TIMBER CRUISING HANDBOOK

CHAPTER 90 - MISCELLANEOUS TABLES

Contents

91 EXHIBITS

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91 - EXHIBITS. The following exhibits are miscellaneous tables which may be used for determining leaning tree heights, determining limiting distance, and determining the number of plots.

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91 - Exhibit 01
Table I
Leaning Tree Heights

Vertical Height (AB) to Top of Lean

BC	30	32	34	36	38	40	42	44	46	48	50	52	54	56	58	60	62	64	66	68	70	72	74	76	BC
8	31																								8
10	32	34	35	37																					10
12	32	34	36	38	40	42	44	46																	12
14	33	35	37	39	40	42	44	46	48	50	52														14
16	34	36	38	39	41	43	45	47	49	51	52	54	56	58	60										16
18	35	37	38	40	42	44	46	48	49	51	53	55	57	59	61	63	65	66							18
20	36	38	39	41	43	45	47	48	50	52	54	56	58	59	61	63	65	67	69	71	73				20
22	37	39	40	42	44	46	47	49	51	53	55	56	58	60	62	64	66	68	70	71	73	75	77	79	22
24	38	40	42	43	45	47	48	50	52	54	55	57	59	61	63	65	66	68	70	72	74	76	78	80	24
26	40	41	43	44	46	48	49	51	53	55	56	58	60	62	64	65	67	69	71	73	75	77	78	80	26
28	41	42	44	46	47	49	50	52	54	56	57	59	61	63	64	66	68	70	72	74	75	77	79	81	28
30	42	44	45	47	48	50	52	53	55	57	58	60	62	64	65	67	69	71	72	74	76	78	80	82	30
32	44	45	47	48	50	51	53	54	56	58	59	61	63	64	66	68	70	72	73	75	77	79	81	82	32
34	45	47	48	50	51	52	54	56	57	59	60	62	64	66	67	69	71	72	74	76	78	80	81	83	34

BC	78	80	82	84	86	88	90	92	94	96	98	100	102	104	106	108	110	112	114	116	118	120			BC
22	81																								22
24	82	84	85	87																					24
26	82	84	86	88	90	92	94	96																	26
28	83	85	87	89	90	92	94	96	98	100	102														28
30	84	85	87	89	91	93	95	97	99	101	102	104	106	108	110										30
32	84	86	88	90	92	94	96	97	99	101	103	105	107	109	111	113	115	116							32
34	85	87	89	91	92	94	96	98	100	102	104	106	108	109	111	113	115	117	119	121	123	125			34

Measure height AB (nearest foot) to tip, or to any point on the leaning stem to which slant height is needed.
Measure horizontal distance BC to base of leaning tree. Read slant height from table. Interpolate as needed.

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91 - Exhibit 02
Table II

Limiting Distance to Face of Tree for Different Diameters for Various Basal Area Factors
(To Face of Tree)

	Basal Area Factor										
DBH	5	10	15	20	25	30	40	50	60	70	80
	Plot Radius Factor										
In.	3.847	2.708	2.203	1.902	1.697	1.546	1.333	1.188	1.081	.997	.930
	PLOT RADII TO FACE OF TREE IN FEET										
0.1	.38	.27	.22	.19	.17	.16	.13	.12	.11	.10	.09
0.2	.77	.54	.44	.38	.34	.31	.27	.24	.22	.20	.19
0.3	1.15	.81	.66	.57	.51	.46	.40	.36	.32	.30	.28
0.4	1.54	1.08	.88	.76	.68	.62	.53	.48	.43	.40	.37
0.5	1.92	1.35	1.11	.95	.85	.77	.67	.59	.54	.50	.47
0.6	2.31	1.63	1.32	1.14	1.02	.93	.80	.71	.65	.60	.56
0.7	2.69	1.90	1.54	1.33	1.19	1.08	.93	.83	.76	.70	.65
0.8	3.08	2.17	1.76	1.52	1.36	1.24	1.07	.95	.87	.80	.74
0.9	3.46	2.44	1.98	1.71	1.53	1.39	1.20	1.07	.97	.90	.84
1	3.85	2.71	2.20	1.90	1.70	1.55	1.33	1.19	1.08	1.00	.93
2	7.69	5.42	4.41	3.80	3.39	3.09	2.67	2.38	2.16	1.99	1.86
3	11.54	8.12	6.61	5.71	5.09	4.64	4.00	3.56	3.24	2.99	2.79
4	15.39	10.83	8.81	7.61	6.79	6.18	5.33	4.75	4.32	3.99	3.72
5	19.24	13.54	11.02	9.51	8.49	7.73	6.67	5.94	5.41	4.99	4.65
6	23.08	16.25	13.22	11.41	10.18	9.28	8.00	7.13	6.49	5.98	5.58
7	26.93	18.96	15.42	13.31	11.88	10.82	9.33	8.32	7.57	6.98	6.51
8	30.78	21.66	17.62	15.22	13.58	12.37	10.66	9.50	8.65	7.98	7.44
9	34.62	24.37	19.83	17.12	15.27	13.91	12.00	10.69	9.73	8.97	8.37
10	38.47	27.08	22.03	19.02	16.97	15.46	13.33	11.88	10.81	9.97	9.30
20	76.94	54.16	44.06	38.04	33.94	30.92	26.66	23.76	21.62	19.94	18.60
30	115.41	81.24	66.09	57.06	50.91	46.38	39.99	35.64	32.43	29.91	27.90
40	153.88	108.32	88.12	76.08	67.88	61.84	53.32	47.52	43.24	39.88	37.20
50	192.35	135.40	110.15	95.10	84.85	77.30	66.65	59.40	54.05	49.85	46.50
60	230.82	162.48	132.18	144.12	101.82	92.76	79.98	71.28	64.86	59.82	55.80
70	269.29	189.56	154.21	133.14	118.79	108.22	93.31	83.16	75.67	69.79	65.10

Example: Given a tree DBH of 22.8 inches and a BAF of 5, determine limiting distance to face of tree:

20-inch distance = 76.94
2-inch distance = 7.69
0.8-inch distance = 3.08

Limiting distance to face of 22.8-inch tree = 87.71 feet

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91 - Exhibit 03
Table III(A)

Number of Measurement Points (k), by Coefficient of Variation (CV) and Sampling Srror (E), When a Measurement Point Costs Three Times More Than a Count-only Point (r = 3.00)

Coefficient of Variation	Sampling error (standard error of estimated total sale volume expressed as a proportion of estimated total sale volume)							
	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10
	--- Number of Measurement Points ---							
0.20	200	50	22	12	8	6	-	-
0.25	312	78	35	20	12	9	5	-
0.30	450	112	50	28	18	12	7	-
0.35	612	153	68	38	24	17	10	6
0.40	800	200	89	50	32	22	12	8
0.45	1,012	253	112	63	40	28	16	10
0.50	1,250	312	139	78	50	35	20	12
0.55	1,512	378	168	95	60	42	24	15
0.60	1,800	450	200	112	72	50	28	18
0.65	2,112	528	235	132	84	59	33	21
0.70	2,450	612	272	153	98	68	38	24
0.75	2,812	703	312	176	112	78	44	28
0.80	3,200	800	356	200	128	89	50	32
0.85	3,612	903	401	226	144	100	56	36
0.90	4,050	1,012	450	253	162	112	63	40
0.95	4,512	1,128	501	282	180	125	71	45
1.00	5,000	1,250	556	312	200	139	78	50

NOTE: Multiply the indicated number of measurement points by 3 to find the total number of points.

Tables III(A), III(B), III(C), and III(D) are excerpts from Johnson (1965).

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91 - Exhibit 04
Table III(B)

Number of Measurement Points (k), by Coefficient of Variation (CV) and Sampling Error (E), When a Measurement Point Costs 5.33 Times More Than a Count-only Point (r = 5.33)

Coefficient of Variation	Sampling error (standard error of estimated total sale volume expressed as a proportion of estimated total sale volume)							
	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10
	--- Number of Measurement Points ---							
0.20	175	44	19	11	7	5	-	-
0.25	273	68	30	17	11	8	-	-
0.30	394	98	44	25	16	11	6	-
0.35	536	134	60	34	21	15	8	5
0.40	700	175	78	44	28	19	11	7
0.45	886	222	98	55	35	25	14	9
0.50	1,094	273	122	68	44	30	17	11
0.55	1,324	331	147	83	53	37	21	13
0.60	1,575	394	175	98	63	44	25	16
0.65	1,849	462	205	116	74	51	29	18
0.70	2,144	536	238	134	86	60	34	21
0.75	2,461	615	273	154	98	68	38	25
0.80	2,800	700	311	175	112	78	44	28
0.85	3,161	790	351	198	126	88	49	32
0.90	3,544	886	394	222	142	98	55	35
0.95	3,949	987	439	247	158	110	62	39
1.00	4,376	1,094	486	273	175	122	68	44

NOTE: Multiply the indicated number of measurement points by 4 to find the total number of points.

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91 - Exhibit 05
Table III(C)

Number of Measurement Points (k), by Coefficient of Variation (CV) and Sampling Error (E), When a Measurement Point Costs 8.33 Times More Than a Count-only Point (r = 8.33)

Coefficient of Variation	Sampling error (standard error of estimated total sale volume expressed as a proportion of estimated total sale volume)							
	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10
	--- Number of Measurement Points ---							
0.20	160	40	18	10	6	-	-	-
0.25	250	63	28	16	10	7	-	-
0.30	360	90	40	23	14	10	6	-
0.35	490	123	54	31	20	14	8	5
0.40	640	160	71	40	26	18	10	6
0.45	810	203	90	51	32	23	13	8
0.50	1,000	250	111	63	40	28	16	10
0.55	1,210	303	134	76	48	34	19	12
0.60	1,440	360	160	90	58	40	23	14
0.65	1,690	423	188	106	68	47	26	17
0.70	1,960	490	218	123	78	54	31	20
0.75	2,250	563	250	141	90	63	35	23
0.80	2,560	640	284	160	102	71	40	26
0.85	2,890	723	321	181	116	80	45	29
0.90	3,240	810	360	203	130	90	51	32
0.95	3,610	903	401	226	144	100	56	36
1.00	4,000	1,000	444	250	160	111	63	40

NOTE: Multiply the indicated number of measurement points by 5 to find the total number of points.

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91 - Exhibit 06
Table III(D)

Number of Measurement Points (k), by Coefficient of Variation (CV) and Sampling Error (E), When a Measurement Point Costs 12.00 Times More Than a Count-only Point (r = 12.00)

Coefficient of Variation	Sampling error (standard error of estimated total sale volume expressed as a proportion of estimated total sale volume)							
	0.01	0.02	0.03	0.04	0.05	0.06	0.08	0.10
	--- Number of Measurement Points ---							
0.20	150	37	17	9	6	-	-	-
0.25	234	59	26	15	9	7	-	-
0.30	337	84	38	21	14	9	5	-
0.35	459	115	51	29	18	13	7	5
0.40	600	150	67	37	24	17	9	6
0.45	759	190	84	47	30	21	12	8
0.50	937	234	104	59	38	26	15	9
0.55	1,134	284	126	71	45	32	18	11
0.60	1,350	337	150	84	54	37	21	14
0.65	1,584	396	176	99	63	44	25	16
0.70	1,837	459	204	115	74	51	29	18
0.75	2,109	527	234	132	84	59	33	21
0.80	2,400	600	267	150	96	67	37	24
0.85	2,709	677	301	169	108	75	42	27
0.90	3,037	759	338	190	122	84	47	30
0.95	3,384	846	376	212	135	94	53	34
1.00	3,750	937	417	234	150	104	59	37

NOTE: Multiply the indicated number of measurement points by 6 to find the total number of points.