This appendix provides suggested stocking levels in a series of tables grouped by plant association and forest series. Each of the 44 upland-forest associations has one to seven tables, depending on the number of tree species associated with it (table 2). The order of these tables follows the order used in table 2, both for the plant associations (the rows in table 2) and for the tree species (the columns of table 2). Note that the tables differ from the stocking-level figures in appendix 2 because they do not include any information about the full-stocking level; only the upper and lower limits of the management zone are described in this appendix.

Each table consists of 17 columns arranged in three sections. Two of the sections are also divided into sub-sections, as illustrated in the example below. Each section or subsection will be described individually.

Table 1: Stocking levels for subalpine fir in the ABLA2/TRCA3 plant association (full stocking = 382).

| | UPPER MANAGEMENT ZONE (SDI = 287) | | | | | | | | LOWER MANAGEMENT ZONE (SDI = 191) | | | | | | | |
| | TREES/ACRE | | | | BASAL AREA/ACRE | | | | TREES/ACRE | | | | BASAL AREA/ACRE | | | |
QMD	EA	IS	UA	ES	EA	IS	UA	CC	EA	IS	UA	ES	EA	IS	UA	CC
1.0	15323	14426	13340	1.8	84	79	73	72	10215	9618	8893	2.2	56	52	49	65
1.2	11178	10524	9731	2.1	88	83	76	73	7452	7016	6488	2.6	59	55	51	66
1.4	8561	8060	7453	2.4	92	86	80	73	5707	5374	4969	3.0	61	57	53	66
1.6	6795	6398	5916	2.7	95	89	83	74	4530	4265	3944	3.3	63	60	55	67
1.8	5543	5218	4825	3.0	98	92	85	75	3695	3479	3217	3.7	65	61	57	68
2.0	4619	4349	4021	3.3	101	95	88	75	3079	2899	2681	4.0	67	63	58	68

Section 1

| Subsection One | Subsection Two | Subsection One | Subsection Two |

| Section Two | Section Three |

Section One: QMD. The first section is a single column providing quadratic mean diameters (QMDs) rang-ing from 1.0 to 10.0 inches in 0.2-inch increments, and from 10.5 to 30.0 inches in 0.5-inch increments (ex-cluding 29.5 inches). Smaller increments were used for QMDs below 10 inches because the additional detail is useful when preparing silvicultural prescriptions for treatments such as precommercial thinning. If more detail is needed than is shown in the tables, intermediate values could be interpolated.

Section Two: ULMZ. The second section of each table, which consists of eight columns divided into two subsections, provides information about the upper limit of the management zone (ULMZ). The ULMZ can be thought of as a constant level of stand density index (SDI); the actual SDI level selected as an ULMZ is shown in the section heading, e.g., "Upper Management Zone (SDI = 287)." Refer to the "Derivation of the Stocking Level Information" section, page 15 (Upper Limit of the Management Zone), for information about how the SDI level was calculated for the ULMZ.

The first subsection of section two provides trees per acre calculations based on the SDI level established for the ULMZ, and the QMD given in column 1. The first column in this subsection provides the trees per acre associated with an even-aged stand structure, the next column provides it for an irregular structure, and the third column shows it for an uneven-aged stand. Note that the lodgepole pine tables do not include a trees per acre value for an uneven-aged stand because that structure is rare in primary lodgepole forest, and be-cause establishment of an uneven-aged structure has not been a management objective for stands where lodgepole is the dominant or featured species.

The fourth column in subsection one shows the equilateral spacing associated with the trees per acre value for an even-aged stand structure. Spacing calculations were always based on even-aged stands because that structure presumably has the most consistent inter-tree distances; the equilateral spacing values shown in this column would not apply to trees left in clumps or in other irregular arrangements. Note that the lodgepole pine tables provide two measures of inter-tree distance – an equilateral spacing as described above, and a square spacing value that might be helpful when preparing silvicultural prescriptions for treatments in young lodgepole stands at very small QMDs. The square spacing calculation was also based on an even-aged stand structure.

Subsection two of section two provides basal area per acre calculations based on the SDI level established for the ULMZ, and the QMD given in column 1. As described above for subsection one (trees per acre), this subsection provides basal areas per acre for an even-aged, irregular, and uneven-aged structure (once again, an uneven-aged value was not calculated for lodgepole pine).

The fourth column in subsection two shows the forest (tree) canopy cover percentage associated with the basal area per acre for an even-aged or irregular stand structure. For Douglas-fir, ponderosa pine, Engelmann spruce, grand fir, and subalpine fir, canopy cover values pertain to an irregular structure because it best reflects the unmanaged stands that were sampled to derive the mathematical formulas used for the calculations. For lodgepole pine and western larch, canopy cover values pertain to even-aged stands because unmanaged stands tend to be even-aged for those species. Lodgepole pine has two canopy cover values – one pertaining to unmanaged stands, and another for managed stands (defined as those thinned early in life, before they attained a mean stand height of nine feet).

Section Three: LLMZ. The third section of each table, which consists of eight columns divided into two subsections, provides information about the lower limit of the management zone (LLMZ). The LLMZ can be thought of as a constant level of stand density index (SDI); the actual SDI level selected as a LLMZ is shown in the section heading, e.g., "Lower Management Zone (SDI = 191)." Refer to the "Derivation of the Stocking Level Information" section, page 16 (Lower Limit of the Management Zone), for information about how the SDI level was calculated for the LLMZ.

Subsection one of section three provides trees per acre calculations based on the SDI level established for the LLMZ, and the QMD given in column 1. As was described above for section two (ULMZ), this subsection provides trees per acre for an even-aged, irregular, and uneven-aged structure (once again, an uneven-aged value was not included in the lodgepole pine tables). The fourth column in this subsection shows the equilateral spacing associated with the trees per acre value for an even-aged stand structure.

Subsection two of section three provides basal area per acre calculations based on the SDI level established for the LLMZ, and the QMD given in column 1. As described above for subsection one (trees per acre), this subsection provides basal areas per acre for an even-aged, irregular, and uneven-aged structure (once again, an uneven-aged value was not calculated for lodgepole pine). The fourth column in this subsection shows the forest (tree) canopy cover associated with the basal area per acre for an even-aged or irregular stand structure, and was calculated as described above for section two.

Footnotes at the end of each table describe the column heading codes, and summarize how the calculations were made for each item. All of the calculations resulting in the figures in appendix 2, and the tables in appendix 3, were made in a computerized spreadsheet program. Calculation methodology followed the instructions from Cochran and others (1994) – see their appendix 2 (page 19) for more information. Further information about how the calculations were made for this publication can be obtained from the author. The information in this appendix could also be derived using a computer program called SDI. Refer to the "Customizing the Stocking-Level Information" section, page 30, for more information about the SDI program and how to obtain it.

Table 90: Stocking levels for lodgepole pine in the PICO/CARU plant association (full stocking = 223).

| | UPPER MANAGEMENT ZONE (SDI = 167) | | | | | | | | LOWER MANAGEMENT ZONE (SDI = 112) | | | | | | | |
| | TREES/ACRE | | | | BASAL AREA/ACRE | | | | TREES/ACRE | | | | BASAL AREA/ACRE | | | |
QMD	EA	IS	ES	SS	EA	IS	UC	MC	EA	IS	ES	SS	EA	IS	UC	MC
1.0	9187	8649	2.3	2.2	50	47	51	78	6125	5766	2.9	2.7	33	31	44	58
1.2	6689	6298	2.7	2.6	53	49	52	78	4460	4199	3.4	3.1	35	33	45	58
1.4	5116	4816	3.1	2.9	55	51	53	78	3410	3211	3.8	3.6	36	34	45	58
1.6	4055	3818	3.5	3.3	57	53	53	78	2703	2545	4.3	4.0	38	36	46	58
1.8	3304	3110	3.9	3.6	58	55	54	78	2202	2074	4.8	4.4	39	37	47	58
2.0	2750	2589	4.3	4.0	60	56	54	78	1834	1726	5.2	4.9	40	38	47	58
2.2	2330	2194	4.6	4.3	62	58	55	78	1553	1462	5.7	5.3	41	39	48	58
2.4	2003	1885	5.0	4.7	63	59	55	78	1335	1257	6.1	5.7	42	39	48	58
2.6	1742	1640	5.4	5.0	64	60	56	78	1162	1094	6.6	6.1	43	40	48	58
2.8	1531	1442	5.7	5.3	65	62	56	78	1021	961	7.0	6.5	44	41	49	58
3.0	1358	1279	6.1	5.7	67	63	56	78	905	853	7.5	6.9	44	42	49	58
3.2	1214	1143	6.4	6.0	68	64	57	78	809	762	7.9	7.3	45	43	49	58
3.4	1092	1029	6.8	6.3	69	65	57	78	728	686	8.3	7.7	46	43	50	58
3.6	989	931	7.1	6.6	70	66	57	78	659	621	8.7	8.1	47	44	50	58
3.8	900	848	7.5	7.0	71	67	57	78	600	565	9.2	8.5	47	45	50	58
4.0	823	775	7.8	7.3	72	68	58	78	549	517	9.6	8.9	48	45	50	58
4.2	756	712	8.2	7.6	73	69	58	78	504	475	10.0	9.3	49	46	51	58
4.4	698	657	8.5	7.9	74	69	58	78	465	438	10.4	9.7	49	46	51	58
4.6	646	608	8.8	8.2	75	70	58	78	430	405	10.8	10.1	50	47	51	58
4.8	600	564	9.2	8.5	75	71	58	78	400	376	11.2	10.4	50	47	51	58
5.0	558	526	9.5	8.8	76	72	59	78	372	351	11.6	10.8	51	48	51	58
5.2	522	491	9.8	9.1	77	72	59	78	348	327	12.0	11.2	51	48	52	58
5.4	488	460	10.1	9.4	78	73	59	78	326	307	12.4	11.6	52	49	52	58
5.6	458	432	10.5	9.7	78	74	59	78	306	288	12.8	11.9	52	49	52	58
5.8	431	406	10.8	10.0	79	75	59	78	288	271	13.2	12.3	53	50	52	58
6.0	407	383	11.1	10.4	80	75	59	78	271	255	13.6	12.7	53	50	52	58
6.2	384	362	11.4	10.6	81	76	60	78	256	241	14.0	13.0	54	51	52	58
6.4	363	342	11.8	10.9	81	76	60	78	242	228	14.4	13.4	54	51	52	58
6.6	344	324	12.1	11.2	82	77	60	78	230	216	14.8	13.8	55	51	53	58
6.8	327	308	12.4	11.5	82	78	60	78	218	205	15.2	14.1	55	52	53	58
7.0	311	293	12.7	11.8	83	78	60	78	207	195	15.6	14.5	55	52	53	58
7.2	296	279	13.0	12.1	84	79	60	78	197	186	16.0	14.9	56	53	53	58
7.4	282	266	13.3	12.4	84	79	60	78	188	177	16.3	15.2	56	53	53	58
7.6	269	254	13.7	12.7	85	80	61	78	180	169	16.7	15.6	57	53	53	58
7.8	258	243	14.0	13.0	85	80	61	78	172	162	17.1	15.9	57	54	53	58
8.0	246	232	14.3	13.3	86	81	61	78	164	155	17.5	16.3	57	54	54	58
8.2	236	222	14.6	13.6	87	82	61	78	157	148	17.9	16.6	58	54	54	58
8.4	226	213	14.9	13.9	87	82	61	78	151	142	18.3	17.0	58	55	54	58
8.6	217	205	15.2	14.2	88	83	61	78	145	136	18.6	17.3	58	55	54	58
8.8	209	197	15.5	14.4	88	83	61	78	139	131	19.0	17.7	59	55	54	58
9.0	201	189	15.8	14.7	89	84	61	78	134	126	19.4	18.0	59	56	54	58
9.2	193	182	16.1	15.0	89	84	61	78	129	121	19.8	18.4	59	56	54	58
9.4	186	175	16.4	15.3	90	84	62	78	124	117	20.1	18.7	60	56	54	58
9.6	179	169	16.7	15.6	90	85	62	78	120	113	20.5	19.1	60	57	54	58
9.8	173	163	17.0	15.9	91	85	62	78	115	109	20.9	19.4	60	57	54	58
10.0	167	157	17.3	16.1	91	86	62	78	111	105	21.2	19.8	61	57	55	58
10.5	154	145	18.1	16.8	92	87	62	78	102	96	22.2	20.6	62	58	55	58

Table 90: Stocking levels for lodgepole pine in the PICO/CARU plant association (full stocking = 223).

| | UPPER MANAGEMENT ZONE (SDI = 167) | | | | | | | | LOWER MANAGEMENT ZONE (SDI = 112) | | | | | | | |
| | TREES/ACRE | | | | BASAL AREA/ACRE | | | | TREES/ACRE | | | | BASAL AREA/ACRE | | | |
QMD	EA	IS	ES	SS	EA	IS	UC	MC	EA	IS	ES	SS	EA	IS	UC	MC
11.0	142	133	18.8	17.5	93	88	62	78	94	89	23.1	21.5	62	59	55	58
11.5	131	123	19.6	18.2	95	89	62	78	87	82	24.0	22.3	63	59	55	58
12.0	122	115	20.3	18.9	96	90	63	78	81	76	24.9	23.2	64	60	55	58
12.5	113	107	21.1	19.6	97	91	63	78	76	71	25.8	24.0	64	61	56	58
13.0	106	100	21.8	20.3	98	92	63	78	71	66	26.7	24.8	65	61	56	58
13.5	99	93	22.5	21.0	99	93	63	78	66	62	27.6	25.7	66	62	56	58
14.0	93	88	23.2	21.6	100	94	63	78	62	58	28.5	26.5	66	62	56	58
14.5	88	82	24.0	22.3	100	95	64	78	58	55	29.4	27.3	67	63	56	58
15.0	83	78	24.7	23.0	101	95	64	78	55	52	30.2	28.1	68	64	56	58
15.5	78	73	25.4	23.6	102	96	64	78	52	49	31.1	28.9	68	64	57	58
16.0	74	69	26.1	24.3	103	97	64	78	49	46	32.0	29.8	69	65	57	58
16.5	70	66	26.8	25.0	104	98	64	78	47	44	32.8	30.6	69	65	57	58
17.0	66	63	27.5	25.6	105	99	64	78	44	42	33.7	31.4	70	66	57	58
17.5	63	59	28.2	26.3	105	99	64	78	42	40	34.6	32.2	70	66	57	58
18.0	60	57	28.9	26.9	106	100	65	78	40	38	35.4	33.0	71	67	57	58
18.5	57	54	29.6	27.6	107	101	65	78	38	36	36.3	33.8	71	67	57	58
19.0	55	52	30.3	28.2	108	101	65	78	36	34	37.1	34.6	72	68	58	58
19.5	52	49	31.0	28.9	108	102	65	78	35	33	38.0	35.3	72	68	58	58
20.0	50	47	31.7	29.5	109	103	65	78	33	31	38.8	36.1	73	69	58	58
20.5	48	45	32.4	30.1	110	103	65	78	32	30	39.7	36.9	73	69	58	58
21.0	46	43	33.1	30.8	111	104	65	78	31	29	40.5	37.7	74	69	58	58
21.5	44	42	33.8	31.4	111	105	65	78	29	28	41.3	38.5	74	70	58	58
22.0	42	40	34.4	32.1	112	105	66	78	28	27	42.2	39.3	75	70	58	58
22.5	41	38	35.1	32.7	113	106	66	78	27	26	43.0	40.0	75	71	58	58
23.0	39	37	35.8	33.3	113	107	66	78	26	25	43.8	40.8	75	71	58	58
23.5	38	36	36.5	33.9	114	107	66	78	25	24	44.7	41.6	76	71	59	58
24.0	36	34	37.2	34.6	114	108	66	78	24	23	45.5	42.3	76	72	59	58
24.5	35	33	37.8	35.2	115	108	66	78	23	22	46.3	43.1	77	72	59	58
25.0	34	32	38.5	35.8	116	109	66	78	23	21	47.1	43.9	77	73	59	58
25.5	33	31	39.2	36.4	116	110	66	78	22	21	48.0	44.6	78	73	59	58
26.0	32	30	39.8	37.1	117	110	66	78	21	20	48.8	45.4	78	73	59	58
26.5	31	29	40.5	37.7	117	111	66	78	20	19	49.6	46.2	78	74	59	58
27.0	30	28	41.2	38.3	118	111	66	78	20	19	50.4	46.9	79	74	59	58
27.5	29	27	41.8	38.9	119	112	67	78	19	18	51.2	47.7	79	74	59	58
28.0	28	26	42.5	39.5	119	112	67	78	19	17	52.0	48.4	79	75	59	58
28.5	27	25	43.1	40.1	120	113	67	78	18	17	52.8	49.2	80	75	59	58
29.0	26	25	43.8	40.8	120	113	67	78	17	16	53.6	49.9	80	75	60	58
30.0	25	23	45.1	42.0	121	114	67	78	16	16	55.3	51.4	81	76	60	58

Column headings are:

QMD   Quadratic mean diameter (the diameter of the tree of average basal area).

EA   Even aged, showing the trees/acre, or basal area/acre, associated with an even-aged stand structure.

IS   Irregular structure; even-aged SDIs were reduced by 6% for an irregular stand structure (from Long 1995).

ES   Equilateral spacing, in feet, that the trees per acre associated with an even-aged stand structure (EA columns) would have when spaced equilaterally apart; also referred to as triangular spacing.

SS   Square spacing; distance between trees (feet) when spaced on a square grid pattern, rather than equilaterally.

UC   Unmanaged canopy cover; based on the "CL" equation from Dealy (1985) and the basal area/acre for an even-aged structure (EA columns). Pertains to unthinned stands, or those thinned after a mean height of 9 feet.

MC   Managed canopy cover; based on Cochran and Dahms (1998). Pertains to stands thinned early in life (< 9').