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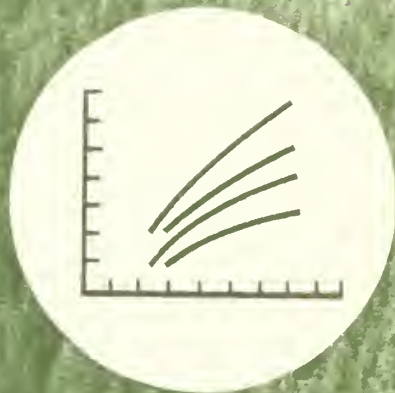
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CASE STUDY: GROWTH AND DEVELOPMENT OF FOREST STANDS IN THE NORTHERN ROCKY MOUNTAINS

Russell T. Graham and Jonalea R. Tonn

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RESEARCH SUMMARY

Tree diameter and height growth were compared for nine habitat types. Ten-year diameter growth was highly variable among habitat types as was 10-year height growth. High variation in both diameter and height growth also occurred within habitat types. Thirty-six local yield tables are presented, one for each stand in the study.

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INTRODUCTION

Information on growth and yield of managed stands plays a major role in both stand prescription preparation and timber management planning. Stand characteristics at various stages of development are used to plan intermediate cuttings as well as the timing of the final harvest. But for many Northern Rockies habitat types (Daubenmire and Daubenmire 1968) used in forest planning, there are insufficient data on forest growth and yield.

To strengthen this data base, permanent sample plots were established in 36 stands on 11 forests during 1970 and 1971 with the intention of measuring the results of management practices; therefore, thinned stands and stands scheduled for thinning were chosen. These study stands, located throughout western Montana, northern Idaho, and eastern Washington (see fig. 1), were not selected with any randomness or experimental design in mind. In 1975 and 1976 the plots were remeasured, resulting in 5 years of growth information.

The study encompasses a wide geographical area consisting of many climatic conditions. The stand elevations range from 3,000 ft (914 m) to 7,000 ft (2 134 m). The slopes and aspects of the stands are also quite variable (table 1).

Because of the diverse growing sites represented, the vegetation varies within the study areas. The tree species represented include:

<i>Abies grandis</i> (Dougl.) Lindl.	grand fir
<i>Pseudotsuga menziesii</i> var. <i>glauca</i> (Beissn.) Franco	Douglas-fir
<i>Pinus ponderosa</i> Laws. var. <i>ponderosa</i>	ponderosa pine
<i>Pinus contorta</i> Dougl.	lodgepole pine
<i>Tsuga heterophylla</i> (Raf.) Sarg.	western hemlock
<i>Thuja plicata</i> Donn	western redcedar
<i>Larix occidentalis</i> Nutt.	western larch

The habitat types represented include:

<i>Tsuga heterophylla/Pachistima myrsinites</i> western hemlock/pachistima myrsinites	<i>Tshe/Pamy</i>
<i>Pinus ponderosa/Symphoricarpos albus</i> ponderosa pine/snowberry	<i>Pipo/Syal</i>
<i>Pseudotsuga menziesii/Calamagrostis rubescens- arctostaphylos uva-ursi</i> Douglas-fir/pinegrass-kinnikinnick	<i>Psme/Caru-aruv</i>
<i>Abies grandis/Pachistima myrsinites</i> grand fir/pachistima myrsinites	<i>Abgr/Pamy</i>
<i>Pseudotsuga menziesii/Symphoricarpos albus</i> Douglas-fir/snowberry	<i>Psme/Syal</i>
<i>Abies lasiocarpa/Pachistima myrsinites</i> sub-alpine fir/pachistima myrsinites	<i>Abla/Pamy</i>
<i>Abies lasiocarpa/Vaccinium scoparium</i> sub-alpine fir/grouse whortleberry	<i>Abla/Vasc</i>
<i>Pseudotsuga menziesii/Physocarpus malvaceus</i> Douglas-fir ninebark	<i>Psme/Phma</i>

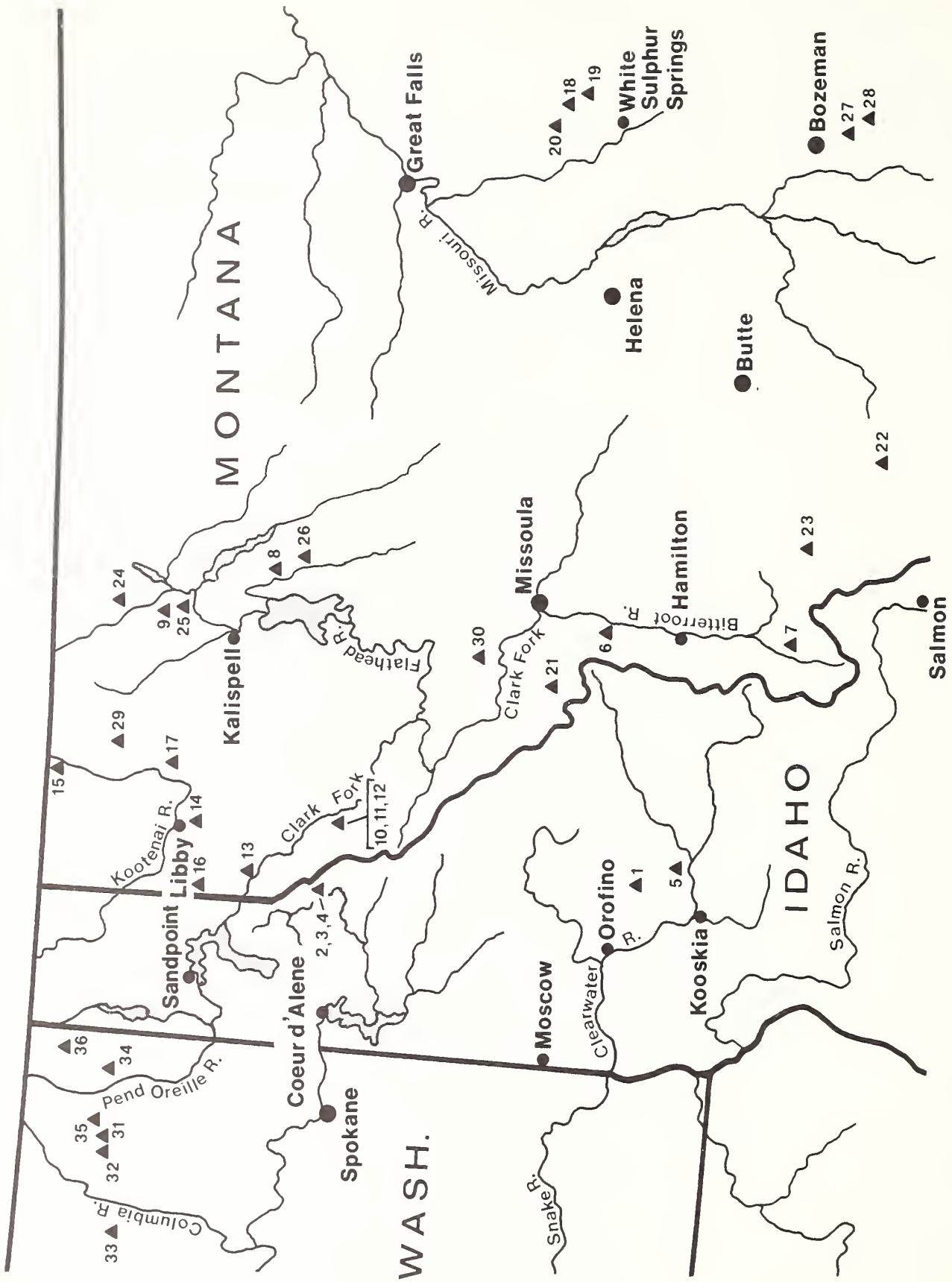


Fig. 1.--Study site locations shown by triangles.

Table 1.--Stand locations and descriptions

Stand no.	Forest	Ranger District	Name	Sub-		Stand Elev.	Timber		Habitat type	Slope Percent	Aspect	Acres	No. Points	
				comp.	comp.		type	Age						
1	Clearwater	Pierce	Sec. 6 Thinning	09	7	06	31	GF	16	Tshe/Pamy	30	S	35	10
2	Coeur d'Alene	Wallace	Berlin Gulch	50	1	02	52	GF	46	Tshe/Pamy	30	SE	86	10
3	Coeur d'Alene	Wallace	Cabin Creek	48	1	11	30	GF/DF	45	Tshe/Pamy	10	Flat	26	10
4	Coeur d'Alene	Wallace	Little Haystack	50	2	02	30	GF/DF	45	Tshe/Pamy	30	NW	15	7
5	Clearwater	Lochsa	Big Hill	20	8	03	40	DF	34	Tshe/Pamy	50	NE	75	10
6	Bitterroot	Stevensville	Sweeny Creek	18	2	01	40	PP	200	Pipo/Syal	10	E	80	16
7	Bitterroot	West Fork	Water Tank Sale	27	5	02	43	PP	80	Psmc/Caru-aruv	10	S	54	20
8	Flathead	Swan Lake	Bear Creek	17	1	02	36	DF	60	Abgr/Pamy	20	W	36	11
9	Flathead	Glacier View	Cedar Flats	47	3	02	33	LP	43	Abgr/Pamy	10	Flat	20	15
10	Kaniksu	Trout Creek	Pine Ridge	11	2	11	40	DF	79	Abgr/Pamy	30	NE	6	6
11	Kaniksu	Trout Creek	Larch Creek	08	4	06	36	DF	50	Abgr/Pamy	40	NE	32	9
12	Kaniksu	Trout Creek	Haines Point	12	7	01	37	LP	55	Tshe/Pamy	10	Flat	10	17
13	Kaniksu	Noxon	Squaw Peak	07	9	05	30	DF	80	Abgr/Pamy	20	SE	26	9
14	Kootenai	Libby	Granite Creek	28	1	22	25	PP	32	Abgr/Pamy	20	E	50	15
15	Kootenai	Rexford	Alkali Lake	01	5	06	28	PP	19	Psmc/Syal	10	SE	45	15
16	Kootenai	Troy	Cheer Creek	34	6	04	41	WH	20	Tshe/Pamy	60	N	182	15
17	Kootenai	Warland	Cripple Horse	06	7	01	36	PP	30	Psmc/Caru-aruv	20	S	100	13
29	Kootenai	Rexford	Pinkham Cr.	20	3	08	42	LP	45	Abia/Pamy	20	W	29	11
18	Lewis & Clark	White Sulphur Springs	Deadman #3	02	2	04	70	LP	19	Abia/Vasc	10	NW	75	15
19	Lewis & Clark	White Sulphur Springs	Deadman #2	02	3	04	68	LP	19	Abia/Vasc	30	S	34	15
20	Lewis & Clark	White Sulphur Springs	Deadman #1	02	5	02	65	LP	18	Abia/Vasc	40	NE	48	15
21	Lolo	Missoula	Teepee Creek	20	2	27	48	PP	44	Psmc/Caru-aruv	30	S	53	12
30	Lolo	Ninemile	Spring Creek	17	2	04	39	DF/PP	200	Psmc/Phma	20	SE	115	15
22	Beaverhead	Dillon	Dinner Station	13	1	01	70	LP	40	Psmc/Syal	30	SE	11	11
23	Beaverhead	Wisdom	Tie Creek Burn	21	2	04	65	LP	12	Psmc/Caru-aruv	30	SW	65	15
24	Flathead	Glacier View	Camas Creek	29	3	02	35	LP	60	Abia/Pamy	10	E	4	15
25	Flathead	Glacier View	Cedar Flats	47	3	03	33	LP	43	Abgr/Pamy	10	Flat	150	32
26	Flathead	Swan Lake	Bond Creek	26	5	13	34	DF	57	Abia/Pamy	10	W	138	7
27	Gallatin	Bozeman	Face Draw	09	5	01	64	LP	20	Abia/Vasc	10	W	61	15
28	Gallatin	Bozeman	Wildhorse	09	8	07	69	LP	16	Abia/Vasc	20	W	40	14
31	Colville	Colville	Robins Creek	17	2	24	32	DF/GF/C	55	Tshe/Pamy	30	E	50	11
32	Colville	Kettle Falls	Long Shot Mine	16	3	01	52	LP	40	Thpl/Pamy	10	Flat	115	10
33	Colville	Colville	Box Canyon	28	3	11	30	DF/WL	40	Psmc/Phma	20	S	27	15
34	Colville	Sullivan Lake	Hanlon Meadows	52	4	01	32	LP	40	Tshe/Pamy	10	S	15	10
35	Colville	Colville	Joslin Meadows	16	5	02	32	LP	49	Thpl/Pamy	20	S	50	11
36	Colville	Sullivan Lake	Johns Creek	38	6	02	32	WL	10	Tshe/Pamy	10	N	26	18

Since there were no criteria for stand selection other than past management or planned future management, many different types of stands were selected. Both stand size and number of sample points per stand were not fixed for the study. Stand age was quite variable, ranging from 10 years to 200 years (table 1).

As would be expected, stand characteristics differ for each stand. Mean stand diameters range from 0.9 to 16.3 inches (2.29 to 41.4 cm) (table 2). Both trees per acre and accretion¹ vary from stand to stand. Because of ingrowth and/or mortality, mean diameters in some of the stands are smaller for the second measurement.

Because of the nature of the data and the lack of an appropriate experimental design, we are presenting the results as a case study. The results are for the stands examined and the data should be extrapolated to other stands and conditions with caution.

ANALYSIS

The analysis involved summarizing data for the 36 stands and making appropriate comparisons. When each stand was chosen for inclusion in the study, the crop trees were tagged and permanently marked. To make valid comparisons between the first and second measurement, only crop trees were used in the thinned stands. In the unthinned stands, the entire stand as it existed was used. Diameter growth and height growth were converted to 10-year periods for ease of comparison. Incomplete records--that is, trees dying during the study--were dropped from the diameter and height growth calculations. A least squares mean separation procedure (SAS Institute 1979) was used to separate the growth means for the habitat types.

To better show the impact of the diameter and height growth changes, each stand was projected into the future using a stand prognosis model (Stage 1973). These projections are the best estimate possible for the potential growth of the stands.

RESULTS

Diameter Growth

Tree size and age are very important in determining tree growth rates. Therefore, to make comparisons among habitat types, the diameter growth means were adjusted for both age and diameter of the trees at the time of the first measurement. In the analysis of covariance, age and initial diameter were both significant ($P < .05$) in explaining diameter growth. These adjusted growth means can be compared allowing for different tree ages and diameters.

The *Pipo/Syal* h.t. had the smallest adjusted 10-year diameter growth mean, 0.68 inches (1.73 cm). The *Abla/Pamy* h.t. had the largest 10-year diameter growth mean, 4.26 inches (10.82 cm) (table 3). The adjusted means can be separated into distinct habitat type groups based on 10-year diameter growth using the least squares mean separation procedure. These were: (1) *Pipo/Syal*; (2) *Abgr/Pamy*, *Thpl/Pamy*; (3) *Psme/Phma*, *Tshe/Pamy*, *Psme/Syal*, *Abla/Vasc*, *Psme/Caru-Aruv*; and (4) the *Abla/Pamy* h.t.

¹Periodic annual cu ft volume growth based on 5-year period excluding ingrowth.

Table 2.--Stand characteristics for each measurement period

Stand	\bar{x} d.b.h.		\bar{x} height		Basal area/acre		Trees/acre		Accretion ¹	
	First	Second	First	Second	First	Second	First	Second	First	Second
	Inches		Feet		Ft ²				Ft ³	
Thinned stands (crop trees)										
1. 0505706	0.9	2.4	6.0	13.1	1	8	300	233	3	19
2. 1106102	8.1	9.9	48.5	56.4	56	54	157	101	192	142
3. 1106111	6.9	7.7	46.5	51.4	78	84	304	260	135	172
4. 1106202	8.6	9.4	62.5	64.0	103	106	253	219	177	229
5. 1605803	8.0	10.3	51.7	58.5	34	36	97	62	124	181
7. 2503502	12.3	8.8	59.5	37.1	39	46	48	109	33	40
8. 2510102	8.6	10.1	51.3	58.3	73	73	183	131	82	121
9. 2510302	5.8	6.7	32.6	40.6	24	25	130	101	29	30
10. 2513211	10.0	10.4	81.5	85.3	147	147	267	249	117	104
11. 2513406	6.8	7.6	47.6	52.2	83	61	246	192	71	87
12. 2513701	4.7	5.6	40.0	40.3	46	48	381	286	143	145
13. 2513905	16.3	13.5	98.5	65.5	93	91	65	91	78	67
14. 2514122	8.5	8.5	42.6	38.7	41	45	105	113	135	80
15. 2514506	5.1	7.3	24.5	31.1	18	16	124	55	24	60
16. 2514604	2.0	3.2	15.9	20.9	6	11	260	200	11	18
17. 2514701	6.1	7.6	24.8	32.3	40	50	196	159	159	130
18. 2515204	2.1	3.2	11.5	15.6	9	22	380	380	30	55
19. 2515304	1.8	2.9	10.8	14.8	6	16	340	340	21	46
20. 2515502	1.6	2.8	8.8	13.1	4	12	300	300	13	31
22. 3002101	4.1	4.8	22.0	24.3	37	46	395	370	79	141
23. 3002204	0.6	1.9	5.0	9.5	1	5	280	280	3	17
24. 3010302	4.7	5.6	38.3	39.4	31	34	256	199	97	49
25. 3010303	6.7	6.5	43.3	42.0	32	65	129	286	37	138
26. 3010513	10.5	12.1	59.9	60.1	60	60	99	75	85	199
27. 3011501	3.7	5.2	17.6	26.1	32	47	433	315	72	55
28. 3011807	2.3	3.6	12.4	17.4	7	29	257	407	28	66
29. 3014308	5.5	6.3	37.9	40.0	39	45	237	208	58	166
31. 4607224	6.3	6.6	33.7	37.1	34	42	159	178	67	88
32. 4607301	7.6	8.3	56.4	63.3	38	46	119	122	47	77
33. 4607311	8.8	10.5	48.1	55.5	32	33	75	55	74	79
34. 4607401	8.1	8.8	55.3	61.6	32	28	89	67	51	48
35. 4607502	7.8	8.6	67.2	69.4	55	57	164	141	91	118
36. 4607602	1.7	3.4	11.5	20.1	3	11	217	173	11	22
Unthinned stands										
6. 2503201	11.3	9.2	47.2	39.0	53	88	76	191	62	38
21. 2516227	4.3	4.4	23.4	22.2	98	106	977	979	118	113
30. 3016204	6.2	7.8	34.0	47.5	108	98	508	295	93	95

¹Based on 5 years preceding measurement.

Table 3.-- 10-year diameter growth (inches) by habitat type and stand

Habitat type	Forest	Stand	Habitat type		Stand	
			Unadjusted	Adjusted ¹	Unadjusted	Adjusted ¹
Pipo/Syal	Bitterroot	6	0.57	0.68 a	0.57	0.49
Abgr/Pamy	Flathead	8	1.45	1.62 b	2.24	2.34
	Flathead	9			1.08	1.17
	Kaniksu	10			.73	1.18
	Kaniksu	11			1.42	1.53
	Kaniksu	13			1.13	1.20
	Kootenai	14			1.92	1.65
	Flathead	25			1.76	1.81
Thpl/Pamy	Colville	35	1.51	1.47 ab	1.42	1.50
	Colville	32			1.65	1.59
Psme/Phma	Lolo	30	2.41	2.97 cd	2.09	2.44
	Colville	33			3.02	2.81
Tshe/Pamy	Clearwater	1	2.69	2.25 c	6.14	6.07
	Coeur d'Alene	2			2.61	2.58
	Coeur d'Alene	3			1.66	1.76
	Coeur d'Alene	4			1.88	1.82
	Clearwater	5			7.23	7.05
	Kaniksu	12			1.81	2.23
	Kootenai	16			2.10	2.02
	Colville	31			2.03	2.13
	Colville	34			1.73	1.62
	Colville	36			3.25	3.07
	Psme/Syal	Kootenai			15	2.82
Beaverhead		22	2.56	2.76		
Abla/Vasc	Lewis & Clark	18	3.45	2.34 c	2.21	2.17
	Lewis & Clark	19			2.20	2.18
	Lewis & Clark	20			2.56	2.53
	Gallatin	27			5.73	5.62
	Gallatin	28			5.33	5.23
Psme/Caru-aruv	Bitterroot	7	3.71	2.99 d	1.28	1.63
	Kootenai	17			2.67	2.42
	Lolo	21			1.27	1.29
	Beaverhead	23			6.66	6.60
Abla/Pamy	Flathead	24	3.77	4.26 e	3.44	3.95
	Flathead	26			4.13	4.15
	Kootenai	29			4.19	4.37

¹Adjusted for initial diameter and age. Different letters indicate significant differences. ($P \leq .05$)

The adjusted diameter growth means for the individual stands within habitat types had a large amount of variation (table 3). The stand diameter growth means in the *Tshe/Pamy* h.t., ranged from 1.62 to 7.05 inches (4.11 to 17.91 cm). In the *Psme/Caru-Aruv* h.t., adjusted diameter growth means ranged from 1.29 to 6.60 inches (3.28 to 16.76 cm). The stand diameter growth means in the other habitat types showed similar variation.

Height Growth

As with diameter growth, height growth is also dependent upon tree size and age. The 10-year height growth means were adjusted using covariance analysis for initial height and age. The growth means by habitat type were then compared using SAS least squares mean separation procedure.

The *Pipo/Syal* h.t. had the smallest 10-year height growth mean, 4.02 ft (1.23 m). The *Thpl/Pamy* h.t. had the largest height growth mean, 10 ft (3.05 m) (table 4). Three habitat type groups were distinguished by height growth: (1) *Pipo/Syal*; (2) *Abla/Pamy*, *Psme/Syal*, *Psme/Phma*, *Abgr/Pamy*, *Tshe/Pamy*, *Abla/Vasc*; (3) *Psme/Caru-Aruv*, *Thpl/Pamy*.

Within each habitat type there is a wide range of height growth means. In the *Tshe/Pamy* habitat type, 10-year adjusted height growth ranged from 2.34 ft (0.71 m) to a maximum of 14.18 ft (4.32 m). Likewise in the *Abgr/Pamy* habitat type, adjusted height growth means ranged from 1.43 ft to 11.19 ft (0.44 to 3.41 m).

Stand Yields

Individual tree height and diameter growth characteristics are of less consequence to forest managers than stand growth characteristics. Therefore, we projected each stand into the future using a prognosis model (Stage 1973). This procedure produced 36 local yield tables, one for each of the stands in the study (appendix tables 5-40).

In reviewing the stand projections we feel most of them are realistic. These projections may be used to estimate future volumes of stands of similar nature. Enough information is provided so the forest manager may compare his stand conditions and descriptions to those we have summarized.

DISCUSSION

A study of this type produces a large amount of information that can be used in many ways. Silviculturists can predict future yields of stands they feel are comparable. Timber management planners and researchers can use these data to refine yield predictions.

This study encompasses a large geographic area with many different sites. Even within habitat types many different sites exist that are reflected in the mean diameter and height growths. In relation to habitat types, we have shown a wide range of growth on the same habitat type. Some areas and habitat types we expected to have poor growth proved capable of excellent diameter and height growth, especially on the central Montana forests.

Table 4.-- 10-year height growth (feet) by habitat type and stand

Habitat type	Forest	Stand	Habitat type		Stand	
			Unadjusted	Adjusted ¹	Unadjusted	Adjusted ¹
Pipo/Syal	Bitterroot	6	3.40	4.02 a	3.4	3.35
Abla/Pamy	Flathead	24	5.00	6.67 ab	3.3	2.64
	Flathead	26			3.1	3.62
	Kootenai	29			8.1	7.39
Psme/Phma	Lolo	30	6.10	7.23 abc	2.6	3.35
	Colville	33			12.5	12.45
Psme/Syal	Kootenai	15	6.60	6.77 ab	13.7	12.21
	Beaverhead	22			5.0	3.40
Abla/Vasc	Lewis & Clark	18	7.00	8.65 bc	8.3	6.19
	Lewis & Clark	19			8.1	5.95
	Lewis & Clark	20			8.6	6.26
	Gallatin	27			16.5	14.69
	Gallatin	28			11.2	9.09
Abgr/Pamy	Flathead	8	7.10	7.48 abc	10.7	10.90
	Flathead	9			6.1	5.36
	Kaniksu	10			7.4	9.10
	Kaniksu	11			7.8	7.71
	Kaniksu	13			5.7	8.43
	Kootenai	14			11.9	11.19
	Flathead	25			1.8	1.43
Tshe/Pamy	Clearwater	1	8.80	8.03 bc	10.6	8.24
	Coeur d'Alene	2			10.8	10.86
	Coeur d'Alene	3			10.8	10.53
	Coeur d'Alene	4			7.6	8.30
	Clearwater	5			9.0	9.05
	Kaniksu	12			3.0	2.34
	Kootenai	16			7.8	5.98
	Colville	31			14.0	12.99
	Colville	34			13.9	14.18
	Colville	36			13.6	11.51
Psme/Caru-aurv	Bitterroot	7	10.00	8.97 c	6.2	6.72
	Kootenai	17			13.0	11.59
	Lolo	21			8.8	7.73
	Beaverhead	23			10.0	7.59
Thpl/Pamy	Colville	32	11.10	10.00 c	15.5	1.58
	Colville	35			8.2	9.18

¹Adjusted for initial height and age. Different letters indicate significant differences. ($P \leq .05$)

Many variables influence tree growth, making it difficult to compare the growth of the stands and the habitat types. We have a limited sample of the numerous sites available in the study area. Using a covariance analysis, with both tree size and age as covariates, we allowed for many differences that exist among the stands. These comparisons and yield tables provide a reference point for future management activities on these habitat types.

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APPENDIX

Note: For all yield tables in the appendix, merchantable volume was measured to a 4-inch top.

Table 5.--Yield table for Stand 1, Clearwater National Forest,
Pierce Ranger District, Section 6 Thinning

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
21	233	8	30	59	0	0	19	1	2.4	13.1
31	184	18	49	236	50	0	33	3	4.2	24.5
41	158	30	65	535	432	170	47	6	5.9	34.9
51	141	43	79	946	854	1,726	69	7	7.5	45.4
61	129	61	96	1,564	1,444	5,086	83	9	9.3	56.0
71	121	79	112	2,309	2,174	8,756	106	12	10.9	66.0
81	115	99	128	3,242	3,079	13,487	137	17	12.6	75.7
91	109	123	145	4,437	4,192	19,240	137	24	14.4	84.8
101	103	143	159	5,571	5,236	24,361	168	30	16.0	93.3
111	98	168	176	6,951	6,485	30,609	176	38	17.7	101.2
121	93	191	190	8,335	7,695	36,367	0	0	19.4	108.6

Table 6.--Yield table for Stand 2, Coeur d'Alene National Forest,
Wallace Ranger District, Berlin Gulch

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
51	101	54	81	1,538	1,293	4,427	142	9	9.9	56.4
61	94	88	111	2,859	2,431	10,163	177	17	13.0	69.9
71	89	122	138	4,460	3,782	17,265	203	27	15.9	82.2
81	84	155	160	6,219	5,234	24,864	230	39	18.4	93.7
91	79	188	181	8,129	6,781	32,995	243	52	20.9	104.3
101	74	219	201	10,039	8,305	40,997	260	65	23.3	114.1
111	69	250	225	11,981	9,868	49,217	263	80	25.8	123.1
121	65	280	247	13,817	11,363	57,008	247	94	28.2	131.3
131	61	304	264	15,350	12,656	63,693	232	106	30.3	138.8
141	56	324	279	16,607	13,785	69,402	221	117	32.4	145.7
151	53	341	290	17,642	14,773	74,281	0	0	34.4	152.0

Table 7.--Yield table for Stand 3, Coeur d'Alene National Forest,
Wallace Ranger District Cabin Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
50	260	84	130	2,020	1,670	3,567	172	15	7.7	51.4
60	239	125	162	3,591	3,094	10,830	210	21	9.8	63.5
70	224	167	189	5,484	4,787	19,565	229	31	11.7	74.6
80	211	203	214	7,465	6,530	29,149	261	43	13.3	84.7
90	200	241	243	9,650	8,450	39,645	288	56	14.9	94.0
100	188	277	270	11,965	10,414	50,280	286	71	16.4	102.5
110	178	308	292	14,112	12,209	59,954	288	86	17.8	110.3
120	167	334	311	16,138	13,873	69,344	286	100	19.1	117.5
130	158	357	327	18,002	15,401	77,899	282	113	20.4	124.1
140	148	377	339	19,694	16,781	85,590	272	125	21.6	130.2
150	139	393	349	21,163	17,974	92,360	0	0	22.7	135.9

Table 8.--Yield table for Stand 4, Coeur d'Alene National Forest,
Wallace Ranger District, Little Haystack

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height	
				Total ft ³	Merchantable ft ³	Scribner bd.ft.					
				<i>Ft</i> ²				<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
50	219	106	149	3,041	2,689	7,566	229	19	9.4	64.0	
60	205	156	183	5,143	4,570	17,780	259	29	11.8	75.6	
70	194	203	213	7,444	6,595	28,617	266	43	13.8	85.7	
80	183	241	241	9,672	8,511	38,798	289	58	15.5	94.7	
90	172	278	267	11,979	10,454	48,948	311	76	17.2	102.9	
100	162	314	292	14,333	12,350	58,972	308	97	18.9	110.4	
110	151	343	311	16,444	13,985	67,465	300	117	20.4	117.3	
120	140	366	326	18,275	15,371	74,631	289	135	21.9	123.8	
130	130	384	335	19,816	16,493	80,179	291	148	23.3	129.9	
140	120	400	345	21,251	17,533	85,170	266	161	24.7	135.6	
150	110	410	349	22,301	18,269	88,368	0	0	26.1	141.1	

Table 9.--Yield table for Stand 5, Clearwater National Forest,
Lochsa Ranger District, Big Hill

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height	
				Total ft ³	Merchantable ft ³	Scribner bd.ft.					
				<i>Ft</i> ²				<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
39	62	36	51	863	851	3,015	181	5	10.3	58.5	
49	59	96	97	2,623	2,512	10,191	244	13	17.2	75.6	
59	56	160	138	4,930	4,432	13,980	271	26	22.9	88.0	
69	53	219	166	7,372	6,168	14,077	316	42	27.5	98.1	
79	50	280	192	10,110	7,859	12,231	351	62	32.0	106.8	
89	47	339	220	13,008	9,433	10,116	341	85	36.3	114.3	
99	44	386	244	15,572	10,540	8,622	362	108	39.9	120.8	
109	42	430	265	18,116	11,407	9,432	359	135	43.6	126.7	
119	39	466	282	20,356	11,941	14,450	349	161	46.9	132.0	
129	36	492	293	22,231	12,158	24,537	319	188	50.0	136.8	
139	33	506	298	23,547	12,042	39,216	0	0	52.6	141.2	

Table 10.--Yield table for Stand 6, Bitterroot National Forest,
Stevensville Ranger District, Sweeny Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height	
				Total ft ³	Merchantable ft ³	Scribner bd.ft.					
				<i>Ft</i> ²				<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
85	191	88	95	1,964	1,486	4,790	38	11	9.2	39.0	
95	177	95	98	2,234	1,709	5,689	40	14	9.9	45.6	
105	165	98	98	2,493	1,930	6,771	41	16	10.4	50.9	
115	154	100	99	2,743	2,142	7,815	43	18	10.9	55.9	
125	143	102	99	3,000	2,361	9,029	42	20	11.4	60.5	
135	133	103	98	3,217	2,547	10,220	42	21	11.9	64.7	
145	124	105	98	3,419	2,721	11,377	39	23	12.5	68.6	
155	115	105	97	3,579	2,860	12,362	38	24	12.9	72.2	
165	107	105	96	3,725	2,987	13,273	37	24	13.4	75.4	
175	100	104	95	3,849	3,094	14,130	33	25	13.8	78.4	
185	93	103	93	3,932	3,168	14,779	0	0	14.2	81.2	

Table 11.--Yield table for Stand 7, Bitterroot National Forest,
West Fork Ranger District, Water Tank Sale

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
205	109	46	52	1,437	1,147	4,385	40	7	8.8	37.1
215	100	53	59	1,765	1,424	6,018	51	8	9.9	46.4
225	94	65	68	2,198	1,764	8,026	50	9	11.3	57.3
235	89	72	73	2,606	2,109	10,010	54	11	12.2	64.2
245	85	79	77	3,040	2,476	12,056	59	13	13.1	70.8
255	81	87	82	3,503	2,869	14,246	58	15	14.1	76.6
265	77	93	85	3,939	3,238	16,367	59	16	14.9	81.9
275	74	99	89	4,368	3,605	18,741	63	18	15.7	86.6
285	71	106	92	4,820	3,994	21,261	61	20	16.6	90.9
295	68	111	95	5,232	4,351	23,615	63	22	17.3	94.9
305	65	116	97	5,642	4,700	25,804	0	0	18.1	98.5

Table 12.--Yield table for Stand 8, Flathead National Forest,
Swan Lake Ranger District, Bear Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
65	131	73	96	1,772	1,628	5,224	121	8	10.1	58.3
75	124	106	118	2,896	2,696	10,086	130	13	12.5	69.3
85	118	136	134	4,064	3,712	15,210	134	18	14.5	78.1
95	113	163	148	5,224	4,644	19,640	147	23	16.2	85.5
105	109	189	160	6,465	5,567	23,779	163	29	17.9	92.0
115	104	218	172	7,809	6,490	27,686	162	36	19.5	97.8
125	100	242	182	9,074	7,296	30,906	166	43	21.0	102.9
135	96	265	193	10,310	8,010	33,408	165	50	22.4	107.5
145	93	284	203	11,460	8,635	35,476	175	57	23.7	111.8
155	89	304	213	12,646	9,218	37,187	167	64	25.1	115.6
165	85	320	220	13,676	9,648	38,136	0	0	26.2	119.1

Table 13.--Yield table for Stand 9, Flathead National Forest,
Glacier View Ranger District, Cedar Flats

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
48	101	25	39	532	381	306	30	5	6.7	40.6
58	91	32	46	781	609	1,358	35	6	8.0	47.9
68	84	38	52	1,075	837	2,681	39	7	9.1	54.9
78	78	45	58	1,393	1,058	4,035	45	8	10.2	61.5
88	74	52	64	1,756	1,293	5,110	52	11	11.3	67.8
98	69	59	69	2,160	1,542	6,193	52	16	12.5	73.7
108	65	64	73	2,519	1,752	6,993	54	23	13.5	79.4
118	59	68	76	2,836	1,922	7,561	54	32	14.5	84.7
128	53	69	76	3,058	2,021	7,777	53	43	15.4	89.7
138	47	68	74	3,159	2,034	7,615	48	56	16.3	94.4
148	40	64	70	3,082	1,932	6,998	0	0	17.2	98.8

Table 14.--Yield table for Stand 10, Kaniksu National Forest,
Trout Creek Ranger District, Pine Ridge

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²			Ft ³	Ft ³	Inches	Feet		
84	249	147	171	5,039	4,435	18,338	104	27	10.4	85.3
94	236	159	173	5,815	5,134	22,708	108	30	11.1	91.3
104	224	171	178	6,595	5,845	27,122	100	34	11.9	96.8
114	212	180	181	7,259	6,454	30,937	110	38	12.5	101.9
124	202	190	185	7,977	7,140	35,125	107	44	13.1	106.7
134	192	198	188	8,609	7,763	38,946	103	50	13.8	111.1
144	182	204	189	9,138	8,288	41,975	108	56	14.4	115.2
154	172	210	191	9,658	8,807	45,006	107	63	15.0	119.0
164	162	215	191	10,097	9,258	47,505	94	67	15.6	122.6
174	153	217	189	10,373	9,554	49,434	99	68	16.1	126.0
184	145	220	188	10,678	9,897	51,568	0	0	16.7	129.3

Table 15.--Yield table for Stand 11, Kaniksu National Forest,
Trout Creek Ranger District, Larch Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²			Ft ³	Ft ³	Inches	Feet		
55	192	61	110	1,355	1,083	1,995	87	10	7.6	52.2
65	177	84	124	2,124	1,835	5,593	98	12	9.3	63.1
75	166	106	137	2,987	2,649	10,163	101	14	10.8	72.6
85	158	126	147	3,855	3,463	15,074	111	18	12.1	80.9
95	150	146	156	4,789	4,343	20,311	120	22	13.3	88.3
105	143	166	165	5,769	5,276	25,816	126	27	14.6	94.9
115	136	185	173	6,755	6,224	31,491	132	32	15.8	100.8
125	130	203	181	7,753	7,187	37,341	128	37	16.9	106.2
135	124	219	188	8,658	8,049	42,652	131	42	18.0	111.1
145	118	233	195	9,543	8,889	47,979	130	47	19.0	115.6
155	112	246	200	10,367	9,663	52,978	0	0	20.1	119.8

Table 16.--Yield table for Stand 12, Kaniksu National Forest,
Trout Creek Ranger District, Haines Point

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²			Ft ³	Ft ³	Inches	Feet		
60	286	48	78	1,013	565	604	145	11	5.6	40.3
70	254	87	112	2,352	1,991	3,741	148	18	7.9	55.4
80	234	117	134	3,652	3,164	12,855	165	24	9.6	64.7
90	219	145	151	5,057	4,343	19,983	193	35	11.0	73.2
100	205	173	168	6,637	5,663	27,633	212	60	12.4	81.1
110	190	196	179	8,159	6,944	34,889	209	107	13.8	88.4
120	171	206	183	9,182	7,767	39,640	198	165	14.9	95.3
130	149	200	175	9,503	8,013	41,343	169	215	15.7	101.8
140	125	181	157	9,039	7,618	39,586	166	223	16.3	108.0
150	103	162	144	8,464	7,080	36,909	129	258	17.0	114.2
160	81	133	121	7,175	6,008	31,483	0	0	17.3	120.3

Table 17.--Yield table for Stand 13, Kaniksu National Forest,
Noxon Ranger District, Squaw Peak

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
85	91	91	99	3,681	3,402	18,079	67	18	13.5	65.5
95	86	100	104	4,168	3,865	20,901	68	21	14.6	71.9
105	81	109	108	4,636	4,297	23,677	66	23	15.6	78.2
115	77	116	112	5,062	4,677	26,099	71	26	16.6	84.5
125	73	124	117	5,513	5,064	28,589	73	28	17.6	90.9
135	70	132	120	5,959	5,484	31,073	73	31	18.6	96.6
145	66	138	122	6,378	5,873	33,414	70	34	19.5	101.9
155	63	143	124	6,743	6,214	35,390	73	36	20.4	106.9
165	60	148	125	7,114	6,559	37,482	73	39	21.2	111.4
175	57	153	127	7,455	6,879	39,494	73	41	22.1	115.6
185	55	157	128	7,770	7,175	41,339	0	0	22.9	119.5

Table 18.--Yield table for Stand 14, Kootenai National Forest,
Libby Ranger District, Granite Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
37	113	45	54	872	599	1,180	80	5	8.5	38.7
47	105	63	69	1,625	1,219	3,629	92	8	10.5	54.3
57	99	80	81	2,464	1,877	7,263	99	12	12.1	65.0
67	94	94	91	3,335	2,531	10,901	112	16	13.5	74.4
77	90	109	100	4,287	3,217	14,724	118	22	14.9	82.8
87	85	122	107	5,255	3,913	18,528	127	26	16.2	90.4
97	81	136	115	6,266	4,638	22,396	130	31	17.5	97.2
107	77	149	121	7,260	5,355	26,561	129	36	18.8	103.5
117	73	160	127	8,198	6,039	30,674	127	44	20.1	109.4
127	68	168	130	9,035	6,658	34,509	129	55	21.3	114.9
137	63	175	132	9,784	7,231	38,443	0	0	22.6	120.4

Table 19.--Yield table for Stand 15, Kootenai National Forest,
Rexford Ranger District, Alkali Lake

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
24	55	16	20	198	129	0	60	2	7.3	31.1
34	50	32	34	782	586	1,741	85	3	10.8	56.4
44	48	48	47	1,597	1,207	5,214	95	6	13.5	73.0
54	46	62	58	2,484	1,865	8,715	104	10	15.7	85.5
64	44	75	67	3,421	2,560	12,337	108	14	17.7	95.6
74	42	87	75	4,356	3,275	16,771	132	18	19.5	104.0
84	40	102	84	5,496	4,150	22,519	123	23	21.6	111.2
94	38	114	91	6,494	4,917	27,947	126	28	23.4	117.4
104	37	126	97	7,482	5,671	33,431	135	32	25.1	122.9
114	35	137	103	8,511	6,447	39,329	126	37	26.8	127.7
124	33	147	107	9,406	7,114	44,620	0	0	28.4	132.1

Table 20.--Yield table for Stand 16, Kootenai National Forest,
Troy Ranger District, Cheer Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height	
				Total ft ³	Merchantable ft ³	Scribner bd.ft.					
				<i>Ft</i> ²				<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
25	200	11	34	117	0	0	18	2	3.2	20.9	
35	167	20	46	273	56	0	26	3	4.6	29.9	
45	146	30	57	498	353	0	32	5	6.1	38.5	
55	131	38	66	762	689	137	38	7	7.3	46.6	
65	119	46	73	1,071	1,032	1,110	48	9	8.4	54.6	
75	109	56	81	1,455	1,391	2,654	51	14	9.7	62.4	
85	99	63	87	1,823	1,705	3,813	61	19	10.8	69.8	
95	90	71	93	2,247	2,040	4,937	60	24	12.0	76.9	
105	81	76	97	2,609	2,299	5,650	61	27	13.1	83.5	
115	74	81	100	2,956	2,529	6,159	66	30	14.2	89.8	
125	67	86	103	3,321	2,763	6,544	0	0	15.3	95.7	

Table 21.--Yield table for Stand 17, Kootenai National Forest,
Warland Ranger District, Cripple Horse

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height	
				Total ft ³	Merchantable ft ³	Scribner bd.ft.					
				<i>Ft</i> ²				<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
35	159	50	63	776	497	676	130	5	7.6	32.3	
45	146	86	90	2,023	1,466	3,549	161	9	10.4	53.9	
55	139	118	110	3,540	2,626	9,932	173	14	12.5	68.6	
65	133	145	126	5,130	3,824	16,946	191	20	14.2	79.6	
75	128	173	140	6,839	5,095	24,106	193	27	15.7	88.6	
85	123	197	151	8,492	6,321	31,001	203	34	17.1	95.8	
95	118	220	162	10,179	7,577	38,213	196	41	18.5	101.9	
105	113	241	170	11,727	8,740	45,295	192	48	19.8	107.1	
115	108	258	178	13,167	9,829	52,347	187	54	20.9	111.6	
125	104	274	185	14,495	10,829	58,946	175	60	22.0	115.6	
135	100	285	191	15,643	11,698	64,866	0	0	22.9	119.2	

Table 22.--Yield table for Stand 18, Lewis and Clark National Forest,
White Sulphur Springs Ranger District, Deadman #3

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height	
				Total ft ³	Merchantable ft ³	Scribner bd.ft.					
				<i>Ft</i> ²				<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
24	380	22	49	182	0	0	55	3	3.2	15.6	
34	318	45	76	702	272	0	56	8	5.1	29.8	
44	281	61	90	1,177	879	0	42	12	6.3	37.6	
54	254	68	95	1,481	1,237	458	47	13	7.0	42.4	
64	231	76	100	1,822	1,591	3,124	52	15	7.8	46.9	
74	212	85	105	2,198	1,951	6,737	55	16	8.6	51.1	
84	197	93	110	2,586	2,295	9,627	59	16	9.3	55.1	
94	184	102	116	3,007	2,642	11,862	65	18	10.1	58.9	
104	173	111	122	3,478	3,026	14,108	65	21	10.9	62.4	
114	163	120	127	3,921	3,388	16,269	64	25	11.6	65.7	
124	153	127	130	4,319	3,716	18,198	0	0	12.3	68.8	

Table 23.--Yield table for Stand 19, Lewis and Clark National Forest,
White Sulphur Springs Ranger District, Deadman #2

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²			Ft ³	Ft ³	Inches	Feet
24	340	16	40	131	0	0	46	2	2.9	14.8
34	281	37	65	567	277	0	59	7	4.9	29.1
44	248	54	82	1,087	975	103	41	11	6.3	38.8
54	223	62	88	1,387	1,374	753	46	12	7.1	43.8
64	204	70	93	1,720	1,772	3,607	53	14	7.9	48.5
74	187	79	100	2,111	2,117	6,674	53	15	8.8	52.9
84	174	88	105	2,497	2,438	9,301	59	15	9.6	57.0
94	163	97	111	2,934	2,830	11,736	62	17	10.4	60.9
104	154	106	117	3,385	2,993	13,936	68	21	11.3	64.5
114	145	116	123	3,859	3,343	16,225	65	26	12.1	67.9
124	136	123	126	4,251	3,670	18,154	0	0	12.9	71.0

Table 24.--Yield table for Stand 20, Lewis and Clark National Forest,
White Sulphur Springs Ranger District, Deadman #1

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²			Ft ³	Ft ³	Inches	Feet
23	300	12	34	97	0	0	31	2	2.8	13.1
33	245	27	50	386	140	0	50	5	4.5	26.0
43	213	43	67	834	578	83	41	8	6.1	37.6
53	191	52	75	1,159	963	513	43	10	7.1	43.7
63	174	60	82	1,487	1,303	2,781	47	12	8.0	48.7
73	160	69	87	1,835	1,627	6,251	51	13	8.9	53.2
83	149	77	94	2,223	1,960	8,358	53	14	9.7	57.5
93	140	86	99	2,621	2,288	10,391	61	15	10.6	61.5
103	132	95	106	3,072	2,657	12,678	63	19	11.5	65.2
113	124	104	111	3,508	3,020	14,798	67	24	12.4	68.7
123	115	111	116	3,936	3,379	16,872	0	0	13.3	72.0

Table 25.--Yield table for Stand 21, Lolo National Forest,
Missoula Ranger District, Teepee Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²			Ft ³	Ft ³	Inches	Feet
49	979	106	188	1,676	1,012	1,497	113	15	4.4	22.2
59	811	146	204	2,657	1,747	3,220	127	31	5.7	29.8
69	657	173	210	3,618	2,511	5,675	117	51	7.0	37.8
79	525	182	199	4,275	3,145	8,490	115	65	8.0	45.5
89	423	182	186	4,775	3,644	11,272	114	73	8.9	52.2
99	346	181	174	5,185	4,056	14,008	105	77	9.8	58.2
109	288	177	162	5,460	4,334	16,420	102	78	10.6	63.5
119	244	172	155	5,702	4,573	18,584	90	77	11.4	68.1
129	208	165	147	5,825	4,710	20,206	89	74	12.1	72.4
139	179	161	141	5,971	4,849	21,691	82	72	12.8	76.5
149	156	156	134	6,068	4,946	22,916	0	0	13.5	80.3

Table 26.--Yield table for Stand 22, Beaverhead National Forest,
Dillon Ranger District, Dinner Station

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
45	370	46	78	600	191	103	141	7	4.8	24.3
55	325	98	126	1,934	1,604	3,596	201	15	7.4	38.0
65	297	156	169	3,789	3,357	13,370	241	26	9.8	47.8
75	278	210	201	5,946	5,216	24,470	290	49	11.8	56.2
85	258	262	238	8,350	7,248	35,982	300	111	13.6	63.5
95	233	294	259	10,243	8,793	44,573	272	223	15.2	69.8
105	199	289	250	10,733	9,117	46,605	255	300	16.3	74.9
115	162	262	224	10,279	8,711	45,009	237	340	17.2	79.5
125	125	225	190	9,250	7,775	40,275	186	346	18.2	83.8
135	89	178	149	7,645	6,362	33,047	125	355	19.1	88.0
145	58	120	107	5,347	4,444	23,175	0	0	19.5	91.5

Table 27.--Yield table for Stand 23, Beaverhead National Forest,
Wisdom Ranger District, Tie Creek Burn

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
17	280	5	29	35	0	0	17	1	1.9	9.5
27	211	14	34	197	14	0	37	3	3.5	22.2
37	176	27	47	531	326	0	46	6	5.3	35.8
47	156	39	59	927	746	264	37	9	6.8	45.8
57	142	47	66	1,212	1,053	1,879	42	10	7.8	50.6
67	130	55	73	1,539	1,364	4,987	52	11	8.8	55.2
77	121	65	80	1,948	1,712	7,513	53	12	9.9	59.7
87	114	74	87	2,359	2,047	9,607	59	14	10.9	64.0
97	107	83	93	2,807	2,417	11,732	62	19	11.9	68.1
107	100	91	99	3,243	2,780	13,813	68	25	12.9	72.1
117	93	98	103	3,676	3,145	15,906	0	0	13.9	75.8

Table 28.--Yield table for Stand 24, Flathead National Forest,
Glacier View Ranger District, Camas Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
		Ft ²					Ft ³	Ft ³	Inches	Feet
65	199	34	51	722	385	0	49	8	5.6	39.4
75	177	45	67	1,130	829	424	36	10	6.8	47.8
85	161	51	72	1,386	1,071	1,974	37	11	7.6	52.2
95	148	56	76	1,640	1,281	3,535	41	12	8.4	56.5
105	137	62	80	1,930	1,493	4,876	43	13	9.1	60.6
115	128	68	84	2,232	1,696	6,182	47	14	9.9	64.6
125	120	74	88	2,565	1,908	7,341	51	16	10.6	68.5
135	112	80	92	2,919	2,127	8,339	50	20	11.4	72.2
145	105	84	94	3,221	2,301	9,215	51	24	12.1	75.8
155	98	87	96	3,494	2,449	9,776	54	30	12.8	79.2
165	91	90	97	3,733	2,566	10,125	0	0	13.5	82.5

Table 29.--Yield table for Stand 25, Flathead National Forest,
Glacier View Ranger District, Cedar Flats

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²	Ft ³			Inches	Feet	
48	286	65	93	1,418	968	834	138	14	6.5	42.0
58	258	101	123	2,662	2,055	5,564	159	19	8.5	51.8
68	239	136	147	4,062	3,074	10,803	178	26	10.2	59.8
78	224	167	166	5,575	4,062	15,823	196	42	11.7	67.0
88	209	195	182	7,116	4,974	19,456	212	73	13.1	73.7
98	191	216	194	8,505	5,709	21,819	202	128	14.4	79.8
108	170	221	194	9,246	6,003	22,293	186	185	15.4	85.4
118	145	209	181	9,254	5,859	21,271	165	215	16.3	90.5
128	119	188	161	8,749	5,419	19,197	143	239	17.0	95.4
138	95	160	140	7,792	4,714	16,309	122	235	17.6	100.1
148	72	131	119	6,660	3,961	13,367	0	0	18.2	104.5

Table 30.--Yield table for Stand 26, Flathead National Forest,
Swan Lake Ranger District, Bond Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²	Ft ³			Inches	Feet	
62	75	60	77	1,408	1,322	4,756	199	7	12.1	60.1
72	71	114	116	3,332	2,946	12,378	229	17	17.1	77.6
82	68	163	145	5,446	4,444	18,662	235	30	21.0	90.2
92	64	203	165	7,501	5,623	22,983	270	43	24.1	100.5
102	61	245	186	9,778	6,646	25,973	279	58	27.2	109.3
112	57	283	205	11,983	7,346	27,240	281	75	30.1	117.0
122	54	317	224	14,047	7,739	27,138	288	91	32.8	123.8
132	51	349	242	16,016	7,821	25,922	282	108	35.6	129.8
142	47	377	257	17,747	7,757	24,336	254	125	38.2	135.1
152	44	397	268	19,037	7,567	23,053	230	139	40.5	139.8
162	41	414	277	19,943	7,465	21,514	0	0	42.8	144.1

Table 31.--Yield table for Stand 27, Gallatin National Forest,
Bozeman Ranger District, Face Draw

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²	Ft ³			Inches	Feet	
25	315	47	73	675	457	700	55	7	5.2	26.1
35	279	63	92	1,154	876	1,044	44	10	6.5	35.0
45	252	73	99	1,497	1,274	1,848	47	12	7.3	39.9
55	231	82	105	1,846	1,640	3,750	54	14	8.1	44.6
65	213	92	111	2,252	2,029	6,653	59	15	8.9	49.0
75	198	102	118	2,689	2,421	9,990	64	16	9.7	53.1
85	186	113	124	3,161	2,828	12,638	63	19	10.5	57.0
95	175	121	129	3,607	3,192	14,746	68	21	11.3	60.6
105	164	130	135	4,072	3,572	16,793	66	26	12.1	64.0
115	154	137	138	4,477	3,902	18,654	66	32	12.8	67.2
125	144	142	140	4,826	4,187	20,228	0	0	13.4	70.1

Table 32.--Yield table for Stand 28, Gallatin National Forest,
Bozeman Ranger District, Wildhorse

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²	Ft ³			Inches	Feet	
21	407	29	63	267	0	0	66	4	3.6	17.4
31	346	55	88	883	448	0	56	10	5.4	30.8
41	307	70	100	1,348	1,040	0	48	13	6.5	37.7
51	278	78	105	1,699	1,438	1,069	53	15	7.2	42.4
61	253	88	111	2,084	1,832	4,018	61	17	8.0	46.9
71	233	98	117	2,527	2,248	7,409	63	17	8.8	51.2
81	217	107	123	2,980	2,636	10,817	66	18	9.5	55.2
91	203	117	129	3,459	3,033	13,777	74	20	10.3	58.9
101	191	128	136	3,994	3,475	16,337	74	24	11.1	62.4
111	180	137	140	4,486	3,878	18,711	73	29	11.8	65.7
121	168	144	144	4,918	4,234	20,817	0	0	12.5	68.7

Table 33.--Yield table for Stand 29, Kootenai National Forest,
Rexford Ranger District, Pinkham Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²	Ft ³			Inches	Feet	
50	208	45	63	960	697	833	166	9	6.3	40.0
60	187	94	110	2,533	2,064	5,404	209	17	9.6	53.8
70	175	142	147	4,455	3,319	11,723	237	42	12.2	63.4
80	162	182	170	6,404	4,505	16,021	266	97	14.4	71.8
90	144	210	183	8,090	5,534	18,359	240	195	16.3	79.2
100	119	206	175	8,547	5,784	17,478	210	290	17.8	85.6
110	89	176	147	7,747	5,228	13,877	152	354	19.1	91.2
120	57	125	110	5,729	3,908	8,537	74	346	20.0	95.7
130	31	64	66	3,007	2,089	4,797	38	172	19.3	98.3
140	19	36	44	1,668	1,207	3,175	30	90	18.6	100.3
150	13	24	31	1,068	835	2,115	0	0	18.6	101.7

Table 34.--Yield table for Stand 30, Lolo National Forest,
Ninemile Ranger District, Spring Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				Ft ²	Ft ³			Inches	Feet	
205	295	98	136	2,448	1,956	6,397	95	25	7.8	47.5
215	248	114	138	3,152	2,567	9,369	96	37	9.2	56.8
225	210	124	138	3,749	3,084	12,256	89	47	10.4	64.7
235	178	127	134	4,169	3,476	14,755	91	54	11.5	71.1
245	152	130	131	4,540	3,821	17,263	85	59	12.5	76.8
255	130	128	125	4,793	4,052	19,227	83	62	13.5	81.8
265	111	127	120	5,003	4,239	20,885	76	61	14.5	86.5
275	96	124	115	5,159	4,381	22,267	71	59	15.4	90.8
285	84	122	111	5,284	4,499	23,507	70	57	16.3	94.7
295	75	120	108	5,412	4,617	24,737	65	55	17.1	98.4
305	66	117	104	5,508	4,706	25,703	0	0	18.0	101.9

Table 35.--Yield table for Stand 31, Colville National Forest,
Colville Ranger District, Robins Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				<i>Ft</i> ²			<i>Ft</i> ³	<i>Ft</i> ³	<i>Inches</i>	<i>Feet</i>
60	178	42	76	884	664	2,327	88	6	6.6	37.1
70	161	69	101	1,705	1,434	6,159	111	10	8.8	46.2
80	149	96	122	2,721	2,464	11,266	130	15	10.9	55.0
90	139	123	140	3,867	3,590	17,103	159	22	12.7	63.8
100	131	153	158	5,234	4,911	24,911	188	30	14.6	72.2
110	124	184	177	6,814	6,413	34,352	204	40	16.5	80.0
120	117	215	195	8,454	7,971	43,868	225	50	18.3	87.3
130	112	246	217	10,205	9,646	54,094	226	62	20.1	94.0
140	106	272	234	11,842	11,219	63,653	225	73	21.7	100.2
150	102	295	250	13,363	12,723	72,847	240	85	23.1	105.9
160	97	318	266	14,916	14,278	82,362	0	0	24.5	111.2

Table 36.--Yield table for Stand 32, Colville National Forest,
Kettle Falls Ranger District, Long Shot Mine

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				<i>Ft</i> ²			<i>Ft</i> ³	<i>Ft</i> ³	<i>Inches</i>	<i>Feet</i>
45	122	46	62	1,442	1,214	3,633	77	10	8.3	63.3
55	113	62	76	2,117	1,820	7,710	86	13	10.0	70.4
65	106	77	89	2,843	2,438	11,577	88	20	11.6	76.9
75	99	90	97	3,518	3,007	14,879	98	32	12.9	82.9
85	91	101	104	4,183	3,578	18,154	97	52	14.2	88.7
95	82	106	107	4,631	3,951	20,309	95	81	15.4	94.2
105	72	105	104	4,774	4,074	21,160	95	106	16.4	99.5
115	60	99	98	4,672	3,984	20,722	74	122	17.4	104.7
125	48	87	87	4,190	3,587	18,772	64	124	18.2	109.9
135	38	74	75	3,598	3,097	16,305	48	116	19.0	115.2
145	28	60	63	2,915	2,544	13,363	0	0	19.7	120.8

Table 37.--Yield table for Stand 33, Colville National Forest
Colville Ranger District, Box Canyon

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				<i>Ft</i> ²			<i>Ft</i> ³	<i>Ft</i> ³	<i>Inches</i>	<i>Feet</i>
45	55	33	44	719	633	2,043	79	4	10.5	55.5
55	52	54	61	1,475	1,328	6,068	90	7	13.7	73.5
65	50	72	75	2,299	2,105	10,492	94	11	16.4	86.2
75	47	89	85	3,124	2,888	14,902	107	16	18.6	96.3
85	45	106	96	4,037	3,740	19,992	110	20	20.8	104.9
95	42	121	104	4,928	4,577	25,063	119	26	22.9	112.4
105	40	137	112	5,864	5,452	30,514	123	31	25.1	119.0
115	38	153	120	6,779	6,313	36,202	119	37	27.2	125.0
125	36	166	126	7,596	7,090	41,353	123	43	29.2	130.4
135	33	178	131	8,396	7,855	46,442	118	48	31.3	135.3
145	31	187	134	9,091	8,530	51,063	0	0	33.1	139.8

Table 38.--Yield table for Stand 34, Colville National Forest,
Sullivan Lake Ranger District, Hanlon Meadows

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				<i>Ft</i> ²			<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
45	67	28	39	837	664	1,767	48	2	8.8	61.6
55	65	39	50	1,296	1,006	3,511	53	3	10.4	69.8
65	64	49	59	1,793	1,356	5,299	53	6	11.9	77.2
75	62	57	66	2,266	1,662	6,746	58	10	13.1	84.0
85	59	65	72	2,746	1,955	7,927	61	16	14.2	90.4
95	56	71	76	3,195	2,206	8,788	61	27	15.3	96.4
105	52	75	78	3,537	2,370	9,248	58	40	16.3	102.1
115	47	75	77	3,720	2,429	9,299	58	49	17.1	107.5
125	42	74	75	3,804	2,429	9,136	54	54	18.0	112.5
135	37	72	72	3,798	2,379	8,795	51	54	18.9	117.3
145	32	69	69	3,763	2,304	8,338	0	0	19.8	121.9

Table 39.--Yield table for Stand 35, Colville National Forest
Colville Ranger District, Joslin Meadow

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				<i>Ft</i> ²			<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
54	141	57	72	2,028	1,655	6,244	118	14	8.6	69.4
64	131	78	91	3,070	2,643	11,436	103	21	10.5	80.5
74	122	93	102	3,884	3,350	16,125	103	31	11.8	86.5
84	114	105	109	4,599	3,940	19,740	113	47	13.0	92.1
94	104	114	114	5,257	4,490	22,963	112	72	14.1	97.5
104	94	117	115	5,656	4,812	24,778	108	101	15.1	102.6
114	82	114	111	5,720	4,849	25,116	95	126	16.0	107.5
124	69	105	103	5,409	4,594	23,904	86	127	16.7	112.2
134	58	95	94	5,003	4,266	22,238	71	119	17.4	116.9
144	47	84	84	4,521	3,886	20,395	58	111	18.1	121.7
154	38	73	75	3,990	3,446	18,082	0	0	18.8	126.6

Table 40.--Yield table for Stand 36, Colville National Forest,
Sullivan Lake Ranger District, Johns Creek

Age	Trees/acre	BA/acre	CCF	Volume per acre			Accretion	Mortality	\bar{x} d.b.h.	\bar{x} height
				Total ft ³	Merchantable ft ³	Scribner bd.ft.				
				<i>Ft</i> ²			<i>Ft</i> ³	<i>Ft</i> ³	Inches	Feet
15	173	11	25	104	8	0	22	2	3.4	20.1
25	145	21	38	305	140	22	44	4	5.1	34.1
35	128	35	54	710	720	752	44	6	7.1	49.1
45	116	45	63	1,084	1,184	2,088	49	8	8.4	60.4
55	108	54	71	1,501	1,625	4,549	63	9	9.6	71.0
65	101	65	79	2,035	1,952	7,611	72	12	10.9	80.8
75	95	77	88	2,634	2,362	10,873	75	16	12.1	89.9
85	90	87	94	3,224	2,877	14,131	80	23	13.3	98.3
95	84	96	100	3,803	3,419	17,410	80	31	14.5	106.2
105	78	102	104	4,295	3,880	20,196	80	45	15.5	113.5
115	72	106	105	4,639	4,234	22,324	0	0	16.4	120.6

Graham, R. T., and J. R. Tonn.

1980. Case study: growth and development of forest stands in the Northern Rocky Mountains. USDA For. Serv. Res. Pap. INT-255, 24 p. Intermt. For. and Range Exp. Stn., Ogden, Utah 84401.

Tree diameter and height growth were compared for nine habitat types. Ten-year diameter growth was highly variable among habitat types as was 10-year height growth. High variation in both diameter and height growth also occurred within habitat types. Thirty-six local yield tables are presented, one for each stand in the study.

KEYWORDS: Stand yield, diameter growth, height growth, habitat type, Northern Rocky Mountains

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