5,557	4,551	0	.0	.0	0	0	.0	.0	.00	2	10.0	.9	33	26
1994	50	111	16.1	238	11.7	174.8	7,008	5,991	0	.0	.0	0	0	.0	.0	.00	0	.0	.0	0	0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	Ft^3				Inches		Ft^2		Ft^3							
1963	19	470	470	5	5	0.00	0.00	0.0	0.0	0	25	0	0	0	25	0	0
1966	22	955	955	83	83	.36	.36	7.1	7.1	161	43	26	4	161	43	26	4
1970	26	1,813	1,819	510	510	.31	.31	7.3	7.4	215	70	107	20	216	70	107	20
1973	29	2,601	2,660	1,144	1,160	.30	.30	7.0	7.7	263	90	211	39	280	92	217	40
1976	32	3,434	3,509	1,899	1,923	.28	.28	7.1	7.3	278	107	252	59	283	110	254	60
1980	36	4,402	4,517	2,873	2,906	.25	.23	5.4	5.8	242	122	244	80	252	125	246	81
1984	40	5,330	5,445	3,799	3,831	.19	.19	4.6	4.6	232	133	231	95	232	136	231	96
1989	45	6,652	6,800	5,134	5,192	.19	.19	4.9	5.1	264	148	267	114	271	151	272	115
1994	50	8,103	8,251	6,574	6,632	.17	.17	4.8	4.8	290	162	288	131	290	165	288	133

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 1,094 cubic feet (24 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 148 cubic feet (2 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 51—Clemons: Stand development for control, per-acre basis (plots 58, 83, and 89)

		After thinning							Removed in thinning							Mortality					
		40 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*Ft*	*Inches*	*No.*	*Inches*	*Ft²*	*- - - - Ft³ - - - -*		*No.*	*Inches*	*Ft²*	*- - - - - - - - Ft³ - - - - - - - -*					*No.*	*Inches*	*Ft²*	*- - - Ft³ - - -*	
1963	19	39	7.7	687	4.0	59.8	852	107	0	0.0	0.0	0	0	0.0	0.0	0.00	0	0.0	0.0	0	0
1966	22	49	9.1	683	4.9	89.5	1,594	323	0	.0	.0	0	0	.0	.0	.00	3	3.4	.2	3	0
1970	26	61	10.7	662	5.9	124.8	2,759	906	0	.0	.0	0	0	.0	.0	.00	22	2.5	.8	11	0
1973	29	70	11.8	643	6.6	150.1	3,855	1,653	0	.0	.0	0	0	.0	.0	.00	18	3.3	1.1	20	0
1976	32	78	12.8	607	7.2	169.0	4,826	2,507	0	.0	.0	0	0	.0	.0	.00	37	5.0	5.0	127	21
1980	36	86	13.8	558	7.9	187.8	5,873	3,564	0	.0	.0	0	0	.0	.0	.00	48	4.4	5.0	128	5
1984	40	94	14.7	500	8.6	198.2	6,820	4,570	0	.0	.0	0	0	.0	.0	.00	58	5.6	9.9	306	140
1989	45	105	15.9	433	9.6	215.2	8,127	6,088	0	.0	.0	0	0	.0	.0	.00	67	5.8	12.2	378	144
1994	50	114	17.0	387	10.5	230.4	9,424	7,588	0	.0	.0	0	0	.0	.0	.00	47	7.1	12.9	465	215

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - Ft³ - - - - - - - - - -*				*- - - Inches - - -*		*- - - Ft² - - -*		*- Ft³ -*							
1963	19	852	852	107	107	0.00	0.00	0.0	0.0	0	45	0	6	0	45	0	6
1966	22	1,594	1,598	323	323	.30	.30	9.9	10.0	247	72	72	15	249	73	72	15
1970	26	2,759	2,773	906	906	.24	.23	8.8	9.0	291	106	146	35	294	107	146	35
1973	29	3,855	3,888	1,653	1,653	.22	.20	8.4	8.8	365	133	249	57	372	134	249	57
1976	32	4,826	4,987	2,507	2,528	.21	.17	6.3	8.0	324	151	285	78	366	156	292	79
1980	36	5,873	6,163	3,564	3,591	.18	.13	4.7	6.0	262	163	264	99	294	171	266	100
1984	40	6,820	7,415	4,570	4,736	.17	.11	2.6	5.1	237	170	252	114	313	185	286	118
1989	45	8,127	9,101	6,088	6,398	.21	.14	3.4	5.8	262	181	304	135	337	202	332	142
1994	50	9,424	10,862	7,588	8,113	.19	.13	3.0	5.6	259	188	300	152	352	217	343	162

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 40 largest trees per acre (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic feet (CVTS) or merchantable cubic to a 6-inch top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) in mortality = 1,438 cubic feet (13 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 52—Clemons: Trees per acre, 1963–1994, by treatment, plot, and period

Treatment	Plot	Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
		19	22	22	26	26	29	29	32	32	36	36	40	40	45	45	50
		Number of trees per acre															
1	63	395	395	210	205	130	130	90	90	70	70	55	55	55	55	55	55
	64	395	395	245	240	155	155	110	110	80	80	60	60	60	60	60	60
	69	395	395	270	260	165	165	115	110	75	75	55	55	55	55	55	55
	Avg.	395	395	242	235	150	150	105	103	75	75	57	57	57	57	57	57
2	81	395	395	245	245	155	155	115	115	95	95	80	80	80	80	80	80
	87	395	390	205	195	140	135	110	110	90	90	75	75	75	75	75	75
	90	395	395	190	190	115	115	90	85	75	70	70	70	70	70	70	70
	Avg.	395	393	213	210	137	135	105	103	87	85	75	75	75	75	75	75
3	67	400	400	280	280	205	205	165	160	135	135	105	105	105	105	105	100
	71	395	395	325	325	250	250	200	200	160	160	130	130	130	130	130	130
	78	395	395	240	240	170	170	130	130	100	100	80	80	80	80	80	80
	Avg.	397	397	282	282	208	208	165	163	132	132	105	105	105	105	105	103
4	66	395	395	295	280	235	235	210	205	185	185	170	170	170	170	170	165
	74	395	390	335	335	275	265	250	235	235	225	225	210	210	195	195	170
	91	395	395	220	215	160	155	135	120	120	120	115	105	105	105	105	105
	Avg.	395	393	283	277	223	218	198	187	180	177	170	162	162	157	157	147
5	60	395	390	360	310	300	290	255	240	220	210	195	160	160	155	155	145
	61	395	395	305	300	245	245	210	205	185	185	155	155	155	155	155	155
	70	395	395	385	385	340	335	305	305	275	270	250	250	245	245	245	235
	Avg.	395	393	350	332	295	290	257	250	227	222	200	188	187	185	185	178
6	62	395	390	345	330	265	260	215	215	175	170	135	135	135	135	135	135
	85	395	395	350	350	275	270	220	220	175	175	135	135	135	135	135	135
	88	400	400	295	295	220	220	180	175	140	140	110	110	110	110	110	110
	Avg.	397	395	330	325	253	250	205	203	163	162	127	127	127	127	127	127
7	75	405	405	405	390	390	365	365	360	355	355	335	335	335	325	325	305
	82	395	395	390	390	355	355	330	325	315	310	300	290	290	280	280	250
	86	395	395	325	325	295	295	270	255	240	230	225	225	225	220	220	220
	Avg.	398	398	373	368	347	338	322	313	303	298	287	283	283	275	275	258
8	59	395	395	365	360	315	290	275	270	240	225	200	200	200	195	195	195
	72	400	400	400	400	395	390	355	355	320	310	280	280	280	280	280	280
	73	395	395	395	390	370	370	325	325	280	280	240	240	240	240	240	240
	Avg.	397	397	387	383	360	350	318	317	280	272	240	240	240	238	238	238
Control	58	585	585	585	585	585	575	575	565	565	530	530	495	495	425	425	395
	83	720	710	710	655	655	615	615	530	530	460	460	410	410	355	355	300
	89	755	755	755	745	745	740	740	725	725	685	685	595	595	520	520	465
	Avg.	687	683	683	662	662	643	643	607	607	558	558	500	500	433	433	387

[a] Columns are measurements after treatment and just before next treatment.

Table 53—Clemons: Basal area per acre, 1963–1994, by treatment, plot, and period

Treatment	Plot	Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
		19	22	22	26	26	29	29	32	32	36	36	40	40	45	45	50
		Square feet per acre															
1	63	41.5	70.1	38.2	65.2	42.2	61.3	44.8	61.5	47.3	65.8	49.2	63.6	63.6	84.3	84.3	105.8
	64	35.1	60.9	39.0	64.9	42.1	60.3	44.5	62.1	47.5	66.0	49.5	63.4	63.4	82.0	82.0	100.5
	69	33.2	54.9	39.1	63.2	42.2	58.5	45.0	61.6	47.6	65.2	49.6	62.6	62.6	79.8	79.8	96.4
	Avg.	36.6	61.9	38.8	64.4	42.2	60.0	44.8	61.7	47.5	65.7	49.4	63.2	63.2	82.0	82.0	100.9
2	81	32.2	57.5	38.6	67.3	45.8	65.1	53.4	71.3	63.2	81.4	74.9	91.1	91.1	114.0	114.0	136.3
	87	42.7	68.5	38.5	60.5	45.8	62.0	53.2	69.1	63.3	80.0	74.1	89.1	89.1	110.3	110.3	130.3
	90	40.4	71.4	38.3	69.0	45.8	64.5	53.5	68.3	62.8	76.8	76.8	93.5	93.5	113.9	113.9	131.9
	Avg.	38.4	65.8	38.4	65.6	45.8	63.9	53.4	69.6	63.1	79.4	75.2	91.2	91.2	112.7	112.7	132.8
3	67	37.8	61.6	44.4	71.5	55.3	74.6	63.0	78.5	70.3	91.4	77.4	94.3	94.3	118.1	118.1	138.7
	71	32.5	53.5	44.4	70.8	55.4	75.6	63.0	84.4	70.0	92.2	77.2	94.9	94.9	119.3	119.3	143.4
	78	37.5	64.5	41.8	73.9	55.4	76.0	63.0	82.8	70.3	90.6	77.5	95.3	95.3	121.1	121.1	142.6
	Avg.	35.9	59.9	43.6	72.1	55.4	75.4	63.0	81.9	70.2	91.4	77.4	94.8	94.8	119.5	119.5	141.6
4	66	35.3	59.5	44.4	71.0	59.0	79.7	71.5	94.4	85.9	111.0	102.8	121.6	121.6	147.1	147.1	167.4
	74	34.0	51.6	45.2	70.2	59.0	74.3	70.7	85.0	85.0	101.6	101.6	115.3	115.3	132.1	132.1	141.2
	91	42.8	74.9	44.4	78.1	59.1	80.4	71.3	82.7	82.7	105.0	101.8	115.2	115.2	138.7	138.7	160.6
	Avg.	37.4	62.0	44.7	73.1	59.0	78.1	71.2	87.4	84.5	105.9	102.1	117.4	117.4	139.3	139.3	156.4
5	60	32.8	54.3	50.3	71.7	68.5	92.7	81.4	98.6	88.3	111.2	105.1	109.2	109.2	134.4	134.4	152.0
	61	36.6	62.7	50.5	84.1	68.5	94.0	81.4	102.7	93.3	122.9	105.0	129.5	129.5	162.0	162.0	192.3
	70	33.0	51.8	50.5	77.2	68.6	89.5	81.3	102.2	93.2	114.3	106.4	124.3	122.9	147.6	147.6	170.0
	Avg.	34.1	56.3	50.5	77.7	68.5	92.1	81.4	101.2	91.6	116.1	105.5	121.0	120.5	148.0	148.0	171.4
6	62	34.2	56.6	50.8	81.6	65.0	86.9	72.7	94.5	77.4	101.1	79.5	99.0	99.0	126.2	126.2	154.4
	85	32.8	56.3	50.6	81.7	64.9	86.4	72.6	95.2	77.1	98.6	79.4	96.5	96.5	120.2	120.2	144.2
	88	42.8	70.1	52.5	87.4	66.6	90.1	75.0	93.7	77.6	95.6	80.9	97.2	97.2	121.5	121.5	143.5
	Avg.	36.6	61.0	51.3	83.6	65.5	87.8	73.4	94.5	77.4	98.4	80.0	97.6	97.6	122.6	122.6	147.4
7	75	34.1	54.7	54.7	78.8	78.8	95.3	95.3	116.1	115.3	139.3	132.7	150.8	150.8	173.4	173.4	188.8
	82	32.5	55.5	54.6	88.8	81.7	106.0	99.5	119.4	116.2	137.7	132.8	147.8	147.8	172.3	172.3	190.5
	86	39.8	66.7	56.5	89.5	81.7	107.8	99.4	119.3	116.1	134.9	132.9	152.6	152.6	177.0	177.0	204.5
	Avg.	35.4	59.0	55.3	85.7	80.7	103.0	98.1	118.3	115.9	137.3	132.8	150.4	150.4	174.2	174.2	194.6
8	59	36.0	60.2	56.7	89.2	78.1	95.6	90.9	111.5	100.4	122.6	108.0	127.9	127.9	152.2	152.2	178.7
	72	33.8	52.6	52.6	79.3	78.1	99.6	90.8	111.2	100.7	121.0	107.5	124.6	124.6	149.8	149.8	172.8
	73	32.5	53.5	53.5	82.0	78.1	101.9	90.8	113.9	100.6	122.6	107.4	125.6	125.6	149.7	149.7	172.9
	Avg.	34.1	55.4	54.3	83.5	78.1	99.0	90.8	112.2	100.6	122.1	107.6	126.0	126.0	150.6	150.6	174.8
Control	58	59.9	87.4	87.4	120.4	120.4	144.8	144.8	166.6	166.6	187.2	187.2	196.0	196.0	205.8	205.8	221.6
	83	65.7	96.3	96.3	132.3	132.3	154.7	154.7	162.1	162.1	173.0	173.0	185.1	185.1	205.0	205.0	217.0
	89	54.0	84.8	84.8	121.6	121.6	150.7	150.7	178.3	178.3	203.1	203.1	213.4	213.4	234.9	234.9	252.5
	Avg.	59.8	89.5	89.5	124.8	124.8	150.1	150.1	169.0	169.0	187.8	187.8	198.2	198.2	215.2	215.2	230.4

[a] Columns are measurements after treatment and just before next treatment.

Table 54—Clemons: Quadratic mean diameter, 1963–1994, by treatment, plot, and period

Treatment	Plot	Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
		19	22	22	26	26	29	29	32	32	36	36	40	40	45	45	50
		Inches															
1	63	4.4	5.7	5.8	7.6	7.7	9.3	9.6	11.2	11.1	13.1	12.8	14.6	14.6	16.8	16.8	18.8
	64	4.0	5.3	5.4	7.0	7.1	8.4	8.6	10.2	10.4	12.3	12.3	13.9	13.9	15.8	15.8	17.5
	69	3.9	5.0	5.2	6.7	6.8	8.1	8.5	10.1	10.8	12.6	12.9	14.4	14.4	16.3	16.3	17.9
	Avg.	4.1	5.4	5.4	7.1	7.2	8.6	8.9	10.5	10.8	12.7	12.7	14.3	14.3	16.3	16.3	18.1
2	81	3.9	5.2	5.4	7.1	7.4	8.8	9.2	10.7	11.0	12.5	13.1	14.5	14.5	16.2	16.2	17.7
	87	4.5	5.7	5.9	7.5	7.7	9.2	9.4	10.7	11.4	12.8	13.5	14.8	14.8	16.4	16.4	17.8
	90	4.3	5.8	6.1	8.2	8.5	10.1	10.4	12.1	12.4	14.2	14.2	15.6	15.6	17.3	17.3	18.6
	Avg.	4.2	5.5	5.8	7.6	7.9	9.4	9.7	11.2	11.6	13.2	13.6	15.0	15.0	16.6	16.6	18.0
3	67	4.2	5.3	5.4	6.8	7.0	8.2	8.4	9.5	9.8	11.1	11.6	12.8	12.8	14.4	14.4	15.9
	71	3.9	5.0	5.0	6.3	6.4	7.4	7.6	8.8	9.0	10.3	10.4	11.6	11.6	13.0	13.0	14.2
	78	4.2	5.5	5.7	7.5	7.7	9.1	9.4	10.8	11.3	12.9	13.3	14.8	14.8	16.7	16.7	18.1
	Avg.	4.1	5.3	5.4	6.9	7.0	8.2	8.5	9.7	10.0	11.4	11.8	13.1	13.1	14.7	14.7	16.1
4	66	4.1	5.3	5.3	6.8	6.8	7.9	7.9	9.2	9.2	10.5	10.5	11.5	11.5	12.6	12.6	13.6
	74	4.0	4.9	5.0	6.2	6.3	7.2	7.2	8.1	8.1	9.1	9.1	10.0	10.0	11.1	11.1	12.3
	91	4.5	5.9	6.1	8.2	8.2	9.8	9.8	11.2	11.2	12.7	12.7	14.2	14.2	15.6	15.6	16.7
	Avg.	4.2	5.4	5.4	7.1	7.1	8.3	8.3	9.5	9.5	10.8	10.8	11.9	11.9	13.1	13.1	14.2
5	60	3.9	5.1	5.1	6.5	6.5	7.7	7.7	8.7	8.6	9.9	9.9	11.2	11.2	12.6	12.6	13.9
	61	4.1	5.4	5.5	7.2	7.2	8.4	8.4	9.6	9.6	11.0	11.1	12.4	12.4	13.8	13.8	15.1
	70	3.9	4.9	4.9	6.1	6.1	7.0	7.0	7.8	7.9	8.8	8.8	9.5	9.6	10.5	10.5	11.5
	Avg.	4.0	5.1	5.2	6.6	6.6	7.7	7.7	8.7	8.7	9.9	10.0	11.0	11.1	12.3	12.3	13.5
6	62	4.0	5.2	5.2	6.7	6.7	7.8	7.9	9.0	9.0	10.4	10.4	11.6	11.6	13.1	13.1	14.5
	85	3.9	5.1	5.1	6.5	6.6	7.7	7.8	8.9	9.0	10.2	10.4	11.4	11.4	12.8	12.8	14.0
	88	4.4	5.7	5.7	7.4	7.5	8.7	8.7	9.9	10.1	11.2	11.6	12.7	12.7	14.2	14.2	15.5
	Avg.	4.1	5.3	5.4	6.9	6.9	8.1	8.1	9.3	9.4	10.6	10.8	11.9	11.9	13.4	13.4	14.6
7	75	3.9	5.0	5.0	6.1	6.1	6.9	6.9	7.7	7.7	8.5	8.5	9.1	9.1	9.9	9.9	10.7
	82	3.9	5.1	5.1	6.5	6.5	7.4	7.4	8.2	8.2	9.0	9.0	9.7	9.7	10.6	10.6	11.8
	86	4.3	5.6	5.6	7.1	7.1	8.2	8.2	9.3	9.4	10.4	10.4	11.2	11.2	12.1	12.1	13.1
	Avg.	4.0	5.2	5.2	6.6	6.6	7.5	7.5	8.4	8.5	9.3	9.3	10.0	10.0	10.9	10.9	11.8
8	59	4.1	5.3	5.3	6.7	6.7	7.8	7.8	8.7	8.8	10.0	9.9	10.8	10.8	12.0	12.0	13.0
	72	3.9	4.9	4.9	6.0	6.0	6.8	6.8	7.6	7.6	8.5	8.4	9.0	9.0	9.9	9.9	10.6
	73	3.9	5.0	5.0	6.2	6.2	7.1	7.2	8.0	8.1	9.0	9.1	9.8	9.8	10.7	10.7	11.5
	Avg.	4.0	5.1	5.1	6.3	6.3	7.2	7.3	8.1	8.2	9.1	9.1	9.9	9.9	10.9	10.9	11.7
Control	58	4.3	5.2	5.2	6.1	6.1	6.8	6.8	7.4	7.4	8.0	8.0	8.5	8.5	9.4	9.4	10.1
	83	4.1	5.0	5.0	6.1	6.1	6.8	6.8	7.5	7.5	8.3	8.3	9.1	9.1	10.3	10.3	11.5
	89	3.6	4.5	4.5	5.5	5.5	6.1	6.1	6.7	6.7	7.4	7.4	8.1	8.1	9.1	9.1	10.0
	Avg.	4.0	4.9	4.9	5.9	5.9	6.6	6.6	7.2	7.2	7.9	7.9	8.6	8.6	9.6	9.6	10.5

[a] Columns are measurements after treatment and just before next treatment.

Table 55—Clemons: Total stem volume per acre, 1963–1994, by treatment, plot, and period

		Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
Treatment	**Plot**	**19**	**22**	**22**	**26**	**26**	**29**	**29**	**32**	**32**	**36**	**36**	**40**	**40**	**45**	**45**	**50**
								Cubic feet per acre									
11	63	544	1,188	650	1,411	919	1,533	1,121	1,711	1,304	2,071	1,546	2,169	2,169	3,198	3,198	4,492
	64	460	1,014	656	1,384	897	1,478	1,097	1,700	1,312	2,066	1,535	2,130	2,130	3,086	3,086	4,154
	69	434	903	646	1,322	888	1,424	1,102	1,669	1,299	2,011	1,519	2,078	2,078	2,962	2,962	3,867
	Avg.	479	1,035	651	1,372	901	1,478	1,107	1,693	1,305	2,049	1,533	2,126	2,126	3,082	3,082	4,171
2	81	412	963	650	1,453	995	1,627	1,337	1,947	1,731	2,623	2,403	3,185	3,185	4,415	4,415	5,786
	87	595	1,214	691	1,341	1,021	1,601	1,380	1,972	1,813	2,655	2,450	3,153	3,153	4,391	4,391	5,690
	90	540	1,239	667	1,494	983	1,603	1,322	1,835	1,697	2,377	2,377	3,085	3,085	4,234	4,234	5,433
	Avg.	516	1,139	669	1,429	1,000	1,610	1,347	1,918	1,747	2,552	2,410	3,141	3,141	4,347	4,347	5,636
3	67	504	1,050	762	1,520	1,187	1,870	1,587	2,253	2,039	2,942	2,515	3,319	3,319	4,653	4,653	6,120
	71	418	883	733	1,459	1,143	1,826	1,534	2,348	1,959	2,883	2,430	3,285	3,285	4,597	4,597	6,002
	78	495	1,103	722	1,591	1,198	1,916	1,603	2,450	2,096	2,932	2,520	3,371	3,371	4,790	4,790	6,313
	Avg.	472	1,012	739	1,523	1,176	1,871	1,575	2,350	2,031	2,919	2,488	3,325	3,325	4,680	4,680	6,145
4	66	469	1,015	758	1,495	1,247	1,949	1,750	2,621	2,389	3,413	3,166	4,123	4,123	5,597	5,597	7,009
	74	444	851	748	1,421	1,197	1,728	1,647	2,230	2,230	2,927	2,927	3,722	3,722	4,729	4,729	5,643
	91	582	1,328	793	1,700	1,287	2,023	1,790	2,307	2,307	3,255	3,160	3,865	3,865	5,287	5,287	6,855
	Avg.	498	1,064	767	1,539	1,244	1,900	1,729	2,386	2,309	3,198	3,084	3,904	3,904	5,204	5,204	6,502
5	60	411	871	806	1,434	1,366	2,127	1,861	2,562	2,282	3,202	3,026	3,402	3,402	4,748	4,748	5,956
	61	478	1,056	858	1,774	1,447	2,281	1,983	2,842	2,586	3,787	3,237	4,280	4,280	6,030	6,030	7,887
	70	425	848	827	1,565	1,392	2,086	1,892	2,720	2,488	3,363	3,133	3,924	3,886	5,245	5,245	6,566
	Avg.	438	925	831	1,591	1,402	2,164	1,912	2,708	2,452	3,451	3,132	3,869	3,856	5,341	5,341	6,803
6	62	422	938	844	1,707	1,353	2,179	1,820	2,509	2,052	3,181	2,507	3,412	3,412	4,841	4,841	6,554
	85	408	932	841	1,696	1,349	2,161	1,826	2,530	2,061	3,096	2,493	3,339	3,339	4,648	4,648	6,207
	88	568	1,222	916	1,900	1,455	2,351	1,961	2,576	2,142	3,042	2,582	3,416	3,416	4,837	4,837	6,308
	Avg.	466	1,031	867	1,768	1,386	2,230	1,869	2,538	2,085	3,106	2,528	3,389	3,389	4,776	4,776	6,356
7	75	468	949	949	1,694	1,694	2,349	2,349	3,212	3,193	4,270	4,074	5,053	5,053	6,354	6,354	7,595
	82	445	978	961	1,964	1,815	2,699	2,535	3,394	3,304	4,280	4,125	5,091	5,091	6,529	6,529	7,945
	86	573	1,234	1,049	2,068	1,891	2,874	2,654	3,527	3,441	4,349	4,285	5,445	5,445	6,968	6,968	8,783
	Avg.	495	1,054	986	1,909	1,800	2,641	2,513	3,378	3,313	4,300	4,161	5,196	5,196	6,617	6,617	8,108
8	59	501	1,051	993	1,959	1,716	2,436	2,313	3,123	2,825	3,848	3,382	4,399	4,399	5,754	5,754	7,339
	72	470	908	908	1,685	1,661	2,447	2,231	3,038	2,755	3,669	3,252	4,109	4,109	5,422	5,422	6,789
	73	440	906	906	1,738	1,655	2,513	2,246	3,129	2,774	3,741	3,287	4,198	4,198	5,495	5,495	6,897
	Avg.	470	955	936	1,794	1,677	2,465	2,264	3,096	2,785	3,752	3,307	4,235	4,235	5,557	5,557	7,008
Control	58	864	1,572	1,572	2,676	2,676	3,735	3,735	4,764	4,764	5,861	5,861	6,731	6,731	7,747	7,747	9,004
	83	958	1,758	1,758	3,001	3,001	4,065	4,065	4,749	4,749	5,551	5,551	6,542	6,542	7,987	7,987	9,125
	89	734	1,452	1,452	2,600	2,600	3,764	3,764	4,964	4,964	6,208	6,208	7,187	7,187	8,648	8,648	10,142
	Avg.	852	1,594	1,594	2,759	2,759	3,855	3,855	4,826	4,826	5,873	5,873	6,820	6,820	8,127	8,127	9,424

[a] Columns are measurements after treatment and just before next treatment.

Table 56—Clemons: Merchantable volume per acre, 1963–1994, by treatment, plot, and period

Treatment	Plot	Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
		19	22	22	26	26	29	29	32	32	36	36	40	40	45	45	50
		Cubic feet to a 6-inch top per acre															
1	63	8	183	92	686	448	1093	825	1,449	1,098	1,883	1,396	2,022	2,022	3,030	3,030	4,286
	64	2	121	70	529	351	909	690	1,332	1,056	1,835	1,367	1,969	1,969	2,911	2,911	3,952
	69	0	56	42	448	322	803	678	1,307	1,076	1,809	1,378	1,937	1,937	2,804	2,804	3,683
	Avg.	3	120	68	554	374	935	731	1,363	1,077	1,842	1,380	1,976	1,976	2,915	2,915	3,973
2	81	0	82	73	608	450	1,060	938	1,584	1,448	2,331	2,182	2,962	2,962	4,171	4,171	5,504
	87	24	235	146	630	522	1,113	995	1,604	1,532	2,363	2,236	2,940	2,940	4,152	4,152	5,414
	90	2	186	138	867	620	1,264	1,073	1,627	1,518	2,207	2,207	2,907	2,907	4,021	4,021	5,177
	Avg.	9	168	119	702	531	1,146	1,002	1,605	1,499	2,300	2,208	2,936	2,936	4,115	4,115	5,365
3	67	1	147	105	634	545	1,155	996	1,667	1,557	2,478	2,174	2,980	2,980	4,298	4,298	5,761
	71	9	51	42	376	295	844	741	1,566	1,339	2,297	1,960	2,828	2,828	4,150	4,150	5,549
	78	3	136	101	803	647	1,349	1,167	2,023	1,789	2,642	2,303	3,145	3,145	4,532	4,532	6,007
	Avg.	4	111	83	604	496	1,116	968	1,752	1,562	2,472	2,146	2,984	2,984	4,326	4,326	5,772
4	66	8	96	70	522	420	1,057	935	1,843	1,689	2,758	2,566	3,526	3,526	4,995	4,995	6,402
	74	12	72	72	382	331	749	728	1,299	1,299	2,051	2,051	2,881	2,881	3,963	3,963	4,964
	91	16	256	150	968	746	1,524	1,362	1,953	1,953	2,915	2,836	3,568	3,568	4,954	4,954	6,472
	Avg.	12	141	97	624	499	1,110	1,008	1,698	1,647	2,574	2,484	3,325	3,325	4,637	4,637	5,946
5	60	0	69	64	452	421	1,074	942	1,646	1,440	2,417	2,299	2,834	2,834	4,194	4,194	5,414
	61	4	118	104	737	615	1,385	1,212	2,098	1,919	3,166	2,724	3,791	3,791	5,529	5,529	7,352
	70	17	82	82	404	350	870	781	1,501	1,392	2,261	2,113	2,911	2,899	4,246	4,246	5,613
	Avg.	7	90	83	531	462	1,109	978	1,748	1,584	2,615	2,379	3,179	3,175	4,656	4,656	6,126
6	62	1	84	84	558	417	1,116	943	1,694	1,392	2,548	2,006	2,938	2,938	4,377	4,377	6,069
	85	4	74	72	554	433	1,109	975	1,712	1,416	2,421	1,989	2,845	2,845	4,152	4,152	5,678
	88	7	184	138	895	716	1,560	1,320	1,988	1,681	2,564	2,232	3,071	3,071	4,476	4,476	5,911
	Avg.	4	114	98	669	522	1,262	1,079	1,798	1,496	2,511	2,076	2,952	2,952	4,335	4,335	5,886
7	75	6	62	62	386	386	918	918	1,670	1,670	2,702	2,588	3,557	3,557	4,922	4,922	6,238
	82	0	56	56	577	551	1,287	1,214	2,028	1,985	2,958	2,843	3,828	3,828	5,309	5,309	6,846
	86	19	208	149	876	802	1,710	1,582	2,499	2,486	3,461	3,422	4,578	4,578	6,125	6,125	7,913
	Avg.	8	108	89	613	580	1,305	1,238	2,066	2,047	3,041	2,951	3,988	3,988	5,452	5,452	6,999
8	59	1	88	87	702	625	1,336	1,264	2,069	1,899	2,987	2,613	3,630	3,630	5,001	5,001	6,562
	72	13	113	113	426	422	959	855	1,514	1,384	2,276	1,981	2,828	2,828	4,155	4,155	5,518
	73	2	48	48	399	374	1,029	951	1,754	1,609	2,552	2,277	3,189	3,189	4,497	4,497	5,893
	Avg.	5	83	83	509	474	1,108	1,024	1,779	1,630	2,605	2,290	3,216	3,216	4,551	4,551	5,991
Control	58	112	388	388	1,031	1,031	1,803	1,803	2,650	2,650	3,716	3,716	4,602	4,602	5,856	5,856	7,220
	83	145	411	411	1,135	1,135	1,915	1,915	2,697	2,697	3,629	3,629	4,678	4,678	6,309	6,309	7,675
	89	65	169	169	551	551	1,240	1,240	2,175	2,175	3,347	3,347	4,431	4,431	6,100	6,100	7,868
	Avg.	107	323	323	906	906	1,653	1,653	2,507	2,507	3,564	3,564	4,570	4,570	6,088	6,088	7,588

[a] Columns are measurements after treatment and just before next treatment.

Table 57—Clemons: Scribner board foot volume (6-inch top in 32-foot logs) per acre, 1963–1994, by treatment, plot, and period

		Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
Treatment	**Plot**	**19**	**22**	**22**	**26**	**26**	**29**	**29**	**32**	**32**	**36**	**36**	**40**	**40**	**45**	**45**	**50**
								Scribner board feet per acre									
1	63	0	0	0	1,268	718	3,962	2,963	4,946	3,825	6,741	5,021	7,716	7,716	12,469	12,469	19,324
	64	0	0	0	1,561	1,074	3,120	2,295	4,567	3,634	6,429	4,604	7,528	7,528	11,713	11,713	17,543
	69	0	0	0	837	606	2,768	2,481	4,650	3,737	6,285	4,686	7,501	7,501	11,384	11,384	15,827
	Avg.	0	0	0	1,222	799	3,284	2,579	4,721	3,732	6,485	4,771	7,582	7,582	11,855	11,855	17,565
2	81	0	0	0	1,699	1,286	3,626	3,276	5,134	4,628	8,673	7,977	12,185	12,185	16,890	16,890	24,763
	87	0	225	100	1,580	1,455	3,705	3,299	5,399	5,031	9,245	8,606	11,879	11,879	17,563	17,563	24,902
	90	0	0	0	2,492	1,717	4,340	3,614	4,961	4,591	8,049	8,049	10,651	10,651	15,913	15,913	22,909
	Avg.	0	75	33	1,923	1,486	3,890	3,396	5,165	4,750	8,656	8,210	11,572	11,572	16,789	16,789	24,191
3	67	0	0	0	1,873	1,742	4,300	3,724	5,843	5,486	9,416	8,207	12,378	12,378	18,205	18,205	26,185
	71	0	100	100	387	225	2,768	2,393	5,780	4,891	9,288	7,902	11,465	11,465	17,730	17,730	24,927
	78	0	0	0	2,392	1,998	4,732	4,107	6,892	6,122	9,911	8,639	12,588	12,588	18,767	18,767	27,612
	Avg.	0	33	33	1,551	1,322	3,933	3,408	6,172	5,500	9,538	8,249	12,144	12,144	18,234	18,234	26,241
4	66	0	106	106	1,124	943	3,569	3,082	6,881	6,311	9,955	9,352	14,591	14,591	21,230	21,230	28,030
	74	0	106	106	781	674	2,520	2,520	4,382	4,382	7,587	7,587	11,408	11,408	16,797	16,797	22,087
	91	0	119	0	2,879	2,217	5,248	4,703	6,408	6,408	10,634	10,346	13,685	13,685	19,809	19,809	29,629
	Avg.	0	110	71	1,595	1,278	3,779	3,435	5,890	5,700	9,392	9,095	13,228	13,228	19,278	19,278	26,582
5	60	0	0	0	874	874	3,269	2,832	5,496	4,726	8,211	7,729	10,380	10,380	17,098	17,098	23,174
	61	0	100	100	1,936	1,811	4,336	3,805	7,404	6,889	12,135	10,500	14,632	14,632	22,726	22,726	32,127
	70	0	125	125	681	531	2,767	2,480	5,913	5,449	8,460	7,921	11,485	11,485	18,037	18,037	24,866
	Avg.	0	75	75	1,164	1,072	3,457	3,039	6,271	5,688	9,602	8,717	12,166	12,166	19,287	19,287	26,723
6	62	0	0	0	1,493	1,087	3,451	2,769	6,388	5,276	9,752	7,651	11,898	11,898	18,824	18,824	27,397
	85	0	0	0	1,062	806	3,897	3,472	6,318	5,216	9,127	7,302	11,795	11,795	17,933	17,933	25,553
	88	0	0	0	2,966	2,348	5,660	4,759	6,697	5,644	9,853	8,505	12,590	12,590	19,349	19,349	27,381
	Avg.	0	0	0	1,840	1,413	4,336	3,667	6,468	5,379	9,577	7,819	12,094	12,094	18,702	18,702	26,777
7	75	0	0	0	862	862	3,130	3,130	6,768	6,768	10,255	9,817	15,164	15,164	22,500	22,500	28,797
	82	0	0	0	1,349	1,349	4,556	4,305	7,655	7,493	11,583	11,081	16,569	16,569	23,239	23,239	30,827
	86	0	131	0	2,692	2,398	6,650	6,124	9,530	9,530	13,020	12,826	19,379	19,379	26,813	26,813	35,953
	Avg.	0	44	0	1,634	1,536	4,779	4,520	7,984	7,930	11,620	11,241	17,038	17,038	24,184	24,184	31,859
8	59	0	0	0	1,592	1,374	4,855	4,604	7,861	7,192	11,314	9,979	14,770	14,770	22,163	22,163	29,388
	72	0	0	0	1,237	1,237	2,884	2,483	5,314	4,876	9,219	8,210	11,965	11,965	18,378	18,378	24,857
	73	0	0	0	649	649	3,383	3,383	6,769	6,426	10,004	9,083	13,329	13,329	19,763	19,763	26,731
	Avg.	0	0	0	1,159	1,087	3,707	3,490	6,648	6,164	10,179	9,091	13,355	13,355	20,101	20,101	26,992
Control	58	0	737	737	3,125	3,125	6,179	6,179	9,762	9,762	14,849	14,849	20,141	20,141	26,804	26,804	33,249
	83	250	924	924	2,930	2,930	6,442	6,442	10,464	10,464	14,658	14,658	20,164	20,164	29,007	29,007	35,857
	89	119	356	356	1,175	1,175	3,307	3,307	7,951	7,951	13,849	13,849	19,654	19,654	27,306	27,306	36,394
	Avg.	123	672	672	2,410	2,410	5,309	5,309	9,393	9,393	14,452	14,452	19,987	19,987	27,706	27,706	35,167

[a] Columns are measurements after treatment and just before next treatment.

Table 58—Clemons: Trees per acre by 1-inch diameter at breast height (d.b.h.) classes, after calibration (1963) and after thinning (1994), by treatment (age in parentheses)

	Treatment 1		Treatment 3		Treatment 5		Treatment 7		Treatment 2		Treatment 4		Treatment 6		Treatment 8		Control	
D.b.h. class	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)	1963 (19 yr)	1994 (50 yr)
									Trees per acre									
2	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
3	12	0	7	0	12	0	10	0	17	0	12	0	15	0	13	0	128	0
4	132	0	118	0	132	0	125	0	143	0	118	0	137	0	142	0	233	0
5	143	0	140	0	143	0	152	0	143	0	160	0	150	0	163	0	192	15
6	77	0	100	0	85	0	83	2	77	0	78	0	75	5	58	3	65	23
7	30	0	25	0	22	0	18	0	10	5	25	0	17	10	17	12	37	25
8	2	0	3	0	3	3	7	0	3	8	3	2	3	15	3	15	17	38
9	0	0	2	0	0	0	0	10	2	7	0	2	2	20	0	28	7	47
10	0	0	0	0	0	0	0	8	0	15	0	5	0	23	0	28	5	62
11	0	0	0	0	0	3	0	15	0	20	0	10	0	37	0	20	2	30
12	0	0	0	0	0	2	0	10	0	18	0	10	0	30	0	30	2	40
13	0	0	0	0	0	13	0	12	0	12	0	8	0	25	0	25	0	32
14	0	3	0	3	0	3	0	17	0	18	0	13	0	18	0	25	0	25
15	0	0	0	3	0	15	0	18	0	25	0	10	0	37	0	17	0	15
16	0	7	0	10	0	7	0	10	0	10	0	22	0	18	0	17	0	12
17	0	3	0	8	0	12	0	17	0	8	0	15	0	10	0	5	0	3
18	0	8	0	12	0	15	0	7	0	13	0	8	0	3	0	5	0	10
19	0	15	0	10	0	13	0	10	0	7	0	10	0	3	0	3	0	0
20	0	5	0	7	0	5	0	5	0	8	0	12	0	3	0	2	0	3
21	0	10	0	10	0	7	0	2	0	0	0	0	0	0	0	2	0	2
22	0	3	0	7	0	3	0	3	0	2	0	0	0	0	0	2	0	2
23	0	0	0	3	0	2	0	2	0	0	0	0	0	0	0	0	0	2
24	0	0	0	0	0	0	0	0	0	2	0	0	0	0	0	0	0	0
25	0	2	0	2	0	0	0	0	0	0	0	0	0	0	0	0	0	2
Total	395	57	395	75	397	103	395	147	395	178	397	127	398	258	397	238	687	387

Table 59—Skykomish: Stand development for treatment 1, per-hectare basis (plots 6010, 6022, and 6034)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 --------					No.	Cm	m^2	--- m^3 ---	
1961	24	14.8	20.9	840	13.4	11.7	68.6	14.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.0	0	0.0	0.0	0.0	0.0
1965	28	19.1	26.3	457	18.7	12.3	92.7	42.9	379	16.0	7.6	55.0	15.7	.1	.1	.92	4	10.9	0	.3	.0
1968	31	21.5	29.5	342	22.6	13.5	114.5	75.2	107	20.7	3.6	29.9	16.8	.3	.2	.94	8	13.8	.1	9	.0
1971	34	24.0	33.2	231	27.9	13.9	131.9	108.1	111	21.4	4.0	36.5	22.0	.3	.2	.83	0	.0	.0	.0	.0
1975	38	27.4	38.7	152	35.1	14.6	156.5	143.5	78	27.9	4.8	50.0	41.4	.6	.5	.85	0	.0	.0	.0	.0
1979	42	30.5	43.2	124	40.1	15.6	181.9	171.0	29	39.4	3.5	41.5	38.9	1.4	1.3	.99	0	.0	.0	.0	.0
1983	46	32.5	46.6	124	44.7	19.3	242.7	230.3	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1988	51	35.0	51.3	124	49.2	23.4	310.9	296.6	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1993	56	38.7	55.7	124	53.3	27.4	395.3	378.1	.0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1961	24	68.6	68.6	14.0	14.0	0.00	0.00	0.0	0.0	0.0	2.9	0.0	0.6	0.0	2.9	0.0	0.6
1965	28	147.8	148.0	58.6	58.6	1.03	1.03	2.1	2.1	19.8	5.3	11.1	2.1	19.8	5.3	11.1	2.1
1968	31	199.4	200.6	107.7	107.7	1.16	1.14	1.6	1.6	17.2	6.4	16.4	3.5	17.5	6.5	16.4	3.5
1971	34	253.3	254.5	162.6	162.6	1.13	1.13	1.5	1.5	18.0	7.4	18.3	4.8	18.0	7.5	18.3	4.8
1975	38	327.9	329.1	239.4	239.4	1.27	1.27	1.4	1.4	18.7	8.6	19.2	6.3	18.7	8.7	19.2	6.3
1979	42	394.9	396.0	305.7	305.7	1.24	1.24	1.1	1.1	16.7	9.4	16.6	7.3	16.7	9.4	16.6	7.3
1983	46	455.6	456.7	365.0	365.0	1.15	1.15	.9	.9	15.2	9.9	14.8	7.9	15.2	9.9	14.8	7.9
1988	51	523.8	525.0	431.3	431.3	.90	.90	.8	.8	13.6	10.3	13.2	8.5	13.6	10.3	13.2	8.5
1993	56	608.2	609.4	512.8	512.8	.82	.82	.8	.8	16.9	10.9	16.3	9.2	16.9	10.9	16.3	9.2

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 212.9 cubic meters (54 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 1.2 cubic meters (< 1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 60—Skykomish: Stand development for treatment 1, per-hectare basis (plots 6010, 6022, and 6034)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 ---------					No.	Cm	m^2	--- m^3 ---	
1961	24	14.3	18.9	910	12.7	11.5	62.1	8.0	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	18.1	24.1	543	17.2	12.6	88.2	31.1	366	15.6	7.0	48.1	13.6	.1	.1	.94	0	.0	.0	.0	.0
1968	31	20.4	26.8	432	20.3	13.9	113.0	61.3	107	20.5	3.5	29.4	16.2	.3	.2	1.01	4	14.3	.1	.5	.0
1971	34	22.3	29.5	362	23.7	15.9	143.7	101.5	66	21.0	2.3	19.4	11.2	.3	.2	.90	4	22.9	.2	1.4	.9
1975	38	26.7	34.8	305	28.7	19.7	213.0	179.7	54	24.9	2.6	27.1	20.1	.5	.4	.88	4	22.9	.2	1.6	1.1
1979	42	29.2	39.1	263	33.2	22.8	268.3	241.5	41	29.7	2.9	32.8	28.5	.8	.7	.91	0	.0	.0	.0	.0
1983	46	32.6	43.3	263	36.6	27.7	362.9	334.7	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1988	51	35.8	47.2	259	39.8	32.2	455.0	425.6	0	.0	.0	.0	.0	.0	.0	.00	4	43.2	.6	8.3	7.9
1993	56	38.9	50.9	255	42.8	36.7	553.6	522.3	0	.0	.0	.0	.0	.0	.0	.00	4	32.5	.3	5.3	4.8

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1961	24	62.1	62.1	8.0	8.0	0.00	0.00	0.0	0.0	0.0	2.6	0.0	.3	0.0	2.6	0.0	.3
1965	28	136.3	136.3	44.7	44.7	.95	.95	2.0	2.0	18.6	4.9	9.2	1.6	18.6	4.9	9.2	1.6
1968	31	190.5	191.0	91.0	91.0	1.06	1.05	1.6	1.7	18.1	6.1	15.5	2.9	18.2	6.2	15.5	2.9
1971	34	240.6	242.4	142.4	143.3	.98	.99	1.4	1.5	16.7	7.1	17.1	4.2	17.1	7.1	17.4	4.2
1975	38	336.9	340.4	240.7	242.8	1.13	1.13	1.6	1.6	24.1	8.9	24.6	6.3	24.5	9.0	24.9	6.4
1979	42	425.1	428.5	331.0	333.0	1.01	1.01	1.5	1.5	22.0	10.1	22.6	7.9	22.0	10.2	22.6	7.9
1983	46	519.7	523.2	424.2	426.2	.85	.85	1.2	1.2	23.7	11.3	23.3	9.2	23.7	11.4	23.3	9.3
1988	51	611.8	623.6	515.1	525.1	.63	.66	.9	1.0	18.4	12.0	18.2	10.1	20.1	12.2	19.8	10.3
1993	56	710.4	727.5	611.8	626.6	.60	.59	.9	1.0	19.7	12.7	19.3	10.9	20.8	13.0	20.3	11.2

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 156.8 cubic meters (37 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 17.1 cubic meters (2 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 61—Skykomish: Stand development for treatment 3, per-hectare basis (plots 6016, 6031, and 6036)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	m^2	- - - - m^3 - - - -		*No.*	*Cm*	m^2	- - - - - - - - m^3 - - - - - - - -					*No.*	*Cm*	m^2	- - - m^3 - - -	
1961	24	14.2	20.6	926	12.7	11.6	65.1	11.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	18.0	26.0	613	17.2	14.2	98.5	38.8	313	14.8	5.4	36.7	7.9	.1	.1	.90	0	.0	.0	.0	.0
1968	31	20.3	29.6	506	20.3	16.3	125.8	68.8	107	20.2	3.4	26.3	15.4	.2	.2	1.00	0	.0	.0	.0	.0
1971	34	23.0	32.4	408	23.9	18.2	162.4	115.0	99	19.6	3.0	25.3	12.4	.3	.1	.85	0	.0	.0	.0	.0
1975	38	26.8	37.9	296	30.0	20.9	214.5	183.9	111	23.1	4.6	46.0	31.7	.4	.3	.82	0	.0	.0	.0	.0
1979	42	29.7	43.0	226	36.2	23.1	261.7	240.3	66	25.9	3.5	38.7	30.2	.6	.5	.76	4	31.0	.3	3.3	2.9
1983	46	32.2	47.5	226	40.2	28.5	347.4	324.6	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1988	51	36.3	52.2	222	44.4	34.3	459.9	434.7	0	.0	.0	.0	.0	.0	.0	.00	4	17.8	.1	.8	.3
1993	56	39.6	56.4	222	47.8	39.8	576.3	547.4	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	- - - - - - - - - - m^3 - - - - - - - - - -				- - - - *Cm* - - - -		- - - m^2 - - -		- m^3 -							
1961	24	65.1	65.1	11.3	11.3	0.00	0.00	0.0	0.0	0.0	2.7	0.0	0.5	0.0	2.7	0.0	0.5
1965	28	135.2	135.2	46.7	46.7	.94	.94	2.0	2.0	17.5	4.8	8.9	1.7	17.5	4.8	8.9	1.7
1968	31	188.8	188.8	92.2	92.2	1.03	1.03	1.8	1.8	17.9	6.1	15.2	3.0	17.9	6.1	15.2	3.0
1971	34	250.7	250.7	150.7	150.7	.96	.96	1.7	1.7	20.6	7.4	19.5	4.4	20.6	7.4	19.5	4.4
1975	38	348.8	348.8	251.3	251.3	1.09	1.09	1.8	1.8	24.5	9.2	25.2	6.6	24.5	9.2	25.2	6.6
1979	42	434.7	438.0	337.9	340.8	1.03	1.03	1.4	1.5	21.5	10.4	21.6	8.0	22.3	10.4	22.4	8.1
1983	46	520.3	523.6	422.2	425.1	1.00	1.00	1.4	1.4	21.4	11.3	21.1	9.2	21.4	11.4	21.1	9.2
1988	51	632.9	636.9	532.3	535.5	.84	.79	1.2	1.2	22.5	12.4	22.0	10.4	22.7	12.5	22.1	10.5
1993	56	749.3	753.4	645.0	648.2	.68	.68	1.1	1.1	23.3	13.4	22.5	11.5	23.3	13.5	22.5	11.6

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 173.0 cubic meters (39 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 4.1 cubic meters (1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 62—Stand development for treatment 4, per-hectare basis (plots 6001, 6023, and 6035)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	m^2	- - - - m^3 - - - -		*No.*	*Cm*	m^2	- - - - - - - - m^3 - - - - - - - - -					*No.*	*Cm*	m^2	- - - m^3 - - -	
1961	24	14.5	21.7	778	13.9	11.8	63.6	15.8	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	18.8	27.4	486	19.3	14.1	99.3	52.0	292	15.8	5.7	36.6	10.4	.1	.1	.87	0	.0	.0	.0	.0
1968	31	20.9	31.2	420	22.7	17.0	133.7	90.2	66	21.9	2.5	19.4	12.4	.3	.2	.97	0	.0	.0	.0	.0
1971	34	24.0	34.8	366	26.6	20.3	186.0	147.7	54	21.0	1.9	16.0	9.2	.3	.2	.81	0	.0	.0	.0	.0
1975	38	27.9	40.3	321	31.9	25.5	270.5	238.4	45	24.6	2.1	22.6	16.8	.5	.4	.79	0	.0	.0	.0	.0
1979	42	30.4	44.6	301	36.2	30.7	353.3	324.0	21	25.3	1.0	11.7	9.1	.6	.6	.71	0	.0	.0	.0	.0
1983	46	33.9	49.0	301	39.4	36.6	462.7	430.9	0.0	.0	.0	.0	.0	.0	.0	0	0	.0	.0	.0	.0
1988	51	37.2	53.0	288	42.5	40.8	561.0	527.3	0	.0	.0	.0	.0	.0	.0	.00	12	37.1	1.3	17.6	16.3
1993	56	40.3	56.3	280	45.1	44.8	660.3	623.8	0	.0	.0	.0	.0	.0	.0	.00	4	29.2	.3	3.9	3.4

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	- - - - - - - - - - m^3 - - - - - - - - - -				- - - - *Cm* - - - -		- - - m^2 - - -		- m^3 -							
1961	24	63.6	63.6	15.8	15.8	0.00	0.00	0.0	0.0	0.0	2.6	0.0	0.7	0.0	2.6	0.0	0.7
1965	28	135.9	135.9	62.3	62.3	1.04	1.04	2.0	2.0	18.1	4.9	11.6	2.2	18.1	4.9	11.6	2.2
1968	31	189.7	189.7	113.0	113.0	1.12	1.12	1.8	1.8	17.9	6.1	16.9	3.6	17.9	6.1	16.9	3.6
1971	34	258.0	258.0	179.8	179.8	1.07	1.07	1.7	1.7	22.8	7.6	22.3	5.3	22.8	7.6	22.3	5.3
1975	38	365.1	365.1	287.3	287.3	1.12	1.12	1.9	1.9	26.8	9.6	26.9	7.6	26.8	9.6	26.9	7.6
1979	42	459.6	459.6	382.0	382.0	.92	.92	1.6	1.6	23.6	10.9	23.7	9.1	23.6	10.9	23.7	9.1
1983	46	569.0	569.0	488.9	488.9	.82	.82	1.5	1.5	27.4	12.4	26.7	10.6	27.4	12.4	26.7	10.6
1988	51	667.4	684.9	585.3	601.6	.61	.61	.9	1.1	19.7	13.1	19.3	11.5	23.2	13.4	22.5	11.8
1993	56	766.7	788.2	681.7	701.5	.52	.49	.8	.8	19.9	13.7	19.3	12.2	20.6	14.1	20.0	12.5

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 106.3 cubic meters (23 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 21.5 cubic meters (3 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 63—Skykomish: Stand development for treatment 5, per-hectare basis (plots 6009, 6011, and 6028)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	*m^2*	*- - - - m^3 - - - -*		*No.*	*Cm*	*m^2*	*- - - - - - - - m^3 - - - - - - - -*					*No.*	*Cm*	*m^2*	*- - - m^3 - - -*	
1961	24	14.6	20.0	897	13.0	11.8	65.7	11.4	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	18.2	25.2	700	17.1	15.8	111.4	42.4	193	15.4	3.6	24.6	5.5	.1	.1	.93	4	8.8	.0	.1	.0
1968	31	20.8	28.8	626	20.1	19.5	158.8	84.8	62	18.8	1.7	13.7	6.9	.2	.2	.95	12	16.9	.3	2.2	.6
1971	34	23.3	31.8	560	22.9	22.5	206.6	136.9	62	20.1	2.0	17.4	9.1	.3	.2	.90	4	12.2	.0	.4	.0
1975	38	27.6	36.4	490	26.8	27.0	291.4	228.4	66	23.7	2.9	31.2	22.1	.5	.4	.90	4	16.3	.1	.8	.1
1979	42	30.4	40.9	424	30.7	30.7	367.7	314.3	66	24.6	3.1	37.7	28.4	.6	.4	.83	0	.0	.0	.0	.0
1983	46	33.5	45.3	424	33.7	37.1	483.1	428.6	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1988	51	36.5	49.7	424	36.6	43.8	605.0	550.1	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1993	56	40.0	53.8	424	39.2	50.2	747.0	688.6	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - m^3 - - - - - - - - - -*				*- - - - Cm - - - -*		*- - - m^2 - - -*		*- m^3 -*							
1961	24	65.7	65.7	11.4	11.4	0.00	0.00	0.0	0.0	0.0	2.7	0.0	0.5	0.0	2.7	0.0	0.5
1965	28	136.0	136.1	47.9	47.9	.92	.92	1.9	1.9	17.6	4.9	9.1	1.7	17.6	4.9	9.1	1.7
1968	31	197.1	199.4	97.2	97.8	.96	.97	1.8	1.9	20.4	6.4	16.4	3.1	21.1	6.4	16.6	3.2
1971	34	262.2	265.0	158.4	159.0	.83	.82	1.7	1.7	21.7	7.7	20.4	4.7	21.8	7.8	20.4	4.7
1975	38	378.2	381.8	272.1	272.8	.90	.88	1.8	1.9	29.0	10.0	28.4	7.2	29.2	10.0	28.4	7.2
1979	42	492.2	495.8	386.3	387.1	.80	.80	1.7	1.7	28.5	11.7	28.6	9.2	28.5	11.8	28.6	9.2
1983	46	607.6	611.1	500.5	501.3	.75	.75	1.6	1.6	28.8	13.2	28.6	10.9	28.8	13.3	28.6	10.9
1988	51	729.5	733.0	622.1	622.8	.58	.58	1.3	1.3	24.4	14.3	24.3	12.2	24.4	14.4	24.3	12.2
1993	56	871.6	875.1	760.5	761.3	.52	.52	1.3	1.3	28.4	15.6	27.7	13.6	28.4	15.6	27.7	13.6

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 124.6 cubic meters (25 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 3.5 cubic meters (< 1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 64—Skykomish: Stand development for treatment 6, per-hectare basis (plots 6007, 6015, and 6033)

		After thinning							Removed in thinning								Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 ---------					No.	Cm	m^2	--- m^3 ---	
1961	24	15.0	19.6	951	12.7	11.7	67.4	11.9	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	19.1	24.8	720	16.9	15.8	114.8	40.9	218	14.7	3.7	25.9	5.9	.1	.1	.90	12	13.2	.2	1.0	.0
1968	31	21.2	28.5	609	20.2	18.8	153.9	81.4	95	19.7	2.9	23.9	12.3	.3	.2	.99	16	13.1	.2	1.5	.0
1971	34	23.4	31.7	494	23.5	20.6	191.0	129.8	103	19.0	2.9	26.3	12.3	.3	.1	.85	12	24.8	.6	5.2	4.0
1975	38	27.3	37.1	354	29.0	22.4	235.4	195.6	132	23.5	5.7	58.6	41.4	.4	.3	.87	8	16.9	.2	1.6	.5
1979	42	30.8	41.8	247	35.1	22.7	267.6	241.8	103	26.5	5.7	66.4	52.6	.6	.5	.82	4	30.5	.3	3.6	3.2
1983	46	33.2	46.6	247	39.1	28.2	357.4	330.4	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1988	51	36.2	51.2	243	42.8	33.3	451.4	422.5	0	.0	.0	.0	.0	.0	.0	.00	4	46.7	.7	9.6	9.1
1993	56	40.2	55.8	239	46.4	38.6	569.5	537.3	0	.0	.0	.0	.0	.0	.0	.00	4	30.7	.3	4.6	4.1

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1961	24	67.4	67.4	11.9	11.9	0.00	0.00	0.0	0.0	0.0	2.8	0.0	0.5	0.0	2.8	0.0	0.5
1965	28	140.6	141.7	46.8	46.8	.93	.94	1.9	2.0	18.3	5.0	8.7	1.7	18.6	5.1	8.7	1.7
1968	31	203.6	206.1	99.6	99.7	1.04	1.03	2.0	2.1	21.0	6.6	17.6	3.2	21.5	6.6	17.6	3.2
1971	34	267.0	274.7	160.3	164.3	.87	.91	1.6	1.8	21.2	7.9	20.2	4.7	22.9	8.1	21.5	4.8
1975	38	370.1	379.4	267.5	272.0	1.03	1.01	1.9	1.9	25.8	9.7	26.8	7.0	26.2	10.0	26.9	7.2
1979	42	468.8	481.7	366.3	374.0	.95	.97	1.5	1.6	24.7	11.2	24.7	8.7	25.6	11.5	25.5	8.9
1983	46	558.6	571.5	454.9	462.6	1.01	1.01	1.4	1.4	22.5	12.1	22.1	9.9	22.5	12.4	22.1	10.1
1988	51	652.5	675.0	547.0	563.8	.74	.77	1.0	1.2	18.8	12.8	18.4	10.7	20.7	13.2	20.2	11.1
1993	56	770.7	797.8	661.8	682.8	.72	.69	1.1	1.1	23.6	13.8	23.0	11.8	24.6	14.2	23.8	12.2

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 201.1 cubic meters (42 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 27.1 cubic meters (3 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 65—Skykomish: Stand development for treatment 6, per-hectare basis (plots 6007, 6015, and 6033)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	m^2	- - - - m^3 - - - -		*No.*	*Cm*	m^2	- - - - - - - - m^3 - - - - - - - -					*No.*	*Cm*	m^2	- - - m^3 - - -	
1961	24	14.7	20.6	869	13.1	11.7	67.5	12.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	18.3	26.8	704	17.7	17.4	126.5	49.4	156	16.3	3.2	23.7	7.2	.2	.1	.93	8	13.8	.1	.8	.0
1968	31	20.8	30.5	659	20.9	22.5	184.5	104.4	41	21.1	1.4	12.3	7.4	.3	.2	1.01	4	13.9	.1	.5	.0
1971	34	22.8	33.9	613	23.7	27.0	241.9	168.4	41	21.0	1.4	12.7	7.2	.3	.2	.89	4	23.4	.2	1.6	1.2
1975	38	26.5	38.8	560	27.5	33.2	340.3	275.6	49	24.8	2.4	24.2	18.2	.5	.4	.91	4	29.5	.3	3.0	2.6
1979	42	29.9	43.4	515	30.9	38.3	437.5	378.2	41	28.2	2.6	30.3	25.6	.7	.6	.92	4	17.0	.1	1.0	.2
1983	46	33.0	47.8	498	33.7	44.2	554.8	495.4	0	.0	.0	.0	.0	.0	.0	.00	16	22.9	.7	7.7	5.4
1988	51	36.3	52.0	482	36.6	50.4	688.5	628.7	0	.0	.0	.0	.0	.0	.0	.00	16	21.9	.6	7.2	4.5
1993	56	39.4	56.0	465	39.3	55.9	813.4	752.7	0	.0	.0	.0	.0	.0	.0	.00	16	24.7	.8	11.5	8.6

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	- - - - - - - - - - m^3 - - - - - - - - - -				- - - - *Cm* - - - -		- - - m^2 - - -		- m^3 -							
1961	24	67.5	67.5	12.3	12.3	0.00	0.00	0.0	0.0	0.0	2.8	0.0	0.5	0.0	2.8	0.0	0.5
1965	28	150.1	151.0	56.6	56.6	1.09	1.09	2.2	2.2	20.7	5.4	11.1	2.0	20.9	5.4	11.1	2.0
1968	31	220.5	221.9	119.0	119.0	1.05	1.04	2.2	2.2	23.5	7.1	20.8	3.8	23.6	7.2	20.8	3.8
1971	34	290.7	293.7	190.2	191.3	.89	.89	2.0	2.0	23.4	8.5	23.7	5.6	23.9	8.6	24.1	5.6
1975	38	413.3	419.3	315.5	319.3	.90	.91	2.1	2.2	30.6	10.9	31.3	8.3	31.4	11.0	32.0	8.4
1979	42	540.8	547.9	443.7	447.7	.79	.77	1.9	2.0	31.9	12.9	32.0	10.6	32.1	13.0	32.1	10.7
1983	46	658.1	672.9	560.9	570.3	.71	.65	1.5	1.6	29.3	14.3	29.3	12.2	31.3	14.6	30.6	12.4
1988	51	791.8	813.8	694.2	708.1	.58	.51	1.2	1.4	26.7	15.5	26.7	13.6	28.2	16.0	27.6	13.9
1993	56	916.7	950.2	818.3	840.8	.53	.46	1.1	1.3	25.0	16.4	24.8	14.6	27.3	17.0	26.5	15.0

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 103.3 cubic meters (19 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 33.4 cubic meters (4 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 66—Skykomish: Stand development for treatment 8, per-hectare basis (plots 6008, 6025, and 6037)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	m^2	- - - - m^3 - - - -		*No.*	*Cm*	m^2	- - - - - - - - m^3 - - - - - - - -					*No.*	*Cm*	m^2	- - - m^3 - - -	
1961	24	14.0	20.7	889	13.0	11.8	64.8	11.9	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	18.0	26.6	762	17.1	17.4	124.9	47.8	124	16.1	2.5	18.0	5.9	.1	.1	.95	4	9.1	.0	.2	.0
1968	31	21.3	29.7	692	20.0	21.7	177.9	98.1	58	18.9	1.6	12.9	5.9	.2	.1	.95	12	15.1	.2	1.7	.1
1971	34	23.0	32.8	622	22.6	25.0	225.4	149.1	49	21.4	1.8	16.0	9.5	.3	.2	.95	21	17.0	.5	3.7	1.7
1975	38	27.5	37.4	519	26.5	28.5	302.9	238.1	86	23.8	3.8	40.3	29.2	.5	.4	.91	16	20.5	.5	5.4	2.9
1979	42	30.0	41.6	428	30.2	30.7	349.2	299.4	86	25.9	4.5	50.7	39.9	.6	.5	.88	4	11.9	.0	.4	.0
1983	46	32.8	45.6	424	33.1	36.5	458.3	405.7	0	.0	.0	.0	.0	.0	.0	.00	4	15.8	.1	.8	.1
1988	51	37.3	49.8	416	36.1	42.5	586.5	533.5	0	.0	.0	.0	.0	.0	.0	.00	8	20.0	.3	2.8	1.4
1993	56	41.2	52.9	375	39.2	45.1	684.7	633.0	0	.0	.0	.0	.0	.0	.0	.00	41	28.1	2.5	35.9	30.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	- - - - - - - - - - m^3 - - - - - - - - - -				- - - - *Cm* - - - -		- - - m^2 - - -		- m^3 -							
1961	24	64.8	64.8	11.9	11.9	0.00	0.00	0.0	0.0	0.0	2.7	0.0	0.5	0.0	2.7	0.0	0.5
1965	28	143.0	143.1	53.7	53.7	.99	.99	2.0	2.1	19.5	5.1	10.5	1.9	19.6	5.1	10.5	1.9
1968	31	208.8	210.7	109.8	109.9	.94	.93	2.0	2.0	21.9	6.7	18.7	3.5	22.5	6.8	18.7	3.5
1971	34	272.3	277.9	170.4	172.2	.86	.83	1.7	1.9	21.2	8.0	20.2	5.0	22.4	8.2	20.8	5.1
1975	38	390.1	401.0	288.6	293.4	.87	.85	1.8	2.0	29.5	10.3	29.6	7.6	30.8	10.6	30.3	7.7
1979	42	487.1	498.4	389.8	394.5	.77	.75	1.7	1.7	24.2	11.6	25.3	9.3	24.3	11.9	25.3	9.4
1983	46	596.2	608.3	496.1	500.9	.72	.70	1.4	1.5	27.3	13.0	26.6	10.8	27.5	13.2	26.6	10.9
1988	51	724.4	739.3	623.9	630.1	.59	.55	1.2	1.2	25.6	14.2	25.6	12.2	26.2	14.5	25.8	12.4
1993	56	822.6	873.4	723.5	759.6	.63	.46	.5	1.0	19.6	14.7	19.9	12.9	26.8	15.6	25.9	13.6

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 137.9 cubic meters (28 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 50.8 cubic meters (6 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 67—Skykomish: Stand development for control, per-hectare basis (plots 6002, 6014, 6038, and 6039)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	m^2	- - - - m^3 - - - -		*No.*	*Cm*	m^2	- - - - - - - - m^3 - - - - - - - -					*No.*	*Cm*	m^2	- - - m^3 - - -	
1961	24	13.8	20.5	1467	12.1	16.6	88.6	12.4	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1965	28	17.5	25.1	1467	14.8	25.0	172.9	45.7	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1968	31	20.5	28.3	1454	16.9	32.0	258.9	98.3	0	.0	.0	.0	.0	.0	.0	.00	12	12.8	.2	1.2	.0
1971	34	23.3	31.1	1436	18.6	38.3	353.4	169.0	0	.0	.0	.0	.0	.0	.0	.00	19	11.9	.2	1.7	.2
1975	38	27.1	35.0	1300	21.1	44.8	463.7	286.7	0	.0	.0	.0	.0	.0	.0	.00	136	14.4	2.2	20.5	5.9
1979	42	30.8	38.8	1161	23.8	50.2	584.4	413.7	0	.0	.0	.0	.0	.0	.0	.00	139	13.7	2.1	20.2	3.1
1983	46	34.0	42.7	1047	26.2	55.6	724.4	559.6	0	.0	.0	.0	.0	.0	.0	.00	114	14.6	1.9	21.1	2.7
1988	51	37.3	46.8	951	29.0	61.4	847.9	704.5	0	.0	.0	.0	.0	.0	.0	.00	96	16.5	2.0	22.7	6.7
1993	56	40.7	50.4	750	32.9	62.2	931.8	820.0	0	.0	.0	.0	.0	.0	.0	.00	201	19.8	6.2	80.3	43.4

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	- - - - - - - - - - m^3 - - - - - - - - - -				- - - - *Cm* - - - -		- - - m^2 - - -		- m^3 -							
1961	24	88.6	88.6	12.4	12.4	0.00	0.00	0.0	0.0	0.0	3.7	0.0	0.5	0.0	3.7	0.0	0.5
1965	28	172.9	172.9	45.7	45.7	.69	.69	2.1	2.1	21.1	6.2	8.3	1.6	21.1	6.2	8.3	1.6
1968	31	258.9	260.1	98.3	98.3	.68	.68	2.3	2.4	28.7	8.4	17.5	3.2	29.1	8.4	17.5	3.2
1971	34	353.4	356.3	169.0	169.2	.57	.56	2.1	2.2	31.5	10.4	23.6	5.0	32.1	10.5	23.6	5.0
1975	38	463.7	487.1	286.7	292.8	.64	.55	1.6	2.2	27.6	12.2	29.4	7.5	32.7	12.8	30.9	7.7
1979	42	584.4	628.0	413.7	422.9	.65	.47	1.4	1.9	30.2	13.9	31.8	9.8	35.2	15.0	32.5	10.1
1983	46	724.4	789.0	559.6	571.6	.62	.45	1.3	1.8	35.0	15.7	36.5	12.2	40.2	17.2	37.2	12.4
1988	51	847.9	935.2	704.5	723.1	.55	.39	1.2	1.6	24.7	16.6	29.0	13.8	29.2	18.3	30.3	14.2
1993	56	931.8	1099.4	820.0	882.0	.78	.38	.2	1.4	16.8	16.6	23.1	14.6	32.8	19.6	31.8	15.7

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) in mortality = 167.6 cubic meters (15 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 68—Skykomish: Trees per hectare, 1961–1993, by treatment, plot, and period

Treatment	Plot	Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
		24	28	28	31	31	34	34	38	38	42	42	46	46	51	51	56
		Number of trees per hectare															
1	6010	1,013	1,000	556	531	408	408	259	259	148	148	124	124	124	124	124	124
	6022	716	716	395	395	296	296	185	185	136	136	111	111	111	111	111	111
	6034	790	790	420	420	321	321	247	247	173	173	136	136	136	136	136	136
	Avg.	840	836	457	449	342	342	231	231	152	152	124	124	124	124	124	124
2	6005	926	926	580	580	457	445	395	383	321	321	284	284	284	272	272	259
	6012	840	840	519	519	420	420	358	358	284	284	247	247	247	247	247	247
	6026	963	963	531	519	420	420	333	333	309	309	259	259	259	259	259	259
	Avg.	910	910	543	539	432	428	362	358	305	305	263	263	263	259	259	255
3	6016	1,013	1,013	630	630	506	506	395	395	284	284	210	210	210	210	210	210
	6031	840	840	531	531	457	457	371	371	272	259	210	210	210	210	210	210
	6036	926	926	679	679	556	556	457	457	333	333	259	259	259	247	247	247
	Avg.	926	926	613	613	506	506	408	408	296	292	226	226	226	222	222	222
4	6001	815	815	494	494	420	420	346	346	309	309	284	284	284	284	284	284
	6023	778	778	457	457	395	395	346	346	296	296	284	284	284	284	284	284
	6035	741	741	506	506	445	445	408	408	358	358	333	333	333	296	296	272
	Avg.	778	778	486	486	420	420	366	366	321	321	301	301	301	288	288	280
5	6009	1,037	1,025	827	790	741	729	679	679	593	593	519	519	519	519	519	519
	6011	840	840	692	692	618	618	543	543	482	482	408	408	408	408	408	408
	6028	815	815	580	580	519	519	457	445	395	395	346	346	346	346	346	346
	Avg.	897	893	700	687	626	622	560	556	490	490	424	424	424	424	424	424
6	6007	790	790	630	630	531	506	445	445	333	333	247	247	247	235	235	222
	6015	865	852	618	605	494	494	383	371	259	259	173	173	173	173	173	173
	6033	1,198	1,173	914	877	803	790	655	642	469	457	321	321	321	321	321	321
	Avg.	951	939	720	704	609	597	494	486	354	350	247	247	247	243	243	239
7	6021	815	803	667	667	618	618	568	568	519	506	469	445	445	445	445	420
	6027	926	926	766	766	716	716	667	655	618	618	568	556	556	556	556	531
	6030	865	852	679	667	642	630	605	605	543	543	506	494	494	445	445	445
	Avg.	869	860	704	700	659	655	613	609	560	556	515	498	498	482	482	465
8	6008	840	840	741	741	667	655	593	568	494	494	420	420	420	420	420	420
	6025	902	889	741	704	679	655	605	605	506	506	420	408	408	408	408	346
	6037	926	926	803	803	729	704	667	642	556	543	445	445	445	420	420	358
	Avg.	889	885	762	749	692	671	622	605	519	515	428	424	424	416	416	375
Control	6002	1,939	1,939	1,939	1,914	1,914	1,865	1,865	1,618	1,618	1,445	1,445	1,272	1272	1,161	1,161	939
	6014	1,309	1,309	1,309	1,309	1,309	1,284	1,284	1,272	1,272	1,124	1,124	1,025	1,025	976	976	803
	6038	1,050	1,050	1,050	1,050	1,050	1,050	1,050	926	926	815	815	778	778	692	692	605
	6039	1,568	1,568	1,568	1,544	1,544	1,544	1,544	1,383	1,383	1,260	1,260	1,112	1,112	976	976	655
	Avg.	1,467	1,467	1,467	1,454	1,454	1,436	1,436	1,300	1,300	1,161	1,161	1,047	1,047	951	951	750

[a] Columns are measurements after treatment and just before next treatment.

Table 69—Skykomish: Basal area per hectare, 1961–1993, by treatment, plot, and period

		Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
Treatment	**Plot**	**24**	**28**	**28**	**31**	**31**	**34**	**34**	**38**	**38**	**42**	**42**	**46**	**46**	**51**	**51**	**56**
		Square meters per hectare															
1	6010	11.8	20.5	12.4	17.4	13.7	18.6	13.9	19.9	14.5	19.2	15.6	19.6	19.6	23.9	23.9	27.5
	6022	11.8	19.5	12.5	17.3	13.6	17.8	13.9	19.2	14.8	19.0	15.7	19.4	19.4	23.3	23.3	27.6
	6034	11.6	20.0	12.2	16.8	13.4	17.4	13.9	19.3	14.7	19.1	15.5	19.1	19.1	23.0	23.0	27.3
	Avg.	11.7	20.0	12.4	17.2	13.6	17.9	13.9	19.5	14.7	19.1	15.6	19.3	19.3	23.4	23.4	27.5
2	6005	11.5	18.4	12.7	17.6	13.9	17.4	16.0	22.1	19.5	25.7	23.2	28.4	28.4	31.8	31.8	36.3
	6012	11.4	18.8	12.5	17.6	13.8	18.1	15.9	22.4	19.5	24.9	22.0	26.8	26.8	31.7	31.7	35.7
	6026	11.8	21.4	12.5	17.4	14.3	19.0	15.9	22.4	20.2	26.3	23.1	27.9	27.9	33.2	33.2	38.3
	Avg.	11.6	19.6	12.6	17.5	14.0	18.2	15.9	22.3	19.7	25.6	22.8	27.7	27.7	32.2	32.2	36.7
3	6016	11.5	20.6	14.2	20.4	16.4	21.4	18.3	25.5	20.8	26.9	23.2	28.5	28.5	34.3	34.3	39.8
	6031	11.8	19.7	14.1	19.3	16.3	21.1	18.3	25.2	20.9	25.7	23.1	28.2	28.2	33.8	33.8	38.6
	6036	11.7	18.5	14.2	19.5	16.2	21.3	18.3	26.0	21.0	27.4	23.3	29.1	29.1	35.0	35.0	41.1
	Avg.	11.7	19.6	14.2	19.7	16.3	21.3	18.3	25.6	20.9	26.7	23.2	28.6	28.6	34.4	34.4	39.8
4	6001	11.8	19.7	14.2	19.6	17.1	22.3	20.3	27.3	25.6	32.2	30.9	36.8	36.8	42.7	42.7	48.0
	6023	11.7	20.7	14.1	19.7	17.0	22.2	20.3	27.7	25.6	31.4	30.6	36.6	36.6	42.3	42.3	46.7
	6035	11.8	19.2	14.2	19.2	17.0	21.9	20.3	28.2	25.6	31.9	30.8	36.5	36.5	37.7	37.7	39.8
	Avg.	11.8	19.9	14.2	19.5	17.0	22.1	20.3	27.7	25.6	31.8	30.8	36.6	36.6	40.9	40.9	44.8
5	6009	11.4	18.9	15.7	20.6	19.5	24.3	22.6	30.3	27.1	34.0	30.8	37.2	37.2	43.9	43.9	50.4
	6011	11.8	18.6	15.8	21.4	19.5	24.5	22.5	29.9	27.1	34.4	30.8	37.5	37.5	44.4	44.4	50.8
	6028	12.1	20.7	15.8	21.7	19.6	24.8	22.6	29.8	27.1	33.4	30.8	36.8	36.8	43.2	43.2	49.6
	Avg.	11.8	19.4	15.8	21.2	19.5	24.5	22.6	30.0	27.1	33.9	30.8	37.1	37.1	43.8	43.8	50.3
6	6007	11.8	18.9	15.9	21.9	18.8	22.4	20.6	27.8	22.5	28.5	23.2	28.3	28.3	31.3	31.3	35.2
	6015	11.9	20.2	16.1	22.5	18.8	24.3	20.7	27.7	22.4	28.5	22.7	28.3	28.3	34.2	34.2	39.9
	6033	11.6	19.4	15.4	20.7	18.9	24.0	20.7	28.8	22.3	28.3	22.3	28.3	28.3	34.6	34.6	40.8
	Avg.	11.8	19.5	15.8	21.7	18.8	23.6	20.7	28.1	22.4	28.4	22.8	28.3	28.3	33.4	33.4	38.6
7	6021	11.8	20.9	17.4	24.4	22.7	29.0	27.0	36.0	33.3	41.0	38.3	43.7	43.7	50.9	50.9	56.5
	6027	11.6	20.5	17.5	24.1	22.5	28.6	27.0	35.0	33.2	41.1	38.4	44.6	44.6	51.4	51.4	56.6
	6030	11.8	20.6	17.3	23.4	22.4	27.8	27.1	35.9	33.2	40.8	38.4	44.6	44.6	49.1	49.1	55.0
	Avg.	11.7	20.6	17.4	24.0	22.5	28.5	27.0	35.6	33.2	41.0	38.4	44.3	44.3	50.5	50.5	56.0
8	6008	12.0	20.0	17.5	23.9	21.9	27.0	25.0	32.8	28.6	35.5	30.7	36.6	36.6	42.4	42.4	48.1
	6025	11.9	20.2	17.4	22.6	21.8	27.3	25.0	32.8	28.5	35.5	30.8	36.6	36.6	43.4	43.4	46.6
	6037	11.4	19.8	17.5	23.5	21.4	26.2	25.0	31.6	28.6	34.9	30.7	36.4	36.4	41.8	41.8	40.8
	Avg.	11.8	20.0	17.4	23.3	21.7	26.8	25.0	32.4	28.6	35.3	30.7	36.5	36.5	42.5	42.5	45.2
Control	6002	20.1	29.0	29.0	36.2	36.2	42.6	42.6	47.9	47.9	52.1	52.1	56.3	56.3	61.1	61.1	61.2
	6014	14.4	22.8	22.8	29.8	29.8	35.7	35.7	43.8	43.8	49.3	49.3	53.7	53.7	59.8	59.8	62.0
	6038	12.5	19.6	19.6	25.9	25.9	31.9	31.9	38.4	38.4	44.6	44.6	51.3	51.3	56.7	56.7	61.4
	6039	19.7	28.6	28.6	36.3	36.3	43.1	43.1	49.4	49.4	55.2	55.2	61.5	61.5	68.5	68.5	64.7
	Avg.	16.7	25.0	25.0	32.0	32.0	38.3	38.3	44.9	44.9	50.3	50.3	55.7	55.7	61.5	61.5	62.3

[a] Columns are measurements after treatment and just before next treatment.

Table 70—Skykomish: Quadratic mean diameter, 1961–1993, by treatment, plot, and period

		Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
Treatment	**Plot**	**24**	**28**	**28**	**31**	**31**	**34**	**34**	**38**	**38**	**42**	**42**	**46**	**46**	**51**	**51**	**56**
									Centimeters								
1	6010	12.2	16.2	16.9	20.4	20.7	24.1	26.2	31.2	35.3	40.6	40.0	44.9	44.9	49.7	49.7	53.3
	6022	14.5	18.6	20.1	23.6	24.1	27.6	30.9	36.4	37.3	42.2	42.4	47.1	47.1	51.7	51.7	56.3
	6034	13.7	17.9	19.2	22.5	23.1	26.3	26.8	31.5	32.9	37.6	38.1	42.3	42.3	46.5	46.5	50.6
	Avg.	13.4	17.6	18.7	22.2	22.6	26.0	28.0	33.0	35.1	40.1	40.2	44.8	44.8	49.3	49.3	53.4
2	6005	12.6	15.9	16.7	19.6	19.7	22.3	22.7	27.1	27.8	32.0	32.3	35.7	35.7	38.6	38.6	42.2
	6012	13.1	16.9	17.5	20.8	20.4	23.4	23.8	28.2	29.5	33.4	33.7	37.1	37.1	40.4	40.4	42.9
	6026	12.5	16.8	17.3	20.7	20.8	24.0	24.6	29.2	28.9	33.0	33.7	37.0	37.0	40.4	40.4	43.4
	Avg.	12.7	16.5	17.2	20.4	20.3	23.3	23.7	28.2	28.7	32.8	33.2	36.6	36.6	39.8	39.8	42.8
3	6016	12.0	16.1	17.0	20.3	20.3	23.2	24.3	28.7	30.6	34.7	37.5	41.6	41.6	45.6	45.6	49.1
	6031	13.4	17.3	18.4	21.5	21.3	24.2	25.1	29.4	31.3	35.6	37.4	41.4	41.4	45.3	45.3	48.4
	6036	12.7	15.9	16.3	19.1	19.3	22.1	22.6	26.9	28.3	32.3	33.8	37.8	37.8	42.5	42.5	46.0
	Avg.	12.7	16.4	17.2	20.3	20.3	23.2	24.0	28.3	30.1	34.2	36.2	40.2	40.2	44.5	44.5	47.8
4	6001	13.6	17.6	19.1	22.5	22.8	26.0	27.3	31.7	32.5	36.4	37.2	40.6	40.6	43.8	43.8	46.4
	6023	13.9	18.4	19.8	23.4	23.4	26.8	27.4	31.9	33.2	36.7	37.1	40.5	40.5	43.6	43.6	45.8
	6035	14.2	18.2	18.9	22.0	22.1	25.1	25.2	29.7	30.2	33.7	34.3	37.3	37.3	40.2	40.2	43.2
	Avg.	13.9	18.0	19.3	22.6	22.7	25.9	26.6	31.1	31.9	35.6	36.2	39.5	39.5	42.5	42.5	45.1
5	6009	11.8	15.3	15.6	18.2	18.3	20.6	20.6	23.8	24.1	27.0	27.5	30.2	30.2	32.8	32.8	35.2
	6011	13.4	16.8	17.1	19.8	20.0	22.5	22.9	26.5	26.7	30.1	31.0	34.2	34.2	37.2	37.2	39.8
	6028	13.7	18.0	18.6	21.8	22.0	24.7	25.1	29.2	29.5	32.8	33.7	36.8	36.8	39.9	39.9	42.7
	Avg.	13.0	16.7	17.1	20.0	20.1	22.6	22.9	26.5	26.8	30.0	30.7	33.7	33.7	36.7	36.7	39.2
6	6007	13.8	17.4	17.9	21.1	21.2	23.7	24.3	28.2	29.3	33.0	34.6	38.2	38.2	41.2	41.2	44.9
	6015	13.2	17.4	18.2	21.8	22.0	25.0	26.2	30.9	33.2	37.4	40.9	45.6	45.6	50.2	50.2	54.2
	6033	11.1	14.5	14.6	17.4	17.3	19.6	20.0	23.9	24.6	28.1	29.7	33.5	33.5	37.0	37.0	40.2
	Avg.	12.7	16.4	16.9	20.1	20.2	22.8	23.5	27.7	29.0	32.8	35.1	39.1	39.1	42.8	42.8	46.4
7	6021	13.6	18.2	18.2	21.6	21.6	24.4	24.6	28.4	28.6	32.1	32.3	35.4	35.4	38.2	38.2	41.4
	6027	12.6	16.8	17.0	20.0	20.0	22.5	22.7	26.1	26.2	29.1	29.3	32.0	32.0	34.3	34.3	36.8
	6030	13.2	17.5	18.0	21.1	21.1	23.7	23.9	27.5	27.9	30.9	31.1	33.9	33.9	37.5	37.5	39.7
	Avg.	13.1	17.5	17.8	20.9	20.9	23.6	23.7	27.3	27.6	30.7	30.9	33.7	33.7	36.7	36.7	39.3
8	6008	13.5	17.4	17.3	20.3	20.4	22.9	23.2	27.1	27.1	30.2	30.5	33.3	33.3	35.9	35.9	38.2
	6025	13.0	17.0	17.3	20.2	20.2	23.0	23.0	26.3	26.8	29.9	30.6	33.8	33.8	36.8	36.8	41.4
	6037	12.5	16.5	16.6	19.3	19.4	21.8	21.9	25.0	25.6	28.6	29.7	32.3	32.3	35.6	35.6	38.1
	Avg.	13.0	17.0	17.1	19.9	20.0	22.6	22.7	26.1	26.5	29.6	30.2	33.1	33.1	36.1	36.1	39.2
Control	6002	11.5	13.8	13.8	15.5	15.5	17.1	17.1	19.4	19.4	21.4	21.4	23.7	23.7	25.9	25.9	28.8
	6014	11.8	14.9	14.9	17.0	17.0	18.8	18.8	20.9	20.9	23.6	23.6	25.8	25.8	27.9	27.9	31.4
	6038	12.3	15.4	15.4	17.7	17.7	19.7	19.7	23.0	23.0	26.4	26.4	29.0	29.0	32.3	32.3	35.9
	6039	12.6	15.3	15.3	17.3	17.3	18.9	18.9	21.3	21.3	23.6	23.6	26.5	26.5	29.9	29.9	35.5
	Avg.	12.1	14.8	14.8	16.9	16.9	18.6	18.6	21.2	21.2	23.8	23.8	26.3	26.3	29.0	29.0	32.9

[a] Columns are measurements after treatment and just before next treatment.

Table 71—Skykomish: Total stem volume per hectare, 1961–1993, by treatment, plot, and period

		Calibration period 1961–1965[a] Age (years)		Treatment period 1 1965–1968[a] Age (years)		Treatment period 2 1968–1971[a] Age (years)		Treatment period 3 1971–1975[a] Age (years)		Treatment period 4 1975–1979[a] Age (years)		Treatment period 5 1979–1983[a] Age (years)		Treatment period 6 1983–1988[a] Age (years)		Treatment period 7 1988–1993[a] Age (years)	
Treatment	**Plot**	**24**	**28**	**28**	**31**	**31**	**34**	**34**	**38**	**38**	**42**	**42**	**46**	**46**	**51**	**51**	**56**
		Cubic meters per hectare															
1	6010	69	150	91	143	112	171	129	207	152	220	177	240	240	311	311	392
	6022	71	149	98	150	118	171	136	209	162	225	185	246	246	313	313	399
	6034	67	144	90	141	113	163	131	204	156	226	183	242	242	309	309	395
	Avg.	69	148	93	144	115	168	132	207	157	224	182	243	243	311	311	395
2	6005	60	124	87	139	109	152	140	232	205	297	269	366	366	445	445	542
	6012	63	132	88	143	111	161	143	239	208	286	254	342	342	435	435	527
	6026	64	153	90	146	119	176	149	250	226	320	282	382	382	486	486	593
	Avg.	62	136	88	142	113	163	144	240	213	301	268	363	363	455	455	554
3	6016	64	143	100	161	129	192	165	264	216	306	264	346	346	460	460	572
	6031	66	139	100	154	129	190	166	261	218	295	264	351	351	461	461	571
	6036	65	124	96	142	119	182	157	256	210	300	257	345	345	459	459	587
	Avg.	65	135	99	152	126	188	162	261	215	301	262	347	347	460	460	577
4	6001	63	134	98	151	132	200	183	284	266	363	348	459	459	573	573	690
	6023	64	144	102	158	137	206	190	293	270	362	353	461	461	585	585	691
	6035	63	130	98	150	133	199	185	303	276	371	359	468	468	526	526	600
	Avg.	64	136	99	153	134	202	186	293	271	365	353	463	463	561	561	661
5	6009	62	129	108	164	155	219	204	324	290	408	369	485	485	607	607	752
	6011	67	130	112	174	159	225	207	325	294	410	367	485	485	611	611	748
	6028	69	148	115	180	163	229	209	320	291	399	368	480	480	598	598	742
	Avg.	66	136	111	173	159	224	207	323	292	406	368	483	483	605	605	747
6	6007	70	140	119	185	158	213	197	298	242	342	279	365	365	431	431	529
	6015	69	149	120	185	155	223	190	292	236	334	267	352	352	455	455	578
	6033	63	133	105	163	148	216	186	293	229	326	257	356	356	468	468	602
	Avg.	67	141	115	178	154	217	191	294	236	334	268	358	358	452	452	570
7	6021	70	154	129	204	189	263	245	373	346	477	445	552	552	698	698	823
	6027	65	148	126	196	182	254	241	355	337	465	433	554	554	697	697	820
	6030	67	149	125	191	182	247	240	365	338	462	435	559	559	672	672	798
	Avg.	67	150	127	197	185	255	242	365	340	468	438	555	555	689	689	814
8	6008	67	145	128	199	182	248	229	354	310	405	352	461	461	585	585	728
	6025	65	144	123	184	178	243	223	343	299	399	345	454	454	592	592	707
	6037	62	140	124	189	174	234	224	333	301	396	351	461	461	583	583	621
	Avg.	65	143	125	191	178	241	225	343	303	400	349	459	459	587	587	685
Control	6002	107	202	202	293	293	396	396	493	493	607	607	744	744	843	843	916
	6014	76	158	158	241	241	329	329	452	452	573	573	697	697	821	821	922
	6038	66	133	133	207	207	291	291	398	398	518	518	658	658	780	780	915
	6039	106	199	199	295	295	398	398	513	513	641	641	800	800	949	949	975
	Avg.	89	173	173	259	259	354	354	464	464	585	585	725	725	848	848	932

[a] Columns are measurements after treatment and just before next treatment.

Table 72—Clemons: Stand development for treatment 1, per-hectare basis (plots 63, 64, and 69)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 ---------					No.	Cm	m^2	--- m^3 ---	
1963	19	9.6	14.6	976	10.5	8.4	33.5	0.2	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	12.7	18.7	597	13.8	8.9	45.5	4.7	379	13.4	5.3	26.9	3.7	.1	.0	.98	0	.0	.0	.0	.0
1970	26	16.3	23.1	371	18.3	9.7	63.1	26.1	210	17.6	5.1	33.0	12.6	.2	.1	.98	16	12.5	.2	1.2	.1
1973	29	19.0	26.4	259	22.6	10.3	77.4	51.1	111	20.0	3.5	26.0	14.3	.2	.2	.92	0	.0	.0	.0	.0
1976	32	21.2	30.6	185	27.4	10.9	91.3	75.3	70	24.4	3.3	27.2	20.0	.4	.3	.92	4	16.8	.1	.7	.1
1980	36	24.3	35.1	140	32.1	11.3	107.3	96.6	45	32.4	3.7	36.1	32.3	.8	.7	1.01	0	.0	.0	.0	.0
1984	40	26.5	38.1	140	36.4	14.5	148.8	138.3	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1989	45	30.3	43.6	140	41.4	18.8	215.6	204.0	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1994	50	34.0	48.5	140	45.9	23.2	291.9	278.0	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1963	19	33.5	33.5	0.2	0.2	0.00	0.00	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.8	0.0	0.0
1966	22	72.4	72.4	8.4	8.4	1.05	1.05	1.9	1.9	13.0	3.3	2.7	.4	13.0	3.3	2.7	.4
1970	26	122.9	124.1	42.4	42.5	1.06	1.06	1.5	1.5	12.6	4.7	8.5	1.6	12.9	4.8	8.5	1.6
1973	29	163.3	164.5	81.7	81.8	1.18	1.18	1.4	1.4	13.5	5.6	13.1	2.8	13.5	5.7	13.1	2.8
1976	32	204.3	206.2	125.9	126.1	1.37	1.35	1.3	1.3	13.7	6.4	14.7	3.9	13.9	6.4	14.8	3.9
1980	36	256.4	258.3	179.5	179.7	1.21	1.21	1.0	1.0	13.0	7.1	13.4	5.0	13.0	7.2	13.4	5.0
1984	40	297.9	299.7	221.2	221.4	1.05	1.05	.8	.8	10.4	7.4	10.4	5.5	10.4	7.5	10.4	5.5
1989	45	364.8	366.6	286.9	287.1	1.01	1.01	.9	.9	13.4	8.1	13.1	6.4	13.4	8.1	13.1	6.4
1994	50	441.0	442.8	360.9	361.1	.90	.90	.9	.9	15.2	8.8	14.8	7.2	15.2	8.9	14.8	7.2

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 149.1 cubic meters (58 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 1.9 cubic meters (<1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 73—Clemons: Stand development for treatment 2, per-hectare basis (plots 81, 87, and 90)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 --------					No.	Cm	m^2	--- m^3 ---	
1963	19	10.6	14.9	976	10.7	8.8	36.1	0.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	13.6	19.4	527	14.7	8.8	46.8	8.3	445	13.4	6.3	32.8	3.4	.1	.0	.95	4	16.0	.1	.5	.0
1970	26	17.0	24.6	338	20.0	10.5	69.9	37.2	181	17.9	4.6	30.1	11.9	.2	.1	.93	8	18.4	.2	1.5	.8
1973	29	19.8	28.9	259	24.6	12.3	94.2	70.1	74	20.4	2.4	18.5	10.1	.2	.2	.86	4	17.0	.1	.8	.2
1976	32	22.0	33.4	214	29.5	14.5	122.2	104.9	41	21.4	1.5	12.0	7.4	.3	.2	.76	4	30.0	.3	2.5	2.2
1980	36	25.3	37.8	185	34.5	17.3	168.6	154.5	25	22.2	1.0	9.9	6.4	.4	.2	.67	4	34.3	.4	4.1	3.8
1984	40	27.8	41.6	185	38.0	20.9	219.8	205.5	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1989	45	31.7	46.2	185	42.2	25.9	304.1	287.9	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1994	50	35.0	50.3	185	45.8	30.5	394.4	375.4	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1963	19	36.1	36.1	0.6	0.6	0.00	0.00	0.0	0.0	0.0	1.9	0.0	0.0	0.0	1.9	0.0	0.0
1966	22	79.7	80.1	11.7	11.8	1.12	1.12	2.1	2.1	14.5	3.6	3.7	.5	14.7	3.6	3.7	.5
1970	26	132.8	134.7	52.5	53.4	1.16	1.18	1.6	1.6	13.3	5.1	10.2	2.0	13.7	5.2	10.4	2.1
1973	29	175.6	178.3	95.5	96.6	1.26	1.25	1.4	1.4	14.2	6.1	14.3	3.3	14.5	6.1	14.4	3.3
1976	32	215.6	220.7	137.7	141.0	1.25	1.28	1.2	1.3	13.3	6.7	14.1	4.3	14.1	6.9	14.8	4.4
1980	36	271.9	281.1	193.8	200.8	.99	1.01	.9	1.0	14.1	7.6	14.0	5.4	15.1	7.8	15.0	5.6
1984	40	323.0	332.3	244.7	251.7	.87	.87	.9	.9	12.8	8.1	12.7	6.1	12.8	8.3	12.7	6.3
1989	45	407.4	416.6	327.1	334.2	.85	.85	1.0	1.0	16.9	9.1	16.5	7.3	16.9	9.3	16.5	7.4
1994	50	497.6	506.9	414.7	421.7	.72	.72	.9	.9	18.0	10.0	17.5	8.3	18.0	10.1	17.5	8.4

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 103.2 cubic meters (37 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 9.3 cubic meters (2 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table74—Clemons: Stand development for treatment 3, per-hectare basis (plots 67, 71, and 78)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 ---------					No.	Cm	m^2	--- m^3 ---	
1963	19	10.2	14.4	980	10.3	8.2	33.0	0.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	13.3	18.1	696	13.6	10.0	51.7	5.8	284	13.0	3.7	19.1	2.0	.1	.0	.97	0	.0	.0	.0	.0
1970	26	16.6	22.7	515	17.9	12.7	82.3	34.7	181	16.4	3.8	24.3	7.6	.1	.1	.94	0	.0	.0	.0	.0
1973	29	19.5	26.1	408	21.5	14.5	110.2	67.7	107	18.4	2.8	20.7	10.3	.2	.2	.89	0	.0	.0	.0	.0
1976	32	22.8	29.8	325	25.5	16.1	142.1	109.3	78	20.9	2.7	22.3	13.3	.3	.2	.86	4	26.9	.2	2.1	1.7
1980	36	25.2	34.1	259	30.0	17.8	174.1	150.1	66	25.0	3.2	30.2	22.8	.5	.3	.87	0	.0	.0	.0	.0
1984	40	27.9	37.9	259	33.2	21.8	232.6	208.8	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1989	45	31.7	42.8	259	37.3	27.4	327.5	302.7	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1994	50	35.9	46.8	255	40.9	32.5	430.0	403.9	0	.0	.0	.0	.0	.0	.0	.00	4	16.8	.1	.7	.1

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1963	19	33.0	33.0	0.3	0.3	0.00	0.00	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.7	0.0	0.0
1966	22	70.8	70.8	7.8	7.8	1.00	1.00	1.8	1.8	12.6	3.2	2.5	.4	12.6	3.2	2.5	.4
1970	26	125.7	125.7	44.3	44.3	.98	.98	1.6	1.6	13.7	4.8	9.1	1.7	13.7	4.8	9.1	1.7
1973	29	174.3	174.3	87.7	87.7	1.00	1.00	1.5	1.5	16.2	6.0	14.5	3.0	16.2	6.0	14.5	3.0
1976	32	228.5	230.7	142.5	144.3	1.04	1.06	1.4	1.5	18.1	7.1	18.3	4.5	18.8	7.2	18.9	4.5
1980	36	290.7	292.8	206.3	208.0	.90	.90	1.2	1.2	15.5	8.1	15.9	5.7	15.5	8.1	15.9	5.8
1984	40	349.2	351.3	264.9	266.7	.80	.80	1.0	1.0	14.6	8.7	14.7	6.6	14.6	8.8	14.7	6.7
1989	45	444.1	446.2	358.8	360.6	.81	.81	1.1	1.1	19.0	9.9	18.8	8.0	19.0	9.9	18.8	8.0
1994	50	546.6	549.4	460.0	461.9	.72	.67	1.0	1.0	20.5	10.9	20.2	9.2	20.6	11.0	20.3	9.2

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 116.6 cubic meters (40 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 2.9 cubic meters (1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 75—Clemons: Stand development for treatment 5, per-hectare basis (plots 60, 61, and 70)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 --------					No.	Cm	m^2	--- m^3 ---	
1963	19	10.5	15.1	976	10.6	8.6	34.9	0.9	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	13.7	18.9	700	13.8	10.3	53.6	6.8	272	13.7	4.0	20.8	3.1	.1	.1	1.00	4	14.3	.1	.3	.0
1970	26	16.7	23.3	552	18.0	13.5	87.0	34.9	132	17.7	3.2	20.6	8.8	.2	.1	1.00	16	12.6	.2	1.2	.0
1973	29	19.4	26.4	490	21.1	16.3	121.0	70.5	49	20.3	1.6	12.0	7.1	.2	.2	.99	12	19.9	.4	2.9	1.8
1976	32	21.8	30.0	445	24.2	19.4	161.5	115.2	16	22.5	.7	5.4	3.6	.3	.3	.96	29	21.9	1.1	9.2	6.0
1980	36	24.6	33.7	420	27.4	23.4	215.8	173.8	16	25.9	.9	8.0	6.3	.5	.4	.97	8	23.4	.4	3.0	2.1
1984	40	26.9	37.1	399	30.2	26.9	273.1	232.6	0	.0	.0	.0	.0	.0	.0	.00	21	22.8	.8	7.8	5.3
1989	45	30.8	41.2	387	33.3	32.0	364.2	324.5	0	.0	.0	.0	.0	.0	.0	.00	12	22.9	.5	4.9	3.4
1994	50	34.4	45.0	362	36.2	35.9	455.0	416.1	0	.0	.0	.0	.0	.0	.0	.00	25	25.5	1.3	14.8	11.5

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1963	19	34.9	34.9	0.9	0.9	0.00	0.00	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.8	0.0	0.0
1966	22	74.5	74.8	9.9	9.9	1.02	1.02	1.9	1.9	13.2	3.4	3.0	.4	13.3	3.4	3.0	.4
1970	26	128.5	130.0	46.8	46.8	1.03	1.02	1.6	1.7	13.5	4.9	9.2	1.8	13.8	5.0	9.2	1.8
1973	29	174.4	178.8	89.5	91.3	1.00	1.02	1.5	1.6	15.3	6.0	14.3	3.1	16.3	6.2	14.9	3.1
1976	32	220.4	233.9	137.8	145.6	1.03	1.04	1.2	1.6	15.3	6.9	16.1	4.3	18.4	7.3	18.1	4.5
1980	36	282.6	299.2	202.7	212.6	.77	.78	1.2	1.3	15.6	7.9	16.2	5.6	16.3	8.3	16.8	5.9
1984	40	340.0	364.3	261.5	276.7	.70	.64	.9	1.1	14.3	8.5	14.7	6.5	16.3	9.1	16.0	6.9
1989	45	431.0	460.2	353.4	372.0	.62	.60	1.0	1.1	18.2	9.6	18.4	7.9	19.2	10.2	19.1	8.3
1994	50	521.8	565.8	445.0	475.1	.58	.54	.8	1.0	18.2	10.4	18.3	8.9	21.1	11.3	20.6	9.5

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 66.8 cubic meters (22 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 44.0 cubic meters (8 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 76—Clemons: Stand development for treatment 5, per-hectare basis (plots 60, 61, and 70)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	*m^2*	*- - - - m^3 - - - -*		*No.*	*Cm*	*m^2*	*- - - - - - - - m^3 - - - - - - - - -*					*No.*	*Cm*	*m^2*	*- - - m^3 - - -*	
1963	19	10.3	14.4	976	10.1	7.8	30.6	0.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	13.3	18.3	865	13.1	11.6	58.1	5.8	107	12.6	1.3	6.6	.5	.1	.0	.97	4	9.6	.0	.1	.0
1970	26	16.4	23.0	729	16.7	15.7	98.1	32.3	91	17.2	2.1	13.2	4.8	.1	.1	1.03	45	14.2	.7	4.2	.4
1973	29	18.7	26.3	634	19.5	18.7	133.8	68.4	82	19.5	2.5	17.7	9.2	.2	.1	1.00	12	11.3	.1	.7	.0
1976	32	21.4	29.7	560	22.1	21.0	171.6	110.8	58	22.0	2.2	17.9	11.5	.3	.2	1.01	16	23.1	.7	5.7	3.9
1980	36	24.1	33.2	494	25.3	24.2	219.1	166.4	54	24.1	2.4	22.3	16.5	.4	.4	.97	12	17.4	.3	2.4	.9
1984	40	25.9	36.5	461	28.1	27.7	269.8	222.2	4	17.8	.1	.9	.3	.3	.0	.65	29	23.1	1.2	11.1	7.6
1989	45	29.4	40.6	457	31.3	34.0	373.7	325.8	0	.0	.0	.0	.0	.0	.0	.00	4	22.1	.2	1.4	.9
1994	50	32.7	44.3	440	34.3	39.4	476.0	428.7	0	.0	.0	.0	.0	.0	.0	.00	16	22.6	.7	7.3	5.6

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	*- - - - - - - - - - m^3 - - - - - - - - - -*				*- - - - Cm - - - -*		*- - - m^2 - - -*		*- m^3 -*							
1963	19	30.6	30.6	0.5	0.5	0.00	0.00	0.0	0.0	0	1.6	0.0	0.0	0.0	1.6	0.0	0.0
1966	22	64.7	64.8	6.3	6.3	.96	.96	1.7	1.7	11.4	2.9	1.9	.3	11.4	2.9	1.9	.3
1970	26	117.9	122.3	37.6	38.0	.90	.92	1.6	1.7	13.3	4.5	7.8	1.4	14.4	4.7	7.9	1.5
1973	29	171.3	176.4	82.9	83.3	.94	.92	1.8	1.8	17.8	5.9	15.1	2.9	18.0	6.1	15.1	2.9
1976	32	227.0	237.8	136.8	141.1	.86	.89	1.5	1.7	18.6	7.1	18.0	4.3	20.5	7.4	19.3	4.4
1980	36	296.9	310.0	208.9	214.1	.77	.75	1.4	1.5	17.5	8.2	18.0	5.8	18.1	8.6	18.3	5.9
1984	40	348.4	372.7	264.9	277.7	.68	.64	.9	1.2	12.9	8.7	14.0	6.6	15.7	9.3	15.9	6.9
1989	45	452.3	478.0	368.6	382.2	.64	.63	1.3	1.3	20.8	10.1	20.7	8.2	21.1	10.6	20.9	8.5
1994	50	554.6	587.6	471.4	490.7	.59	.55	1.1	1.2	20.5	11.1	20.6	9.4	21.9	11.8	21.7	9.8

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 78.6 cubic meters (21 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 33.0 cubic meters (6 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 77—Clemons: Stand development for treatment 6, per-hectare basis (plots 62, 85, and 88)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 --------					No.	Cm	m^2	--- m^3 ---	
1963	19	10.4	14.5	980	10.4	8.4	32.6	0.3	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	13.6	18.4	815	13.6	11.8	60.7	6.8	161	13.3	2.2	11.4	1.1	.1	.0	.98	4	9.1	.0	.1	.0
1970	26	16.9	23.2	626	17.6	15.0	97.0	36.5	177	17.3	4.1	26.7	10.3	.2	.1	.99	12	11.9	.1	.7	.0
1973	29	20.0	26.3	506	20.7	16.9	130.8	75.5	111	19.5	3.3	25.3	12.7	.2	.1	.95	8	15.2	.2	1.0	.2
1976	32	21.3	29.6	403	23.8	17.8	145.9	104.7	99	22.5	3.9	31.7	21.1	.3	.2	.96	4	10.7	.0	.2	.0
1980	36	24.7	33.0	313	27.4	18.4	176.9	145.2	86	25.0	4.2	40.5	30.5	.5	.4	.93	4	22.9	.2	1.3	.9
1984	40	27.4	35.8	313	30.3	22.4	237.1	206.5	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1989	45	31.3	40.6	313	34.0	28.2	334.2	303.3	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1994	50	35.2	45.0	313	37.2	33.8	444.7	411.9	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1963	19	32.6	32.6	0.3	0.3	0.00	0.00	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.7	0.0	0.0
1966	22	72.1	72.2	8.0	8.0	1.02	1.02	1.9	1.9	13.2	3.3	2.6	.4	13.2	3.3	2.6	.4
1970	26	135.1	136.0	47.9	47.9	.97	.97	1.9	1.9	15.8	5.2	10.0	1.8	15.9	5.2	10.0	1.8
1973	29	194.2	196.1	99.7	99.8	.97	.96	1.7	1.8	19.7	6.7	17.3	3.4	20.0	6.8	17.3	3.4
1976	32	241.0	243.1	150.0	150.1	.96	.93	1.6	1.6	15.6	7.5	16.8	4.7	15.7	7.6	16.8	4.7
1980	36	312.5	315.9	221.0	222.0	.79	.79	1.2	1.3	17.9	8.7	17.8	6.1	18.2	8.8	18.0	6.2
1984	40	372.8	376.2	282.3	283.3	.72	.72	1.0	1.0	15.1	9.3	15.3	7.1	15.1	9.4	15.3	7.1
1989	45	469.8	473.2	379.1	380.1	.73	.73	1.1	1.1	19.4	10.4	19.4	8.4	19.4	10.5	19.4	8.4
1994	50	580.4	583.8	487.6	488.7	.65	.65	1.1	1.1	22.1	11.6	21.7	9.8	22.1	11.7	21.7	9.8

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 135.6 cubic meters (43 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 3.4 cubic meters (1 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 78—Clemons: Stand development for treatment 7, per-hectare basis (plots 75, 82, and 86)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	m^2	---- m^3 ----		*No.*	*Cm*	m^2	-------- m^3 --------					*No.*	*Cm*	m^2	--- m^3 ---	
1963	19	10.9	14.4	984	10.3	8.1	34.7	0.6	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	14.1	18.3	922	13.3	12.7	69.0	6.2	62	13.3	.9	4.7	1.4	.1	.1	1.00	0	.0	.0	.0	.0
1970	26	17.6	22.4	856	16.7	18.5	126.0	40.6	54	16.4	1.1	7.6	2.3	.1	.1	.99	12	14.2	.2	1.3	.1
1973	29	20.4	25.6	795	19.1	22.5	175.8	86.6	41	18.8	1.1	8.9	4.7	.2	.2	.99	21	15.7	.4	2.9	.9
1976	32	22.3	28.3	749	21.5	26.6	231.8	143.2	25	16.9	.6	4.5	1.3	.2	.1	.80	21	13.4	.3	2.2	.0
1980	36	24.4	31.5	708	23.7	30.5	291.2	206.5	29	21.3	1.0	9.7	6.3	.3	.2	.91	12	20.9	.4	4.0	2.6
1984	40	27.5	34.0	700	25.3	34.5	363.6	279.0	0	.0	.0	.0	.0	.0	.0	.00	8	15.7	.2	1.4	.5
1989	45	30.7	37.2	679	27.7	40.0	463.0	381.5	0	.0	.0	.0	.0	.0	.0	.00	21	18.5	.6	5.7	3.1
1994	50	33.9	40.3	638	30.1	44.7	567.3	489.7	0	.0	.0	.0	.0	.0	.0	.00	41	20.0	1.3	14.5	8.5

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- *Cm* ----		--- m^2 ---		---------- m^3 ----------							
1963	19	34.7	34.7	0.6	0.6	0.00	0.00	0.0	0.0	0.0	1.8	0.0	0.0	0.0	1.8	0.0	0.0
1966	22	73.7	73.7	7.6	7.6	.99	.99	1.8	1.8	13.0	3.4	2.3	.3	13.0	3.4	2.3	.3
1970	26	138.3	139.5	44.2	44.3	.84	.84	1.7	1.8	16.1	5.3	9.2	1.7	16.4	5.4	9.2	1.7
1973	29	197.1	201.2	95.0	96.0	.79	.79	1.7	1.8	19.6	6.8	16.9	3.3	20.6	6.9	17.2	3.3
1976	32	257.6	263.9	152.9	153.9	.73	.68	1.5	1.6	20.2	8.0	19.3	4.8	20.9	8.2	19.3	4.8
1980	36	326.6	337.0	222.4	226.0	.53	.52	1.2	1.3	17.3	9.1	17.4	6.2	18.3	9.4	18.0	6.3
1984	40	399.1	410.9	295.0	299.1	.42	.40	1.0	1.0	18.1	10.0	18.1	7.4	18.5	10.3	18.3	7.5
1989	45	498.5	516.0	397.4	404.6	.47	.43	1.1	1.2	19.9	11.1	20.5	8.8	21.0	11.5	21.1	9.0
1994	50	602.8	634.8	505.7	521.4	.49	.42	.9	1.2	20.9	12.1	21.7	10.1	23.8	12.7	23.4	10.4

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 35.5 cubic meters (11 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 32.0 cubic meters (5 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 79—Clemons: Stand development for treatment 8, per-hectare basis (plots 59, 72, and 73)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	m	Cm	No.	Cm	m^2	---- m^3 ----		No.	Cm	m^2	-------- m^3 --------					No.	Cm	m^2	--- m^3 ---	
1963	19	10.8	14.4	980	10.1	7.8	32.9	0.4	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	13.8	18.1	955	12.9	12.5	65.5	5.8	25	11.7	.3	1.3	.0	.0	.0	.91	0	.0	.0	.0	.0
1970	26	17.4	22.3	889	16.1	17.9	117.4	33.2	58	16.5	1.2	8.2	2.5	.1	.1	1.03	8	10.8	.1	.4	.0
1973	29	20.4	25.4	786	18.5	20.9	158.4	71.6	78	17.5	1.9	14.1	5.9	.2	.1	.95	25	16.3	.5	3.7	1.2
1976	32	22.3	28.3	692	20.7	23.1	194.8	114.1	91	19.4	2.7	21.8	10.4	.2	.1	.95	4	20.1	.1	1.1	.6
1980	36	25.0	31.5	593	23.2	24.7	231.4	160.3	78	23.2	3.3	31.2	22.0	.4	.4	1.01	21	14.9	.4	2.8	.6
1984	40	27.5	33.9	593	25.1	28.9	296.4	225.0	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0
1989	45	30.7	37.5	589	27.6	34.6	388.9	318.4	0	.0	.0	.0	.0	.0	.0	.00	4	25.4	.2	2.3	1.8
1994	50	33.7	41.0	589	29.7	40.1	490.4	419.2	0	.0	.0	.0	.0	.0	.0	.00	0	.0	.0	.0	.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	---------- m^3 ----------				---- Cm ----		--- m^2 ---		---------- m^3 ----------							
1963	19	32.9	32.9	0.4	0.4	0.00	0.00	0.0	0.0	0.0	1.7	0.0	0.0	0.0	1.7	0.0	0.0
1966	22	66.8	66.8	5.8	5.8	.92	.92	1.6	1.6	11.3	3.0	1.8	.3	11.3	3.0	1.8	.3
1970	26	126.9	127.3	35.7	35.7	.79	.79	1.7	1.7	15.0	4.9	7.5	1.4	15.1	4.9	7.5	1.4
1973	29	182.0	186.1	80.0	81.2	.77	.77	1.6	1.8	18.4	6.3	14.8	2.8	19.6	6.4	15.2	2.8
1976	32	240.3	245.5	132.9	134.6	.71	.71	1.6	1.7	19.4	7.5	17.6	4.2	19.8	7.7	17.8	4.2
1980	36	308.0	316.1	201.0	203.3	.62	.58	1.2	1.3	16.9	8.6	17.0	5.6	17.6	8.8	17.2	5.6
1984	40	372.9	381.0	265.8	268.1	.48	.48	1.1	1.1	16.2	9.3	16.2	6.6	16.2	9.5	16.2	6.7
1989	45	465.4	475.8	359.2	363.3	.49	.49	1.1	1.2	18.5	10.3	18.7	8.0	19.0	10.6	19.0	8.1
1994	50	567.0	577.3	460.0	464.1	.43	.43	1.1	1.1	20.3	11.3	20.2	9.2	20.3	11.5	20.2	9.3

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[d] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 76.6 cubic meters (24 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 10.4 cubic meters (2 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 80—Clemons: Stand development table for control, per-hectare basis (plots 58, 83, and 89)

		After thinning							Removed in thinning							Mortality					
		100 largest[a]					Volume[c]					Volume		Avg. volume						Volume	
Year	Stand age	Ht	D.b.h.	Trees	QMD[b]	Basal area	CVTS	CV6	Trees	QMD[b]	Basal area	CVTS	CV6	CVTS	CV6	d/D[d]	Trees	QMD[b]	Basal area	CVTS	CV6
	Years	*m*	*Cm*	*No.*	*Cm*	m^2	- - - - m^3 - - - -		*No.*	*Cm*	m^2	- - - - - - - - m^3 - - - - - - - -					*No.*	*Cm*	m^2	- - - m^3 - - -	
1963	19	11.9	19.5	1696	10.2	13.7	59.6	7.5	0	0.0	0.0	0.0	0.0	0.0	0.0	0.00	0	0.0	0.0	0.0	0.0
1966	22	14.9	23.1	1688	12.5	20.5	111.6	22.6	0	.0	.0	.0	.0	.0	.0	.00	8	8.7	.0	.2	.0
1970	26	18.5	27.2	1634	15.0	28.6	193.1	63.4	0	.0	.0	.0	.0	.0	.0	.00	54	6.4	.2	.7	.0
1973	29	21.3	30.0	1589	16.7	34.5	269.7	115.6	0	.0	.0	.0	.0	.0	.0	.00	45	8.3	.2	1.4	.0
1976	32	23.8	32.5	1498	18.3	38.8	337.7	175.4	0	.0	.0	.0	.0	.0	.0	.00	91	12.7	1.1	8.9	1.5
1980	36	26.1	35.1	1379	20.1	43.1	411.0	249.4	0	.0	.0	.0	.0	.0	.0	.00	119	11.1	1.2	9.0	.4
1984	40	28.8	37.4	1235	21.8	45.5	477.2	319.8	0	.0	.0	.0	.0	.0	.0	.00	144	14.2	2.3	21.4	9.8
1989	45	32.0	40.3	1070	24.4	49.4	568.7	426.0	0	.0	.0	.0	.0	.0	.0	.00	165	14.7	2.8	26.4	10.1
1994	50	34.7	43.3	955	26.8	52.9	659.4	530.9	0	.0	.0	.0	.0	.0	.0	.00	115	18.1	3.0	32.5	15.0

		Cumulative yield[e]				QMD growth[f]		Basal area growth		Net volume growth[g]				Gross volume growth			
Year	Stand age	Net CVTS	Gross CVTS	Net CV6	Gross CV6	Net	Survivor	Net	Gross	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI	CVTS PAI	CVTS MAI	CV6 PAI	CV6 MAI
	Years	- - - - - - - - - - m^3 - - - - - - - - - -				- - - - *Cm* - - - -		- - - m^2 - - -		- m^3 -							
1963	19	59.6	59.6	7.5	7.5	0.00	0.00	0.0	0.0	0.0	3.1	0.0	0.4	0.0	3.1	0.0	0.4
1966	22	111.6	111.8	22.6	22.6	.77	.76	2.3	2.3	17.3	5.1	5.0	1.0	17.4	5.1	5.0	1.0
1970	26	193.1	194.0	63.4	63.4	.62	.59	2.0	2.1	20.4	7.4	10.2	2.4	20.6	7.5	10.2	2.4
1973	29	269.7	272.1	115.6	115.6	.56	.51	1.9	2.0	25.6	9.3	17.4	4.0	26.0	9.4	17.4	4.0
1976	32	337.7	348.9	175.4	176.9	.53	.44	1.4	1.8	22.6	10.6	19.9	5.5	25.6	10.9	20.4	5.5
1980	36	411.0	431.2	249.4	251.2	.46	.33	1.1	1.4	18.3	11.4	18.5	6.9	20.6	12.0	18.6	7.0
1984	40	477.2	518.9	319.8	331.4	.42	.29	.6	1.2	16.6	11.9	17.6	8.0	21.9	13.0	20.0	8.3
1989	45	568.7	636.8	426.0	447.7	.52	.34	.8	1.3	18.3	12.6	21.2	9.5	23.6	14.2	23.3	9.9
1994	50	659.4	760.0	530.9	567.7	.48	.34	.7	1.3	18.1	13.2	21.0	10.6	24.6	15.2	24.0	11.4

[a] Average height (ht) and diameter at breast height (d.b.h.) of the 100 largest trees per hectare (estimated from d.b.h. and ht-d.b.h. curves).
[b] Quadratic mean diameter at breast height.
[c] All volumes are total stem cubic meters (CVTS) or merchantable cubic to a 15.25-cm top diameter inside bark (CV6).
[c] Average d.b.h. cut/average d.b.h. before thinning.
[e] Cumulative yield: net = standing + thinning; gross = standing + thinning + mortality; yield does not include any volume removed in a calibration cut. Volume (CVTS) removed in thinnings = 149.1 cubic meters (58 percent of the total gross yield at the time of the last thinning). Volume (CVTS) in mortality = 100.6 cubic meters (13 percent of the total gross yield).
[f] Net is QMD growth of trees alive at the start and end of the period; survivor is QMD growth of trees alive at the end of the period.
[g] MAI = mean annual increment; PAI = periodic annual increment.

Table 81—Clemons: Trees per hectare, 1963–1994, by treatment, plot, and period

		Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
Treatment	**Plot**	**19**	**22**	**22**	**26**	**26**	**29**	**29**	**32**	**32**	**36**	**36**	**40**	**40**	**45**	**45**	**50**
								Number of trees per hectare									
1	63	976	976	519	506	321	321	222	222	173	173	136	136	136	136	136	136
	64	976	976	605	593	383	383	272	272	198	198	148	148	148	148	148	148
	69	976	976	667	642	408	408	284	272	185	185	136	136	136	136	136	136
	Avg.	976	976	597	580	371	371	259	255	185	185	140	140	140	140	140	140
2	81	976	976	605	605	383	383	284	284	235	235	198	198	198	198	198	198
	87	976	963	506	482	346	333	272	272	222	222	185	185	185	185	185	185
	90	976	976	469	469	284	284	222	210	185	173	173	173	173	173	173	173
	Avg.	976	972	527	519	338	333	259	255	214	210	185	185	185	185	185	185
3	67	988	988	692	692	506	506	408	395	333	333	259	259	259	259	259	247
	71	976	976	803	803	618	618	494	494	395	395	321	321	321	321	321	321
	78	976	976	593	593	420	420	321	321	247	247	198	198	198	198	198	198
	Avg.	980	980	696	696	515	515	408	403	325	325	259	259	259	259	259	255
4	66	976	976	729	692	580	580	519	506	457	457	420	420	420	420	420	408
	74	976	963	827	827	679	655	618	580	580	556	556	519	519	482	482	420
	91	976	976	543	531	395	383	333	296	296	296	284	259	259	259	259	259
	Avg.	976	972	700	683	552	539	490	461	445	436	420	399	399	387	387	362
5	60	976	963	889	766	741	716	630	593	543	519	482	395	395	383	383	358
	61	976	976	753	741	605	605	519	506	457	457	383	383	383	383	383	383
	70	976	976	951	951	840	827	753	753	679	667	618	618	605	605	605	580
	Avg.	976	972	865	819	729	716	634	618	560	548	494	465	461	457	457	440
6	62	976	963	852	815	655	642	531	531	432	420	333	333	333	333	333	333
	85	976	976	865	865	679	667	543	543	432	432	333	333	333	333	333	333
	88	988	988	729	729	543	543	445	432	346	346	272	272	272	272	272	272
	Avg.	980	976	815	803	626	618	506	502	403	399	313	313	313	313	313	313
7	75	1,000	1,000	1,000	963	963	902	902	889	877	877	827	827	827	803	803	753
	82	976	976	963	963	877	877	815	803	778	766	741	716	716	692	692	618
	86	976	976	803	803	729	729	667	630	593	568	556	556	556	543	543	543
	Avg.	984	984	922	910	856	836	795	774	749	737	708	700	700	679	679	638
8	59	976	976	902	889	778	716	679	667	593	556	494	494	494	482	482	482
	72	988	988	988	988	976	963	877	877	790	766	692	692	692	692	692	692
	73	976	976	976	963	914	914	803	803	692	692	593	593	593	593	593	593
	Avg.	980	980	955	947	889	865	786	782	692	671	593	593	593	589	589	589
Control	58	1,445	1,445	1,445	1,445	1,445	1,420	1,420	1,396	1,396	1,309	1,309	1,223	1,223	1,050	1,050	976
	83	1,778	1,754	1,754	1,618	1,618	1,519	1,519	1,309	1,309	1,136	1,136	1,013	1,013	877	877	741
	89	1,865	1,865	1,865	1,840	1,840	1,828	1,828	1,791	1,791	1,692	1,692	1,470	1,470	1,284	1,284	1,149
	Avg.	1,696	1,688	1,688	1,634	1,634	1,589	1,589	1,498	1,498	1,379	1,379	1,235	1,235	1,070	1,070	955

[a] Columns are measurements after treatment and just before next treatment.

Table 82—Clemons: Basal area per hectare, 1963–1994, by treatment, plot, and period

Treatment	Plot	Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
		19	22	22	26	26	29	29	32	32	36	36	40	40	45	45	50
		Square meters per hectare															
1	63	9.6	16.1	8.8	15.0	9.7	14.1	10.3	14.1	10.9	15.1	11.3	14.6	14.6	19.4	19.4	24.3
	64	8.1	14.0	9.0	14.9	9.7	13.9	10.2	14.3	10.9	15.2	11.4	14.6	14.6	18.9	18.9	23.1
	69	7.6	12.6	9.0	14.5	9.7	13.5	10.4	14.2	11.0	15.0	11.4	14.4	14.4	18.4	18.4	22.2
	Avg.	8.4	14.2	8.9	14.8	9.7	13.8	10.3	14.2	10.9	15.1	11.4	14.5	14.5	18.9	18.9	23.2
2	81	7.4	13.2	8.9	15.5	10.5	15.0	12.3	16.4	14.5	18.7	17.2	21.0	21.0	26.2	26.2	31.4
	87	9.8	15.8	8.9	13.9	10.5	14.3	12.2	15.9	14.5	18.4	17.0	20.5	20.5	25.4	25.4	30.0
	90	9.3	16.4	8.8	15.9	10.5	14.8	12.3	15.7	14.5	17.7	17.7	21.5	21.5	26.2	26.2	30.3
	Avg.	8.8	15.1	8.8	15.1	10.5	14.7	12.3	16.0	14.5	18.3	17.3	21.0	21.0	25.9	25.9	30.6
3	67	8.7	14.2	10.2	16.4	12.7	17.2	14.5	18.0	16.2	21.0	17.8	21.7	21.7	27.2	27.2	31.9
	71	7.5	12.3	10.2	16.3	12.7	17.4	14.5	19.4	16.1	21.2	17.8	21.8	21.8	27.4	27.4	33.0
	78	8.6	14.8	9.6	17.0	12.7	17.5	14.5	19.0	16.2	20.8	17.8	21.9	21.9	27.9	27.9	32.8
	Avg.	8.3	13.8	10.0	16.6	12.7	17.3	14.5	18.8	16.1	21.0	17.8	21.8	21.8	27.5	27.5	32.6
4	66	8.1	13.7	10.2	16.3	13.6	18.3	16.5	21.7	19.7	25.5	23.6	28.0	28.0	33.8	33.8	38.5
	74	7.8	11.9	10.4	16.1	13.6	17.1	16.3	19.6	19.6	23.4	23.4	26.5	26.5	30.4	30.4	32.5
	91	9.9	17.2	10.2	18.0	13.6	18.5	16.4	19.0	19.0	24.1	23.4	26.5	26.5	31.9	31.9	36.9
	Avg.	8.6	14.3	10.3	16.8	13.6	18.0	16.4	20.1	19.4	24.3	23.5	27.0	27.0	32.0	32.0	36.0
5	60	7.5	12.5	11.6	16.5	15.8	21.3	18.7	22.7	20.3	25.6	24.2	25.1	25.1	30.9	30.9	35.0
	61	8.4	14.4	11.6	19.4	15.7	21.6	18.7	23.6	21.5	28.3	24.2	29.8	29.8	37.3	37.3	44.2
	70	7.6	11.9	11.6	17.8	15.8	20.6	18.7	23.5	21.4	26.3	24.5	28.6	28.3	34.0	34.0	39.1
	Avg.	7.8	12.9	11.6	17.9	15.8	21.2	18.7	23.3	21.1	26.7	24.3	27.8	27.7	34.0	34.0	39.4
6	62	7.9	13.0	11.7	18.8	14.9	20.0	16.7	21.7	17.8	23.3	18.3	22.8	22.8	29.0	29.0	35.5
	85	7.5	12.9	11.6	18.8	14.9	19.9	16.7	21.9	17.7	22.7	18.3	22.2	22.2	27.6	27.6	33.2
	88	9.8	16.1	12.1	20.1	15.3	20.7	17.2	21.6	17.8	22.0	18.6	22.4	22.4	27.9	27.9	33.0
	Avg.	8.4	14.0	11.8	19.2	15.1	20.2	16.9	21.7	17.8	22.6	18.4	22.4	22.4	28.2	28.2	33.9
7	75	7.8	12.6	12.6	18.1	18.1	21.9	21.9	26.7	26.5	32.0	30.5	34.7	34.7	39.9	39.9	43.4
	82	7.5	12.8	12.6	20.4	18.8	24.4	22.9	27.5	26.7	31.7	30.5	34.0	34.0	39.6	39.6	43.8
	86	9.1	15.3	13.0	20.6	18.8	24.8	22.9	27.5	26.7	31.0	30.6	35.1	35.1	40.7	40.7	47.0
	Avg.	8.2	13.6	12.7	19.7	18.6	23.7	22.6	27.2	26.7	31.6	30.5	34.6	34.6	40.1	40.1	44.8
8	59	8.3	13.8	13.0	20.5	18.0	22.0	20.9	25.7	23.1	28.2	24.8	29.4	29.4	35.0	35.0	41.1
	72	7.8	12.1	12.1	18.2	18.0	22.9	20.9	25.6	23.2	27.8	24.7	28.6	28.6	34.5	34.5	39.7
	73	7.5	12.3	12.3	18.9	18.0	23.4	20.9	26.2	23.1	28.2	24.7	28.9	28.9	34.4	34.4	39.8
	Avg.	7.8	12.7	12.5	19.2	18.0	22.8	20.9	25.8	23.1	28.1	24.8	29.0	29.0	34.6	34.6	40.2
Control	58	13.8	20.1	20.1	27.7	27.7	33.3	33.3	38.3	38.3	43.1	43.1	45.1	45.1	47.3	47.3	51.0
	83	15.1	22.1	22.1	30.4	30.4	35.6	35.6	37.3	37.3	39.8	39.8	42.6	42.6	47.1	47.1	49.9
	89	12.4	19.5	19.5	28.0	28.0	34.7	34.7	41.0	41.0	46.7	46.7	49.1	49.1	54.0	54.0	58.1
	Avg.	13.8	20.6	20.6	28.7	28.7	34.5	34.5	38.9	38.9	43.2	43.2	45.6	45.6	49.5	49.5	53.0

[a] Columns are measurements after treatment and just before next treatment.

Table 83—Clemons: Quadratic mean diameter, 1963–1994, by treatment, plot, and period (age in parentheses)

Treatment	Plot	Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
		19	22	22	26	26	29	29	32	32	36	36	40	40	45	45	50
		Centimeters															
1	63	11.2	14.5	14.7	19.4	19.6	23.7	24.3	28.5	28.3	33.4	32.6	37.0	37.0	42.6	42.6	47.7
	64	10.3	13.5	13.7	17.9	18.0	21.5	21.9	25.9	26.5	31.3	31.3	35.4	35.4	40.2	40.2	44.6
	69	10.0	12.8	13.1	17.0	17.4	20.5	21.5	25.8	27.4	32.1	32.7	36.7	36.7	41.5	41.5	45.6
	Avg.	10.5	13.6	13.8	18.1	18.3	21.9	22.6	26.7	27.4	32.3	32.2	36.4	36.4	41.5	41.5	46.0
2	81	9.8	13.1	13.7	18.0	18.7	22.3	23.5	27.1	28.1	31.9	33.3	36.7	36.7	41.1	41.1	44.9
	87	11.3	14.4	14.9	19.2	19.7	23.3	24.0	27.3	28.9	32.5	34.2	37.5	37.5	41.8	41.8	45.4
	90	11.0	14.6	15.5	20.8	21.7	25.8	26.6	30.9	31.5	36.1	36.1	39.8	39.8	43.9	43.9	47.3
	Avg.	10.7	14.1	14.7	19.3	20.0	23.8	24.7	28.4	29.5	33.5	34.5	38.0	38.0	42.3	42.3	45.9
3	67	10.6	13.5	13.7	17.4	17.9	20.8	21.3	24.1	24.9	28.3	29.6	32.6	32.6	36.5	36.5	40.6
	71	9.9	12.7	12.7	16.1	16.2	18.9	19.3	22.4	22.8	26.1	26.5	29.4	29.4	33.0	33.0	36.2
	78	10.6	13.9	14.4	19.1	19.6	23.0	24.0	27.5	28.9	32.8	33.9	37.6	37.6	42.4	42.4	46.0
	Avg.	10.4	13.4	13.6	17.5	17.9	20.9	21.5	24.7	25.5	29.1	30.0	33.2	33.2	37.3	37.3	40.9
4	66	10.3	13.4	13.4	17.3	17.2	20.1	20.1	23.4	23.5	26.7	26.8	29.1	29.1	32.0	32.0	34.7
	74	10.1	12.5	12.7	15.8	15.9	18.2	18.3	20.7	20.7	23.1	23.1	25.5	25.5	28.3	28.3	31.4
	91	11.3	15.0	15.5	20.7	20.9	24.8	25.0	28.6	28.6	32.2	32.4	36.1	36.1	39.6	39.6	42.6
	Avg.	10.6	13.6	13.8	17.9	18.0	21.0	21.1	24.2	24.3	27.3	27.4	30.2	30.2	33.3	33.3	36.2
5	60	9.9	12.9	12.9	16.6	16.5	19.5	19.5	22.1	21.8	25.1	25.3	28.4	28.4	32.1	32.1	35.3
	61	10.5	13.7	14.0	18.2	18.2	21.3	21.4	24.4	24.5	28.1	28.3	31.5	31.5	35.2	35.2	38.4
	70	9.9	12.5	12.5	15.4	15.5	17.8	17.8	19.9	20.0	22.4	22.5	24.3	24.4	26.7	26.7	29.3
	Avg.	10.1	13.0	13.1	16.7	16.7	19.5	19.6	22.1	22.1	25.2	25.4	28.1	28.1	31.3	31.3	34.3
6	62	10.1	13.1	13.2	17.1	17.0	19.9	20.0	22.8	22.9	26.6	26.4	29.5	29.5	33.3	33.3	36.8
	85	9.9	13.0	13.1	16.6	16.7	19.5	19.8	22.7	22.9	25.8	26.4	29.1	29.1	32.5	32.5	35.6
	88	11.3	14.4	14.5	18.7	18.9	22.0	22.2	25.2	25.6	28.4	29.5	32.4	32.4	36.2	36.2	39.3
	Avg.	10.4	13.5	13.6	17.5	17.6	20.5	20.7	23.6	23.8	27.0	27.5	30.3	30.3	34.0	34.0	37.2
7	75	10.0	12.7	12.7	15.5	15.5	17.6	17.6	19.6	19.6	21.6	21.7	23.1	23.1	25.2	25.2	27.1
	82	9.9	12.9	12.9	16.4	16.5	18.8	18.9	20.9	20.9	22.9	22.9	24.6	24.6	27.0	27.0	30.1
	86	10.9	14.1	14.4	18.1	18.1	20.8	20.9	23.6	23.9	26.4	26.5	28.4	28.4	30.9	30.9	33.2
	Avg.	10.3	13.2	13.3	16.7	16.7	19.1	19.1	21.3	21.5	23.6	23.7	25.3	25.3	27.7	27.7	30.1
8	59	10.4	13.4	13.6	17.1	17.1	19.8	19.8	22.1	22.3	25.4	25.3	27.5	27.5	30.4	30.4	33.0
	72	10.0	12.5	12.5	15.3	15.3	17.4	17.4	19.3	19.3	21.5	21.3	23.0	23.0	25.2	25.2	27.0
	73	9.9	12.7	12.7	15.8	15.8	18.1	18.2	20.4	20.6	22.8	23.0	24.9	24.9	27.2	27.2	29.2
	Avg.	10.1	12.9	12.9	16.1	16.1	18.4	18.5	20.6	20.7	23.2	23.2	25.1	25.1	27.6	27.6	29.7
Control	58	11.0	13.3	13.3	15.6	15.6	17.3	17.3	18.7	18.7	20.5	20.5	21.7	21.7	24.0	24.0	25.8
	83	10.4	12.7	12.7	15.5	15.5	17.3	17.3	19.0	19.0	21.1	21.1	23.1	23.1	26.2	26.2	29.3
	89	9.2	11.5	11.5	13.9	13.9	15.5	15.5	17.1	17.1	18.7	18.7	20.6	20.6	23.1	23.1	25.4
	Avg.	10.2	12.5	12.5	15.0	15.0	16.7	16.7	18.3	18.3	20.1	20.1	21.8	21.8	24.4	24.4	26.8

[a] Columns are measurements after treatment and just before next treatment.

Table 84—Clemons: Total stem volume per hectare, 1963–1994, by treatment, plot, and period

Treatment	Plot	Calibration period 1963–1966[a] Age (years)		Treatment period 1 1966–1970[a] Age (years)		Treatment period 2 1970–1973[a] Age (years)		Treatment period 3 1973–1976[a] Age (years)		Treatment period 4 1976–1980[a] Age (years)		Treatment period 5 1980–1984[a] Age (years)		Treatment period 6 1984–1989[a] Age (years)		Treatment period 7 1989–1994[a] Age (years)	
		19	22	22	26	26	29	29	32	32	36	36	40	40	45	45	50
		Cubic meters per hectare															
11	63	38	83	45	99	64	107	78	120	91	145	108	152	152	224	224	314
	64	32	71	46	97	63	103	77	119	92	145	107	149	149	216	216	291
	69	30	63	45	93	62	100	77	117	91	141	106	145	145	207	207	271
	Avg.	34	72	46	96	63	103	77	119	91	143	107	149	149	216	216	292
2	81	29	67	46	102	70	114	94	136	121	184	168	223	223	309	309	405
	87	42	85	48	94	71	112	97	138	127	186	172	221	221	307	307	398
	90	38	87	47	105	69	112	93	128	119	166	166	216	216	296	296	380
	Avg.	36	80	47	100	70	113	94	134	122	179	169	220	220	304	304	395
3	67	35	74	53	106	83	131	111	158	143	206	176	232	232	326	326	428
	71	29	62	51	102	80	128	107	164	137	202	170	230	230	322	322	420
	78	35	77	51	111	84	134	112	171	147	205	176	236	236	335	335	442
	Avg.	33	71	52	107	82	131	110	165	142	204	174	233	233	328	328	430
4	66	33	71	53	105	87	136	123	183	167	239	222	289	289	392	392	491
	74	31	60	52	99	84	121	115	156	156	205	205	261	261	331	331	395
	91	41	93	56	119	90	142	125	161	161	228	221	271	271	370	370	480
	Avg.	35	75	54	108	87	133	121	167	162	224	216	273	273	364	364	455
5	60	29	61	56	100	96	149	130	179	160	224	212	238	238	332	332	417
	61	33	74	60	124	101	160	139	199	181	265	227	300	300	422	422	552
	70	30	59	58	110	97	146	132	190	174	235	219	275	272	367	367	460
	Avg.	31	65	58	111	98	152	134	190	172	242	219	271	270	374	374	476
6	62	30	66	59	120	95	153	127	176	144	223	176	239	239	339	339	459
	85	29	65	59	119	94	151	128	177	144	217	175	234	234	325	325	434
	88	40	86	64	133	102	165	137	180	150	213	181	239	239	339	339	442
	Avg.	33	72	61	124	97	156	131	178	146	217	177	237	237	334	334	445
7	75	33	66	66	119	119	164	164	225	224	299	285	354	354	445	445	532
	82	31	68	67	137	127	189	177	238	231	300	289	356	356	457	457	556
	86	40	86	73	145	132	201	186	247	241	304	300	381	381	488	488	615
	Avg.	35	74	69	134	126	185	176	236	232	301	291	364	364	463	463	568
8	59	35	74	70	137	120	170	162	219	198	269	237	308	308	403	403	514
	72	33	64	64	118	116	171	156	213	193	257	228	288	288	380	380	475
	73	31	63	63	122	116	176	157	219	194	262	230	294	294	385	385	483
	Avg.	33	67	65	126	117	173	158	217	195	263	232	296	296	389	389	491
Control	58	61	110	110	187	187	261	261	333	333	410	410	471	471	542	542	630
	83	67	123	123	210	210	285	285	332	332	389	389	458	458	559	559	639
	89	51	102	102	182	182	263	263	347	347	435	435	503	503	605	605	710
	Avg.	60	112	112	193	193	270	270	338	338	411	411	477	477	569	569	660

[a] Columns are measurements after treatment and just before next treatment.

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