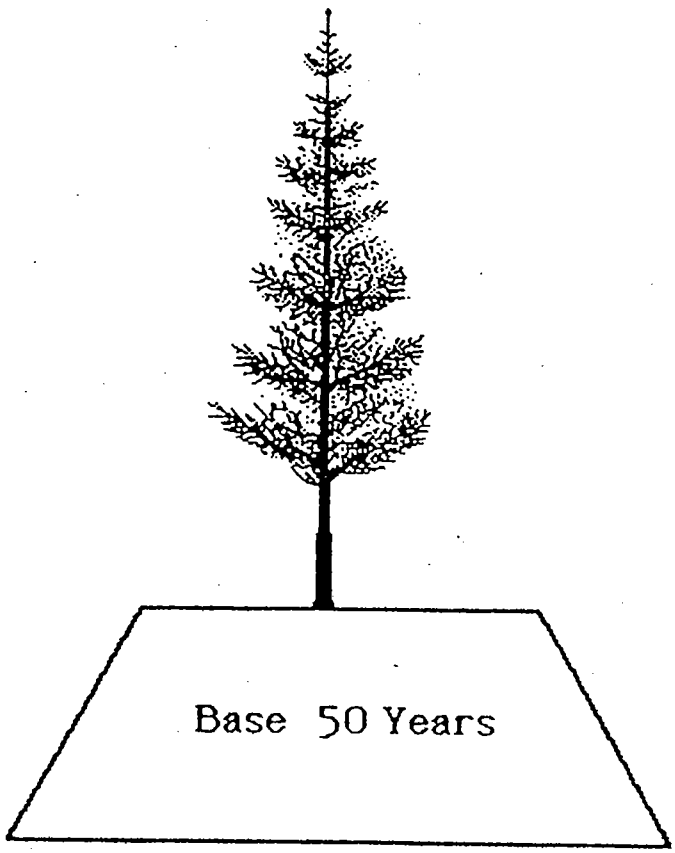
EXHIBIT 7

THE YIELD TABLE

OF

DOUGLAS FIR



125C STEINER

Douglas Fir — Base 50

Site Index 60 — Reflects DNR Ownership — Site Index 60 — 63

Total Age	BH Age	PNB	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre 7"+	Gross Cu. Ft. 7"+	Net 4" Cu. Ft. 7"+	Scrib 6" Board Feet 16' log	Scrib 6" Board Feet 32' log	
30	20	1.00	30	8.2	18.3	50					
32	22	1.00	33	8.4	30.8	81					
34	24	1.00	35	8.5	42.2	108	588	353	1,092	739	
36	26	1.00	38	8.6	52.7	130	819	588	1,583	1,076	
38	28	1.00	40	8.7	62.4	150	1046	819	2,102	1,438	
40	30	1.00	42	8.8	71.4	167	1268	1046	2,649	1,824	
42	32	1.00	45	9.0	79.8	182	1487	1268	3,221	2,233	
44	34	1.00	47	9.1	87.8	195	1701	1487	3,817	2,665	
46	36	1.00	49	9.2	95.3	206	1911	1701	4,434	3,116	
48	38	1.00	50	9.3	102.3	216	2117	1911	5,069	3,586	
50	40	1.00	52	9.4	109.0	225	2319	2117	5,719	4,073	4,737
52	42	1.00	54	9.5	115.4	233	2517	2319	6,382	4,573	
54	44	1.00	55	9.6	121.5	240	2710	2517	7,055	5,086	
56	46	1.00	57	9.7	127.3	246	2900	2710	7,735	5,607	
58	48	1.00	59	9.9	132.9	251	3085	2900	8,421	6,137	
60	50	1.00	60	10.0	138.2	256	3266	3085	9,109	6,671	7727
62	52	1.00	61	10.0	143.4	260	3443	3266	9,797	7,208	
64	54	1.00	63	10.1	148.3	264	3616	3443	10,484	7,747	
66	56	1.00	64	10.2	153.1	268	3784	3616	11,167	8,285	
68	58	1.00	65	10.3	157.7	271	3949	3784	11,844	8,819	
70	60	1.00	66	10.4	162.1	274	4109	3949	12,514	9,350	10,816
72	62	1.00	68	10.5	166.4	277	4265	4109	13,174	9,874	
74	64	1.00	69	10.6	170.6	280	4417	4265	13,824	10,390	
76	66	1.00	70	10.6	174.6	282	4565	4417	14,460	10,896	
78	68	1.00	71	10.7	178.5	285	4709	4565	15,083	11,391	
80	70	1.00	72	10.8	182.3	287	4848	4709	15,690	11,874	
82	72	1.00	73	10.9	186.0	290	4984	4848	16,280	12,342	
84	74	1.00	74	10.9	189.6	292	5115	4984	16,852	12,796	
86	76	1.00	74	11.0	193.1	294	5242	5115	17,404	13,232	
88	78	1.00	75	11.0	196.5	296	5365	5242	17,935	13,651	
90	80	1.00	76	11.1	199.8	299	5484	5365	18,445	14,051	
92	82	1.00	77	11.1	203.0	301	5599	5484	18,930	14,430	
94	84	1.00	78	11.2	206.2	304	5709	5599	19,392	14,788	
96	86	1.00	79	11.2	209.2	306	5816	5709	19,828	15,123	
98	88	1.00	79	11.2	212.2	309	5918	5816	20,238	15,435	
100	90	1.00	80	11.2	215.2	312	6016	5918	20,620	15,722	18,436

Douglas fir — Site Index 60 — Douglas fir
DNR #41 Base 50 — Base 50

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Site Index 65 — Douglas Fir — Reflects DNR Ownership — Base 50 — Site Index 65

Total Age	BH Age	PNB	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre 7"+	Gross Cu. Ft. 7"+	Net 4" Cu. Ft. 7"+	Scrib 6" Board Feet 16' log	Scrib 6" Board Feet 32' log
30	20	1.00	33	8.4	28.6	74	316	52	559	373
32	22	1.00	36	8.5	41.1	103	575	316	1,066	715
34	24	1.00	38	8.7	52.5	128	831	575	1,614	1,089
36	26	1.00	41	8.8	63.0	148	1082	831	2,201	1,497
38	28	1.00	43	9.0	72.7	166	1329	1082	2,826	1,938
40	30	1.00	46	9.1	81.7	181	1571	1329	3,486	2,412
42	32	1.00	48	9.2	90.2	194	1810	1571	4,180	2,917
44	34	1.00	50	9.4	98.1	205	2044	1810	4,903	3,450
46	36	1.00	52	9.5	105.6	214	2275	2044	5,652	4,010
48	38	1.00	55	9.6	112.6	222	2501	2275	6,424	4,593
50	40	1.00	56	9.8	119.4	229	2723	2501	7,215	5,197
52	42	1.00	58	9.9	125.7	236	2941	2723	8,022	5,819
54	44	1.00	60	10.0	131.8	241	3154	2941	8,842	6,456
56	46	1.00	62	10.1	137.7	245	3364	3154	9,671	7,105
58	48	1.00	63	10.3	143.2	249	3569	3364	10,508	7,764
60	50	1.00	65	10.4	148.6	253	3771	3569	11,350	8,431
62	52	1.00	67	10.5	153.7	256	3968	3771	12,193	9,103
64	54	1.00	68	10.6	158.6	259	4161	3968	13,035	9,777
66	56	1.00	69	10.7	163.4	261	4350	4161	13,875	10,452
68	58	1.00	71	10.8	168.0	263	4534	4350	14,710	11,125
70	60	1.00	72	10.9	172.4	265	4715	4534	15,538	11,794
72	62	1.00	73	11.0	176.7	267	4891	4715	16,357	12,458
74	64	1.00	74	11.1	180.9	268	5063	4891	17,166	13,114
76	66	1.00	76	11.2	184.9	270	5232	5063	17,962	13,761
78	68	1.00	77	11.3	188.8	271	5395	5232	18,745	14,397
80	70	1.00	78	11.4	192.6	273	5555	5395	19,512	15,020
82	72	1.00	79	11.5	196.3	274	5711	5555	20,261	15,629
84	74	1.00	80	11.5	199.9	275	5862	5711	20,993	16,222
86	76	1.00	81	11.6	203.4	276	6010	5862	21,704	16,798
88	78	1.00	82	11.7	206.8	278	6153	6010	22,395	17,356
90	80	1.00	83	11.8	210.1	279	6292	6153	23,063	17,895
92	82	1.00	84	11.8	213.3	280	6427	6292	23,708	18,412
94	84	1.00	84	11.9	216.5	282	6557	6427	24,327	18,907
96	86	1.00	85	11.9	219.6	283	6684	6557	24,921	19,378
98	88	1.00	86	12.0	222.6	285	6806	6684	25,488	19,825
100	90	1.00	87	12.0	225.5	286	6925	6806	26,026	20,246

Douglas fir *DNR #41 Base 50* — Site Index 65 — Douglas fir *Base 50*

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Douglas Fir — Base 50

Site Index 70 — Reflects DNR Ownership — Site Index 70 — 72

Total Age	BH Age	PNB	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre 7"+	Gross Cu. Ft. 7"+	Net 4" Cu. Ft. 7"+	Scrib 6" Board Feet 16' log	Scrib 6" Board Feet 32' log	
30	20	1.00	35	8.6	38.2	95	518	234	946	627	
32	22	1.00	38	8.7	50.7	122	797	518	1,538	1,028	
34	24	1.00	41	8.9	62.1	144	1073	797	2,183	1,474	
36	26	1.00	44	9.0	72.5	162	1344	1073	2,878	1,963	
38	28	1.00	47	9.2	82.2	178	1611	1344	3,621	2,496	
40	30	1.00	49	9.4	91.3	191	1874	1611	4,407	3,069	
42	32	1.00	52	9.5	99.7	202	2133	1874	5,233	3,681	
44	34	1.00	54	9.7	107.6	211	2388	2133	6,094	4,328	
46	36	1.00	56	9.8	115.1	219	2638	2388	6,986	5,006	
48	38	1.00	59	10.0	122.2	226	2885	2638	7,904	5,713	
50	40	1.00	61	10.1	128.9	231	3127	2885	8,846	6,445	7,727
52	42	1.00	63	10.3	135.3	236	3365	3127	9,806	7,199	
54	44	1.00	65	10.4	141.4	240	3599	3365	10,782	7,971	
56	46	1.00	67	10.5	147.2	243	3828	3599	11,769	8,758	
58	48	1.00	68	10.7	152.8	246	4054	3828	12,766	9,558	
60	50	1.00	70	10.8	158.1	248	4276	4054	13,768	10,367	11,400
62	52	1.00	72	10.9	163.3	250	4493	4276	14,774	11,182	
64	54	1.00	73	11.1	168.2	252	4706	4493	15,780	12,002	
66	56	1.00	75	11.2	173.0	253	4915	4706	16,785	12,823	
68	58	1.00	76	11.3	177.6	254	5120	4915	17,785	13,644	
70	60	1.00	78	11.4	182.0	255	5321	5120	18,779	14,462	15,804
72	62	1.00	79	11.5	186.3	256	5517	5321	19,765	15,274	
74	64	1.00	80	11.7	190.4	257	5710	5517	20,741	16,080	
76	66	1.00	82	11.8	194.5	257	5898	5710	21,704	16,876	
78	68	1.00	83	11.9	198.4	258	6082	5898	22,654	17,662	
80	70	1.00	84	12.0	202.2	258	6262	6082	23,588	18,435	
82	72	1.00	85	12.1	205.9	259	6438	6262	24,506	19,194	
84	74	1.00	86	12.2	209.4	259	6609	6438	25,405	19,937	
86	76	1.00	87	12.3	212.9	260	6777	6609	26,284	20,663	
88	78	1.00	88	12.3	216.3	260	6940	6777	27,142	21,370	
90	80	1.00	89	12.4	219.6	261	7100	6940	27,977	22,057	
92	82	1.00	90	12.5	222.9	261	7255	7100	28,789	22,722	
94	84	1.00	91	12.6	226.0	262	7406	7255	29,576	23,365	
96	86	1.00	92	12.7	229.1	262	7552	7406	30,336	23,984	
98	88	1.00	93	12.7	232.1	263	7695	7552	31,069	24,577	
100	90	1.00	94	12.8	235.1	264	7833	7695	31,773	25,144	27,370

Douglas fir — Site Index 70 — Douglas fir

DNR #41 Base 50 — Base 50

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Douglas Fir — Base 50

Site Index 75 — Reflects DNR Ownership — Site Index 75

Total Age	BH Age	PNB	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre 7"+	Gross Cu. Ft. 7"+	Net 4" Cu. Ft. 7"+	Scrib 6" Board Feet 16' log	Scrib 6" Board Feet 32' log
30	21	1.00	39	8.8	53.5	126	870	568	1,697	1,127
32	23	1.00	42	9.0	65.4	148	1168	870	2,419	1,626
34	25	1.00	45	9.2	76.3	166	1461	1168	3,204	2,181
36	27	1.00	48	9.4	86.4	181	1751	1461	4,047	2,790
38	29	1.00	51	9.5	95.7	193	2036	1751	4,944	3,449
40	31	1.00	54	9.7	104.4	204	2317	2036	5,890	4,156
42	33	1.00	57	9.9	112.6	212	2594	2317	6,878	4,906
44	35	1.00	59	10.0	120.3	219	2867	2594	7,904	5,696
46	37	1.00	62	10.2	127.6	225	3135	2867	8,963	6,520
48	39	1.00	64	10.4	134.5	229	3400	3135	10,050	7,376
50	41	1.00	66	10.5	141.0	233	3660	3400	11,161	8,258
52	43	1.00	68	10.7	147.3	236	3916	3660	12,291	9,164
54	45	1.00	70	10.8	153.2	239	4168	3916	13,437	10,089
56	47	1.00	72	11.0	158.9	241	4416	4168	14,596	11,031
58	49	1.00	74	11.2	164.4	242	4660	4416	15,763	11,985
60	51	1.00	76	11.3	169.6	243	4900	4660	16,936	12,949
62	53	1.00	78	11.4	174.6	244	5135	4900	18,112	13,919
64	55	1.00	79	11.6	179.5	245	5366	5135	19,288	14,894
66	57	1.00	81	11.7	184.2	245	5594	5366	20,462	15,869
68	59	1.00	82	11.9	188.7	245	5816	5594	21,631	16,844
70	61	1.00	84	12.0	193.0	245	6035	5816	22,793	17,816
72	63	1.00	85	12.1	197.3	245	6250	6035	23,946	18,782
74	65	1.00	87	12.3	201.4	245	6461	6250	25,089	19,740
76	67	1.00	88	12.4	205.3	245	6667	6461	26,219	20,688
78	69	1.00	89	12.5	209.2	245	6869	6667	27,334	21,625
80	71	1.00	91	12.6	212.9	245	7067	6869	28,433	22,548
82	73	1.00	92	12.7	216.6	244	7261	7067	29,515	23,457
84	75	1.00	93	12.9	220.1	244	7451	7261	30,577	24,349
86	77	1.00	94	13.0	223.5	244	7637	7451	31,619	25,222
88	79	1.00	95	13.1	226.9	244	7818	7637	32,639	26,076
90	81	1.00	96	13.2	230.2	244	7995	7818	33,636	26,909
92	83	1.00	97	13.3	233.4	244	8169	7995	34,608	27,719
94	85	1.00	98	13.3	236.5	244	8338	8169	35,555	28,506
96	87	1.00	99	13.4	239.5	244	8503	8338	36,475	29,267
98	89	1.00	100	13.5	242.5	244	8663	8503	37,366	30,002
100	91	1.00	101	13.6	245.4	244	8820	8663	38,228	30,709

Douglas fir DNR #41 Base 50 — Site Index 75 — Douglas fir Base 50

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Douglas Fir — Base 50

Site Index 105 — Reflects DNR Ownership — Site Index 105

Total Age	BH Age	PNB	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre 7"+	Gross Cu. Ft. 7"+	Net 4" Cu. Ft. 7"+	Scrib 6" Board Feet 16' log	Scrib 6" Board Feet 32' log
30	22	1.00	56	10.0	102.9	187	2352	1931	6,035	4,148
32	24	1.00	61	10.3	114.3	197	2769	2352	7,631	5,360
34	26	1.00	65	10.6	124.8	204	3182	2769	9,337	6,686
36	28	1.00	69	10.9	134.5	209	3590	3182	11,139	8,113
38	30	1.00	73	11.1	143.5	212	3994	3590	13,023	9,631
40	32	1.00	77	11.4	152.0	214	4395	3994	14,979	11,228
42	34	1.00	80	11.7	159.9	215	4791	4395	16,996	12,896
44	36	1.00	84	12.0	167.4	215	5183	4791	19,066	14,624
46	38	1.00	87	12.2	174.5	214	5570	5183	21,180	16,406
48	40	1.00	91	12.5	181.2	213	5954	5570	23,331	18,233
50	42	1.00	94	12.7	187.6	212	6333	5954	25,513	20,099
52	44	1.00	97	13.0	193.7	210	6708	6333	27,719	21,997
54	46	1.00	100	13.3	199.5	208	7080	6708	29,945	23,922
56	48	1.00	102	13.5	205.1	206	7447	7080	32,185	25,869
58	50	1.00	105	13.8	210.4	203	7809	7447	34,435	27,832
60	52	1.00	108	14.0	215.5	201	8168	7809	36,691	29,808
62	54	1.00	110	14.3	220.5	198	8523	8168	38,949	31,792
64	56	1.00	112	14.5	225.2	196	8873	8523	41,207	33,781
66	58	1.00	115	14.8	229.8	193	9219	8873	43,460	35,771
68	60	1.00	117	15.0	234.3	191	9561	9219	45,706	37,759
70	62	1.00	119	15.2	238.6	188	9899	9561	47,943	39,742
72	64	1.00	121	15.5	242.7	186	10233	9899	50,168	41,717
74	66	1.00	123	15.7	246.7	184	10563	10233	52,379	43,683
76	68	1.00	125	15.9	250.6	181	10888	10563	54,574	45,636
78	70	1.00	127	16.1	254.4	179	11209	10888	56,752	47,574
80	72	1.00	129	16.4	258.1	177	11526	11209	58,910	49,497
82	74	1.00	131	16.6	261.7	175	11840	11526	61,047	51,401
84	76	1.00	132	16.8	265.2	173	12148	11840	63,163	53,286
86	78	1.00	134	17.0	268.6	171	12453	12148	65,255	55,149
88	80	1.00	136	17.2	271.9	169	12754	12453	67,322	56,989
90	82	1.00	137	17.4	275.2	167	13050	12754	69,364	58,805
92	84	1.00	139	17.6	278.3	165	13342	13050	71,379	60,596
94	86	1.00	140	17.8	281.4	163	13631	13342	73,367	62,361
96	88	1.00	142	18.0	284.4	162	13914	13631	75,327	64,097
98	90	1.00	143	18.1	287.3	160	14194	13914	77,257	65,805
100	92	1.00	144	18.3	290.2	159	14470	14194	79,158	67,484

Douglas fir — DNR #41 — Base 50

Site Index 105

Douglas fir — Base 50

81 D McDuff - 112

Douglas Fir — Base 50

Site Index 110 — Reflects DNR Ownership — Site Index 110 — 112

Total Age	BH Age	PNB	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre 7"+	Gross Cu. Ft. 7"+	Net 4" Cu. Ft. 7"+	Scrib 6" Board Feet 16' log	Scrib 6" Board Feet 32' log	
30	22	1.00	59	10.2	108.9	191	2574	2133	6,854	4,745	
32	24	1.00	63	10.5	120.3	199	3011	2574	8,613	6,097	
34	26	1.00	68	10.8	130.8	205	3444	3011	10,488	7,572	
36	28	1.00	72	11.1	140.5	209	3873	3444	12,463	9,154	
38	30	1.00	76	11.4	149.5	211	4297	3873	14,525	10,832	
40	32	1.00	80	11.7	158.0	212	4718	4297	16,660	12,593	
42	34	1.00	84	12.0	165.9	212	5134	4718	18,859	14,428	
44	36	1.00	88	12.3	173.4	211	5546	5134	21,112	16,326	
46	38	1.00	91	12.5	180.5	210	5954	5546	23,410	18,280	
48	40	1.00	95	12.8	187.2	209	6358	5954	25,746	20,280	
50	42	1.00	98	13.1	193.6	207	6757	6358	28,113	22,321	23,688
52	44	1.00	101	13.4	199.7	204	7153	6757	30,504	24,394	
54	46	1.00	104	13.7	205.5	202	7544	7153	32,914	26,495	
56	48	1.00	107	13.9	211.1	199	7931	7544	35,339	28,617	
58	50	1.00	110	14.2	216.4	197	8314	7931	37,772	30,756	
60	52	1.00	113	14.5	221.5	194	8693	8314	40,211	32,907	34,644
62	54	1.00	115	14.7	226.5	191	9068	8693	42,652	35,066	
64	56	1.00	118	15.0	231.2	189	9438	9068	45,090	37,228	
66	58	1.00	120	15.3	235.8	186	9805	9438	47,523	39,392	
68	60	1.00	123	15.5	240.3	183	10167	9805	49,948	41,552	
70	62	1.00	125	15.8	244.6	180	10525	10167	52,363	43,706	45,785
72	64	1.00	127	16.0	248.7	178	10879	10525	54,764	45,852	
74	66	1.00	129	16.3	252.7	175	11229	10879	57,150	47,987	
76	68	1.00	131	16.5	256.6	173	11575	11229	59,519	50,109	
78	70	1.00	133	16.7	260.4	170	11916	11575	61,869	52,215	
80	72	1.00	135	17.0	264.1	168	12253	11916	64,199	54,304	
82	74	1.00	137	17.2	267.7	166	12587	12253	66,507	56,373	
84	76	1.00	139	17.4	271.2	164	12916	12587	68,791	58,422	
86	78	1.00	141	17.7	274.6	162	13241	12916	71,051	60,448	
88	80	1.00	142	17.9	277.9	160	13561	13241	73,286	62,451	
90	82	1.00	144	18.1	281.1	158	13878	13561	75,494	64,429	
92	84	1.00	146	18.3	284.3	156	14190	13878	77,674	66,381	
94	86	1.00	147	18.5	287.4	154	14499	14190	79,827	68,305	
96	88	1.00	149	18.7	290.4	152	14803	14499	81,950	70,202	
98	90	1.00	150	18.9	293.3	151	15103	14803	84,045	72,069	
100	92	1.00	152	19.1	296.2	149	15399	15103	86,109	73,906	76,875

Douglas fir — Site Index 110 — Douglas fir

DNR #41 Base 50 — Base 50

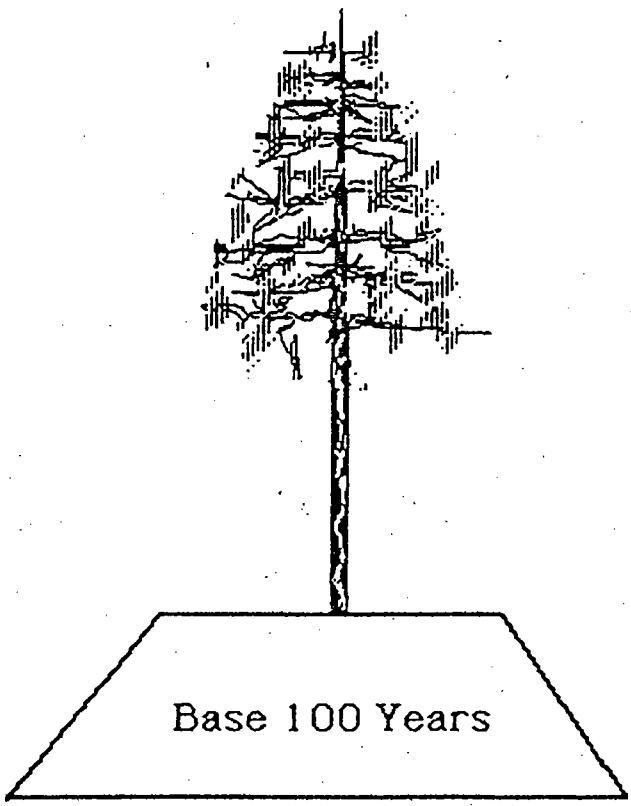
7-7

EXHIBIT 7.5

THE YIELD TABLE

OF

PONDEROSA PINE



Base 100 Ponderosa Pine Site Index Tables

121

Site Index		90	95	100	105			110	115			120	125
Tot. Age	BH Age	Site Ht. feet	Site Ht. feet	Site Ht. feet	Site Ht. feet	Tot. Age	BH Age	Site Ht. feet	Site Ht. feet	Tot. Age	BH Age	Site Ht. feet	Site Ht. feet
20	7	27	28	30	31	20	8	33	36	20	9	39	40
25	12	34	36	37	39	25	13	41	45	25	14	51	53
30	17	40	42	44	47	30	18	49	53	30	19	63	66
35	22	44	47	49	52	35	23	54	57	35	24	59	62
40	27	49	52	55	57	40	28	60	63	40	29	66	69
45	32	53	57	60	63	45	33	66	69	45	34	72	75
50	37	58	61	64	67	50	38	71	74	50	39	77	81
55	42	62	65	68	72	55	43	75	79	55	44	82	86
60	47	65	69	73	76	60	48	80	84	60	49	87	91
65	52	69	73	76	80	65	53	84	88	65	54	92	96
70	57	72	76	80	84	70	58	88	92	70	59	97	101
75	62	75	80	84	88	75	63	92	97	75	64	101	105
80	67	78	83	87	92	80	68	96	101	80	69	105	109
85	72	81	86	90	95	85	73	100	104	85	74	109	114
90	77	84	89	94	98	90	78	103	108	90	79	113	117
95	82	87	92	97	102	95	83	107	111	95	84	116	121
100	87	90	95	100	105	100	88	110	115	100	89	120	125
105	92	92	97	103	108	105	93	113	118	105	94	123	129
110	97	95	100	105	111	110	98	116	121	110	99	127	132
115	102	97	103	108	114	115	103	119	124	115	104	130	135
120	107	100	105	111	116	120	108	122	127	120	109	133	139
125	112	102	108	113	119	125	113	125	130	125	114	136	142
130	117	104	110	116	122	130	118	127	133	130	119	139	145
135	122	106	112	118	124	135	123	130	136	135	124	142	148
140	127	108	114	120	127	140	128	133	139	140	129	145	151
145	132	110	117	123	129	145	133	135	141	145	134	147	154
150	137	113	119	125	131	150	138	137	144	150	139	150	156
155	142	114	121	127	133	155	143	140	146	155	144	153	159
160	147	116	123	129	136	160	148	142	149	160	149	155	161

Ibid Ponderosa Pine Site Index Tables

7-9

108c Philomath - 104

Ponderosa Pine

Site Index 105 — Base 100 Site Index 105 — 104

Total Age	BH Age	Norm.	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre	Gross Cu.Ft.	Net 4" Cu.Ft.	Scrib 6" Bd Ft	
20	10	1.00	31	4.2	111	1,170	1455	486		
25	15	1.00	39	5.3	144	944	2242	1235		
30	20	1.00	47	6.1	169	820	2983	1976		
35	25	1.00	52	6.9	188	728	3670	2683	2,979	
40	30	1.00	57	7.6	204	651	4304	3349	6,116	
45	35	1.00	63	8.2	215	583	4891	3971	9,301	
50	40	1.00	67	8.9	225	523	5434	4553	12,488	11,992
55	45	1.00	72	9.5	231	469	5938	5095	15,647	
60	50	1.00	76	10.1	236	422	6406	5601	18,760	18,155
65	55	1.00	80	10.8	240	380	6841	6073	21,814	
70	60	1.00	84	11.4	243	344	7246	6513	24,802	24,099
75	65	1.00	88	12.0	244	311	7624	6924	27,718	
80	70	1.00	92	12.6	245	283	7978	7307	30,559	
85	75	1.00	95	13.2	245	258	8308	7665	33,322	
90	80	1.00	98	13.8	245	235	8618	7998	36,008	
95	85	1.00	102	14.4	245	216	8907	8310	38,616	
100	90	1.00	105	15.0	244	199	9179	8601	41,146	40,187
105	95	1.00	108	15.6	243	183	9434	8873	43,600	
110	100	1.00	111	16.2	242	170	9674	9126	45,977	
115	105	1.00	114	16.7	241	157	9899	9362	48,281	
120	110	1.00	116	17.3	240	147	10111	9583	50,513	
125	115	1.00	119	17.9	238	137	10310	9789	52,674	
130	120	1.00	122	18.4	237	128	10498	9980	54,768	
135	125	1.00	124	19.0	236	121	10675	10159	56,795	
140	130	1.00	127	19.5	236	114	10843	10326	58,758	
145	135	1.00	129	20.0	235	107	11000	10482	60,660	
150	140	1.00	131	20.5	234	102	11150	10627	62,503	
155	145	1.00	133	21.0	234	97	11291	10763	64,290	
160	150	1.00	136	21.5	233	92	11426	10890	66,023	

1" delay SITE INDEX 121

Ponderosa Pine

Site Index 120 — Base 100 — Site Index 120 — 121

Total Age	BH Age	Norm.	Site Height feet	Ave. DBH inches	Per Acre Data: Basal Area sq ft	Trees /Acre	Gross Cu.Ft.	Net 4" Cu.Ft.	Scrib 6" Bd Ft
20	10	1.00	36	5.3	126	813	2126	1032	
25	15	1.00	45	6.5	160	695	3110	1992	341
30	20	1.00	53	7.4	186	622	4024	2917	4,316
35	25	1.00	59	8.2	206	563	4865	3786	8,456
40	30	1.00	66	8.9	222	510	5640	4597	12,639
45	35	1.00	72	9.6	235	462	6356	5352	16,803
50	40	1.00	77	10.3	244	419	7018	6054	20,912 21533
55	45	1.00	82	11.0	252	379	7632	6707	24,945
60	50	1.00	87	11.7	257	344	8202	7316	28,889 29,628
65	55	1.00	92	12.4	261	312	8734	7883	32,737
70	60	1.00	97	13.1	264	284	9230	8412	36,486 37334
75	65	1.00	101	13.7	266	259	9694	8906	40,134
80	70	1.00	105	14.4	267	236	10128	9367	43,680
85	75	1.00	109	15.1	267	216	10535	9798	47,124
90	80	1.00	113	15.7	267	199	10917	10201	50,468
95	85	1.00	116	16.4	267	183	11276	10578	53,714
100	90	1.00	120	17.0	266	169	11614	10931	56,862 57,990
105	95	1.00	123	17.6	265	156	11931	11260	59,917
110	100	1.00	127	18.3	264	145	12230	11569	62,880
115	105	1.00	130	18.9	263	135	12512	11858	65,753
120	110	1.00	133	19.5	262	126	12779	12128	68,540
125	115	1.00	136	20.1	261	118	13030	12381	71,243
130	120	1.00	139	20.8	260	111	13267	12617	73,864
135	125	1.00	142	21.4	259	104	13492	12839	76,408
140	130	1.00	145	21.9	258	98	13704	13047	78,877
145	135	1.00	147	22.5	257	93	13905	13241	81,273
150	140	1.00	150	23.1	257	88	14096	13423	83,600
155	145	1.00	153	23.7	256	84	14277	13594	85,860
160	150	1.00	155	24.2	256	80	14449	13755	88,058

Ponderosa Pine
CZ FMSS 1974

Site Index 120

Ponderosa Pine
Base 100

7-11

EXHIBIT "I"

EXHIBIT 8

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February 23, 2004

Lane County Planning Commission

RE: Lane County File #PA 03-5657, Dahlen; Response to Goal One Coalition Letter dated February 5, 2004

Members of the Planning Commission:

In conjunction with my Forest Productivity Analysis, completed in December, 2003, I have enclosed the following written response to a letter written by Jim Just of Goal One Coalition. I have addressed each issue as presented in the letter, most of which I have already addressed in my analysis. I am answering these questions as a qualified, Society of American Foresters Certified Professional Forester (#2953), with 27 years of experience including 17 years as a consultant, with Bachelor of Science (Cal Poly, SLO) and Master of Forestry (Oregon State) Degrees. As a consultant I have extensive experience in drawing up forest management plans, handling the administration of these plans and the merchandising of logs to maximize the return to my clients.

Following are responses to questions raised in Goal One Letter:

Mr. Just states that my report does not assert that NRCS data are not available for soils on the subject parcel, and does not assert or show that NRCS data are inaccurate. Therefore no alternative method for determining productivity, including income potential, can be used.

I did not make either of these assertions in my report; Jim Belknap did all of the cu.ft./ac./yr. calculations using only the data from the 1997 Lane County Soil Ratings for Forestry and Agriculture. No alternative methodology was used.

Mr. Just then presents a table of his own to show the parcel in question is capable of producing 155.40 cf/ac/yr. I have compiled six separate tables for comparison, all using SCS/NRCS data (the NRCS is the new name for the SCS; same entity). I have also included ponderosa pine figures for the soil types Jim Just provides site index figures for; even though he provides no exhibits showing where these site indexes come from. Before introducing these tables some clarification on data used by Jim Just must be presented.

1) KMX as a "merchantable" species (see ORS 197.247(1)(b)(C)). KMX is a hybrid cross between knobcone pine and Monterey pine. It would grow well on this site. However, knobcone pine is small and slow growing, it is valuable as a ground cover to shelter more valuable trees after a forest fire. It has no commercial value. Monterey pine is a taller tree used as ornamentals or for windbreaks. It has no commercial value. The cross between the two is used primarily to grow trees on marginal sites where trees are desired for ornamental, aesthetic or other reasons. There is no current commercial market for this species.

2) Hybrid poplar as a "merchantable" species. There currently is no market for poplar. In the past there was a market for the chips; that has ceased to exist. The other argument which could be raised is that you can buy "poplar" boards at several locations in the area. The poplar being sold is called yellow poplar and comes from the tulip tree grown in the southeast portion of the country. Poplar would also not grow on the site in question due to moisture constraints.

3) After stating that an alternative method (to NRCS data and/or Dept. of Forestry methodology) for determining productivity cannot be used, Mr. Just presents estimates of cf/ac/yr data with no supporting tables or exhibits.

4) Mr. Just has compiled his table from multiple sources, including figures from the 1990 Office of State Forester Memorandum, General File 7-1-1. He has used these figures after stating in an earlier rebuttal letter to Lane County (see Lane County File #PA 02-5838, Ogle), that this file does not exist.

Using 1997 Lane County Soil Ratings for Forestry and Agriculture (NRCS Data).

Soil Unit	Acres	Species	Site Index	Cf/Ac/Yr	Total Cu.Ft. Productivity
28C	79.842	DF	NA	none	0
41C	12.157	DF	109	152	1,847.864
43C	10.161	DF	NA	54	548.694
43E	28.514	DF	NA	63	1,796.382
52D	13.864	DF	NA	none	0
78	15.009	DF	NA	none	0
102C	34.574	DF	NA	none	0
105A	11.637	DF	NA	none	0
108C	9.746	DF	NA	none	0
113C	0.371	DF	107	149	55.279
125C	9.042	DF	NA	none	0
125D	3.950	DF	NA	none	0
135E	27.358	DF	110	154	4,213.132
138E	27.256	DF	NA	none	0
138G	37.011	DF	NA	none	0
	320.492				8,461.351

Total - 8,461.351 cu.ft. ÷ 320.492 ac. = 26.401 cf./ac./yr.

Using Lane County "Green Sheet" Soil Ratings (SCS Data).

Soil Unit	Acres	Species	Site Index	Cf/Ac/Yr	Total Cu.Ft. Productivity
28C	79.842	DF	NA	40	3,193.680
41C	12.157	DF	97	130	1,580.410
43C	10.161	DF	NA	45	457.245
43E	28.514	DF	NA	45	1,283.130
52D	13.864	DF	NA	40	554.560
78	15.009	DF	125	184	2,761.656
102C	34.574	DF	NA	45	1,555.830
105A	11.637	DF	NA	45	523.665
108C	9.746	DF	NA	45	438.570
113C	0.371	DF	102	140	51.940
125C	9.042	DF	NA	30	271.260
125D	3.950	DF	NA	30	118.500
135E	27.358	DF	110	154	4,213.132
138E	27.256	DF	NA	70	1,907.920
138G	37.011	DF	NA	70	2,590.770
	320.492				21,502.268

Total - 21,502.268 cu.ft. ÷ 320.492 ac. = 67.091 cf./ac./yr.

8.2

Using Office of State Forester Forest Soil Ratings Memorandum (SCS Data).

Soil Unit	Acres	Species	Site Index	Cf/Ac/Yr	Total Cu.Ft. Productivity
28C	79.842	DF	NA	40	3,193.680
41C	12.157	DF	120	115	1,398.055
43C	10.161	DF	NA	45	457.245
43E	28.514	DF	NA	45	1,283.130
52D	13.864	DF	NA	40	554.560
78	15.009	DF	159	169	2,536.521
102C	34.574	DF	NA	45	1,555.830
105A	11.637	DF	NA	45	523.665
108C	9.746	DF	NA	45	438.570
113C	0.371	DF	131	131	48.601
125C	9.042	DF	NA	30	271.260
125D	3.950	DF	NA	30	118.500
135E	27.358	DF	160	170	4,650.860
138E	27.256	DF	90	70	1,907.920
138G	37.011	DF	90	70	2,590.770
	320.492				21,529.167

Total - 21,529.167 cu.ft. ÷ 320.492 ac. = 67.175 cf./ac./yr.

Selecting the highest productivity figures from the three tables presented.

Soil Unit	Acres	Species	Site Index	Cf/Ac/Yr	Total Cu.Ft. Productivity
28C	79.842	DF	NA	40	3,193.680
41C	12.157	DF	109	152	1,847.864
43C	10.161	DF	NA	54	548.694
43E	28.514	DF	NA	63	1,796.382
52D	13.864	DF	NA	40	554.560
78	15.009	DF	125	184	2,761.656
102C	34.574	DF	NA	45	1,555.830
105A	11.637	DF	NA	45	523.665
108C	9.746	DF	NA	45	438.570
113C	0.371	DF	107	149	55.279
125C	9.042	DF	NA	30	271.260
125D	3.950	DF	NA	30	118.500
135E	27.358	DF	160	170	4,650.860
138E	27.256	DF	90	70	1,907.920
138G	37.011	DF	90	70	2,590.770
	320.492				22,815.490

Total - 22,815.490 cu.ft. ÷ 320.492 ac. = 71.189 cf./ac./yr.

8-3

Selecting the highest productivity figures from all tables, then including ponderosa pine figures (with no exhibits to show where this figures came from) as presented by Mr. Just.

Soil Unit	Acres	Species	Site Index	Cf/Ac/Yr	Total Cu.Ft. Productivity
28C	79.842	DF	NA	40	3,193.680
41C	12.157	DF	109	152	1,847.864
43C	10.161	DF	NA	54	548.694
43E	28.514	DF	NA	63	1,796.382
52D	13.864	PP	92	113	1,566.632
78	15.009	DF	125	184	2,761.656
102C	34.574	DF	NA	45	1,555.830
105A	11.637	DF	NA	45	523.665
108C	9.746	PP	104	141	1,374.186
113C	0.371	DF	107	149	55.279
125C	9.042	DF	NA	30	271.260
125D	3.950	DF	NA	30	118.500
135E	27.358	DF	160	170	4,650.860
138E	27.256	DF	90	70	1,907.920
138G	37.011	DF	90	70	2,590.770
	320.492				24,763.178

Total - 24,763.178 cu.ft. ÷ 320.492 ac. = 77.266 cf./ac./yr.

Selecting the highest productivity figures from all tables, then including ponderosa pine figures from the Office of State Forester Forest Soil Ratings Memorandum (SCS Data).

Soil Unit	Acres	Species	Site Index	Cf/Ac/Yr	Total Cu.Ft. Productivity
28C	79.842	DF	NA	40	3,193.680
41C	12.157	DF	109	152	1,847.864
43C	10.161	DF	NA	54	548.694
43E	28.514	DF	NA	63	1,796.382
52D	13.864	PP	92	88	1,220.032
78	15.009	DF	125	184	2,761.656
102C	34.574	DF	NA	45	1,555.830
105A	11.637	DF	NA	45	523.665
108C	9.746	PP	104	110	1,072.060
113C	0.371	DF	107	149	55.279
125C	9.042	DF	NA	30	271.260
125D	3.950	DF	NA	30	118.500
135E	27.358	DF	160	170	4,650.860
138E	27.256	DF	90	70	1,907.920
138G	37.011	DF	90	70	2,590.770
	320.492				24,114.452

Total - 24,114.452 cu.ft. ÷ 320.492 ac. = 75.242 cf./ac./yr.

All of these tables presented show the subject property produces less than 85 cu. ft./ac./yr. of "merchantable" timber volume. This has been determined by Lane County, and the State of Oregon, to be the measuring parameter for marginal soils.

8-4

EXHIBIT 9

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September 8, 2004

Lane County Board of Commissioners

RE: Lane County File #PA 02-5838, Ogle; Response to Goal One Coalition Letters dated August 6 and 19, 2004

Members of the Board of Commissioners:

In conjunction with my testimony, which I presented on Wednesday afternoon, July 14, 2004, and my letter dated July 26, 2004, I have enclosed the following written reponse to the August 6 and 19 Goal One letters written by Jim Just. I have addressed each issue as presented in the letters, most of which I also addressed with my testimony. I am answering these questions as a qualified, Society of American Foresters Certified Professional Forester (#2953), with 27 years of experience including 17 years as a consultant, with Bachelor of Science (Cal Poly, SLO) and Master of Forestry (Oregon State) Degrees.

Responses to questions raised in August 6, 2004, letter from Goal One.

Page 2: Mr. Just states that I have reclassified a substantial portion of the NRCS-identified 107 and 108 Philomath units. From an on site analysis I am stating that these areas of extremely thin soils over rock, with exposed rock showing in many places, are incapable of supporting tree growth. Trees are not growing there now; trees were not growing there 55 years ago (see Photo Exhibits 1-1 and 2). I am not retyping the soils, I am making an **on site observation** that trees will not grow here; the primary reason being that the soil depth is limited, or nonexistent due to rock. There is not enough soil for tree roots to establish themselves.

Page 3: Mr. Just cites Land Use Planning Notes Number 3, April 1998, as the methodology for determining site productivity. Number 1 is that plots must be taken to measure productivity of a soil type. This is true. This is how the NRCS and ODF have arrived at the productivity figures which are published in their tables. These are the productivity figures I am using, I am not trying to create new productivity tables. I am simply taking site trees as described in step number 2, so that I can then use the productivity tables. I **have not** deviated from the methodology as described in these notes.

Page 4: Mr. Just states that I do not provide any productivity data for the "grassland with exposed rock". From an on site analysis and aerial photos from 1952 and 2000, it can be seen that trees have not grown in these areas for the last 55 years (see Exhibits 1 and 2). Since the 1952 photos show no trees it can logically be assumed that trees did not grow for a time period prior to this. The same conditions exist today that existed 55 years ago; very thin soils on top of rock, with not enough soil for a tree to establish a root system. For these reasons I have assigned a productivity rating of "0" to these areas (see Exhibit 1-1)

Mr. Just then states that I concede no site trees were measured. This is not true. I **state** in my July 26th letter that I bored site trees on the property. I did not bore site trees in the grassland areas because **no trees exist** to bore. He then states that a more detailed soil survey is required. I am not changing a soil type; I am merely stating that from a site analysis, and looking at aerial photos, no trees have grown in these areas as far back as the records go and are not growing there now.

9.1

Page 4: Mr. Just states I do not give a date for my site analysis; I visited the property on **July 26, 2004**. At this time I bored ten site trees (shown on page 3). I have visited the site previously; this is the date I bored site trees. From a forestry standpoint this is the accepted standard for industry and the U.S. Forest Service as well. This is also the standard as cited by Mr. Just (see page 4 of his August 6th letter).

Page 4: Mr. Just states I did not submit a soils report; I **will repeat again** that I am not determining a soil type, I am making a **site specific** observation that no trees are growing in these areas. I have included aerial photos delineating the areas under discussion (see Exhibits 1 and 2). The approximate scale for these photos has also been included on the photos. I bored the site trees in the areas underlaid by the Philomath soils (107C and 108F). I bored **ponderosa pine in these areas (soil types 107C and 108F)** because Mr. Just has accepted the **Douglas-fir** growth figures from Lane County Soil tables for the other soils; the McDuff clay loam (81D), the Panther silty clay loam (102C) and the Ritner cobbly silty clay loam (113E & G). These soils have a high growth rate for Douglas-fir; in fact Douglas-fir growth will exceed ponderosa pine growth on the better soils. **At no time** has Mr. Just disagreed with my original Douglas-fir growth figures **for these soils. At no time** has he presented any ponderosa pine growth figures for these soils. Therefore I did not bore ponderosa pine trees on these soil types.

Page 4: Mr. Just states that I have not noted any limitations encountered on the site. **I will repeat again,** from an on site analysis it can be seen that there is exposed rock throughout the property. This would indicate a very thin soil layer. The absence of trees (see aerial photos) would also indicate thin soils; trees need enough soil for roots to establish themselves. These statements are made from a **visual** observation, combined with years of experience trying to establish trees in this type of ground. Trees will not grow from rock or in very shallow soils. I cannot make statements concerning an overview of the geology, bedrock, etc. because I am not a soil scientist. I did not describe on-site and adjacent hydrology, including surface and subsurface features, intermittent versus perennial, flood plain and floodways and other related information because a **water expert has already done so**. The remaining points brought up by Mr. Just, such as describing landforms and topography, confirming the relationship of landforms to soil mapping units, describing revised soil mapping units with their range of characteristics and explaining how and why they differ from NRCS mapping, are confusing. I am not sure what any of this has to do with my on site observation that trees have not, are not and will not grow on the rocky, thin soiled areas. Mr. Just also infers (although this is very confusing) that I have not descibed the site or the natural vegetation present. In my original productivity analysis submitted in December, 2003, I describe the aspect, slopes and vegetation on the parcel. Apparently Mr. Just did not read my original analysis.

Page 4: Following these statements Mr. Just then says that the Philomath soils (107C and 108F) were "typed". He then states that this report (I am not sure which report he is referring to) has not been reviewed by ODF to confirm ODF-approved methodology was followed. I do not understand the point in these statements; I simply used the soil types **as delineated by Lane County** to determine where these soils exist on the subject parcel.

Mr. Just then states that it is not explained how adequately stocked plots were identified and delineated. I have **no idea** what he means by this statement; adequately stocked plots of what? I bored site trees to determine the site index, then used growth figures from tables; I did not cruise the property to determine volumes or stocking levels. If I had it would show much lower volume figures per acre than the tables show, as the productivity tables **assume full stocking**. Full stocking levels are not needed in order to take site trees. To wit: site index determines tree **height**, stocking levels determine tree **diameter.** Tree **diameters are not taken** to determine a site index.

9-2

Last paragraph page 4: The next statement "It has not been that a sufficient number of appropriate dominant or co-dominant site trees selected and sampled for each plot" is indecipherable. I cannot figure out what he is trying to say here. In my July 26th letter (see page 2) I state that I bored trees to determine the site index, however, I did not include the data collected. I am providing the data now (see below). Mr. Just then states that "No data on plot and tariff trees is included in the record". Plots are taken for information on tree species, volume, log grades, etc.; tariff trees are one method of taking sample trees for a cruise. Site trees to determine site index are just that, they are not "plots" or "tariff trees". Site trees are simply individual trees taken within a stand to determine site index; they **do not** have to be taken in plots and tariff trees have **nothing** to do with site index, they are sampled trees which are used to determine **volume** per acre. You **do not** have to take plots or tariff trees to accurately determine site index.

Site index is a function of two factors, climate and soil (see Exhibit 3). Site index (or site quality) is changed only by modifying the soil or climatic factors. Climatic conditions can vary substantially from site to site, this occurs naturally. The soil tables created for growth are extrapolated from huge sample data bases and then averaged for that particular soil. In other words; soil productivity figures for a particular soil are averages for that soil type over a wide range of conditions. These conditions vary from site to site depending on aspect, slope, rainfall, temperature, etc. These are the climatic factors mentioned above. If you take the **same soil** and place it on a north aspect you will get better growth than if the soil is on a south aspect. The **same soil** will produce higher growth in an area of higher rainfall than another area. In short, different conditions on the site produce different growth rates from the same soil. These differences show up in tree growth which can be measured by boring trees to obtain a site index. In other words the growth of the trees is a reflection of the site index; i.e., the **same soil** can have many **different** site index numbers. This is the reason a **site specific** analysis is conducted.

Site Trees Bored on the Site:

Breast Height Age	Total Age*	Total Height	Site Index**
47	54	67'	100
48	55	77'	110
47	54	53'	80
52	59	81'	106
53	60	81'	110
47	54	60'	90
52	59	79'	110
46	53	68'	100
50	57	77'	105
48	55	73'	105
			1,016

Throwing out the lowest site index of 80 leaves 936 ÷ 9 = Site Index 104

*Total age includes adding 7 years, which errs on the optimistic side (see Exhibit 3). You must add between 5 and 10 years to a breast height age; 5 years being Site I ground, 10 years being Site IV ground. The Ogle parcel **is not** Site I ground.
**Interpolated using Meyer's eastern Oregon tables (see Exhibit 3).

From my on site analysis and photo delineation of the soil types (using a light table and overlaying the **Lane County soil maps** on the aerial photos, see Exhibit 1) in question, I have created the following tables. These soil maps are in the record already. To arrive at the acreages shown I used the acres presented by Lane County and took proportions of these acres by dividing the amount of grassland shown on the photo with the acreages presented by the county. Since the counties acreages are the **accepted acreages** this is a more accurate calculation of acres than using the approximate scale shown on the photo.

I used a figure of 110 cf/ac/yr. for the ponderosa pine growth for this site index of 104(see Exhibit 4). If I use the ponderosa pine table presented by Mr. Just (see Exhibit 5), and follow the included directions on how to obtain a growth figure (also Exhibit 5-1) I arrive at a figure of 108 cf/ac/yr for this site class. This figure was obtained using interpolation (see Exhibit 5-3). I will use the higher figure to error on the optimistic side. Using the tables presented by Mr. Just will result in lower figures, therefore I have used the eastern Oregon tables. Mr. Just presents higher figures (141 cf/ac/yr) using a site index of 120. However, he does not show where he obtained a site index of 120.

Note on using eastern Oregon productivity figures: On Page 5 Mr. Just states that I am wrong in using eastern Oregon site index tables because I should be using northern California and southwest Oregon site index tables, which **do not exist according to his own Exhibits** (see Exhibit 5-1). Mr. Just then states that I should be using data compiled from **two very limited** research papers from northern California. I am not sure how limited data from a different state, further away from the Willamette Valley than eastern Oregon, is more appropriate for use than the eastern Oregon tables. I then explain how I come up with my productivity figures; from trees bored on the site, I obtained a site index number using the eastern Oregon site index created by Meyer. I have also explained (see above) that using the tables presented by Mr. Just result in lower productivity numbers.

The DF productivity figures are from both my original tables and Mr. Just's tables.

In Tax Lot 303 there are 8.766 acres within the 107C soil type and 4.715 acres within the 108F soil type which are thin soils over rock; in Tax Lot 304 there are 2.575 acres within the 107C soil type and 1.897 acres within the 108F soil type which are thin soils over rock. These areas have not grown trees for as long as aerial records have been kept (see Exhibits 1 and 2). I have shown these acres on the bottom of each table. I have used 45 cu.ft./ac./yr. for the Panther 102C soil since this is the number shown on the SCS tables (see Exhibit 6).

Note on the Panther 102C soil: On page 5 (Goal One August 6, 2004 letter) Mr. Just states that I am wrong in using 45 cf/ac/yr for the Panther soil unit. I obtained this figure from the most recent table available with a figure. The 1997 Lane County Soil Ratings Table has a rating of none for this soil. Therefore I went back in time to the **most recent** table with a rating. This is the February , 1990 Foresters Memo published by ODF and included with my original analysis. This is the memo that Mr. Just stated unequivocally **did not exist.** He then found an **older** Foresters Memo which has a 50 cf/ac/yr rating. Both of these tables begin by stating that **if a rating has changed, the new number supersedes the old number.** Therefore, I have used 45 cf/ac/yr for the Panther soil.

PRODUCTIVITY TABLES FOR TAX LOTS 303 &304

Tax Lot 303 Growth	Acres	Growth/Year	Total
81D McDuff clay loam	5.600	158 Cu.Ft./Ac.	884.80 Cu.Ft.
102C Panther silty clay loam	1.747	45 Cu.Ft./Ac.	78.615 Cu.Ft.
107C Philomath silty clay*	9.510	110 Cu.Ft./Ac.	1,046.10 Cu.Ft.
108F Philomath cobbly silty clay*	2.327	110 Cu.Ft./Ac.	255.97 Cu.Ft.
113G Ritner cobbly silty clay loam	6.914	149 Cu.Ft./Ac.	1,030.186 Cu.Ft.
Grassland with exposed rock	13.481	0 Cu.Ft./Ac.	0 Cu.Ft.
Totals	39.579		3,295.671 Cu.Ft.

Average Growth Potential -- 39.579 Acres ÷ 3,295.671 Cu.Ft. = 83.268 Cu.Ft./Ac./Yr.

9-4

Tax Lot 304 Growth	Acres	Growth/Year	Total
102C Panther silty clay loam	12.936	45 Cu.Ft./Ac.	582.120 Cu.Ft.
107C Philomath silty clay*	10.278	110 Cu.Ft./Ac.	1,130.580 Cu.Ft.
108F Philomath cobbly silty clay*	3.731	110 Cu.Ft./Ac.	410.410 Cu.Ft.
113G Ritner cobbly silty clay loam	2.741	149 Cu.Ft./Ac.	408.409 Cu.Ft.
Grassland with exposed rock	4.472	0 Cu.Ft./Ac.	0 Cu.Ft.
Totals	34.158		2,531.519 Cu.Ft.

Average Growth Potential -- 34.158 Acres ÷ 2,531.519 Cu.Ft. = 74.112 Cu.Ft./Ac./Yr.

*These growth figures are for ponderosa pine for Site Index 104 (see Exhibit 4). All other growth figures are for Douglas-fir.

A portion of the acres delineated as grassland with exposed rock are underneath the two powerlines crossing the property (see Exhibit 1). These areas will never grow trees due to the power companies continually cutting them down to keep their corridors clear. On page 5 (Goal One Letter) Mr. Just states that just because you cannot grow trees under the powerlines (due to powerline regulations) does not mean I should not consider this ground. Michael Farthing will address this issue.

The productivity tables shown below deduct the remaining powerline acreage, which have no trees at the present time and will not have trees in the future.

Tax Lot 303 Growth	Acres	Growth/Year	Total
81D McDuff clay loam	5.600	158 Cu.Ft./Ac.	884.80 Cu.Ft.
102C Panther silty clay loam	0.287	45 Cu.Ft./Ac.	12.915 Cu.Ft.
107C Philomath silty clay*	7.915	110 Cu.Ft./Ac.	870.650 Cu.Ft.
108F Philomath cobbly silty clay*	2.327	110 Cu.Ft./Ac.	255.970 Cu.Ft.
113G Ritner cobbly silty clay loam	6.914	149 Cu.Ft./Ac.	1,030.186 Cu.Ft.
Powerline	3.055	0 Cu.Ft./Ac.	0 Cu.Ft.
Grassland with exposed rock	13.481	0 Cu.Ft./Ac.	0 Cu.Ft.
Totals	39.579		3,054.521 Cu.Ft.

Average Growth Potential -- 39.579 Acres ÷ 3,054.521 Cu.Ft. = 77.175 Cu.Ft./Ac./Yr.

Tax Lot 304 Growth	Acres	Growth/Year	Total
102C Panther silty clay loam	12.326	45 Cu.Ft./Ac.	554.670 Cu.Ft.
107C Philomath silty clay*	9.329	110 Cu.Ft./Ac.	1,026.190 Cu.Ft.
108F Philomath cobbly silty clay*	2.782	110 Cu.Ft./Ac.	306.020 Cu.Ft.
113G Ritner cobbly silty clay loam	2.741	149 Cu.Ft./Ac.	408.409 Cu.Ft.
Powerline	2.508	0 Cu.Ft./Ac.	0 Cu.Ft.
Grassland with exposed rock	4.472	0 Cu.Ft./Ac.	0 Cu.Ft.
Totals	34.158		2,295.289 Cu.Ft.

Average Growth Potential -- 34.158 Acres ÷ 2,295.289 Cu.Ft. = 67.196 Cu.Ft./Ac./Yr.

*These growth figures are for ponderosa pine for Site Index 104 (see Exhibit 4). All other growth figures are for Douglas-fir.

9.5

EXHIBIT 10

Table 45 - Forest Survey Site Class

This value will be assigned by strata label, and will be the results of the Forest Inventory.

Size = 1; Type = numeric

Code	Potential Yield, Mean Annual Increment
1	225 or more cubic feet per acre
2	165 to 225 cubic feet per acre
3	120 to 165 cubic feet per acre
4	85 to 120 cubic feet per acre
5	50 to 85 cubic feet per acre
6	20 to 50 cubic feet per acre
7	Less than 20 cubic feet per acre

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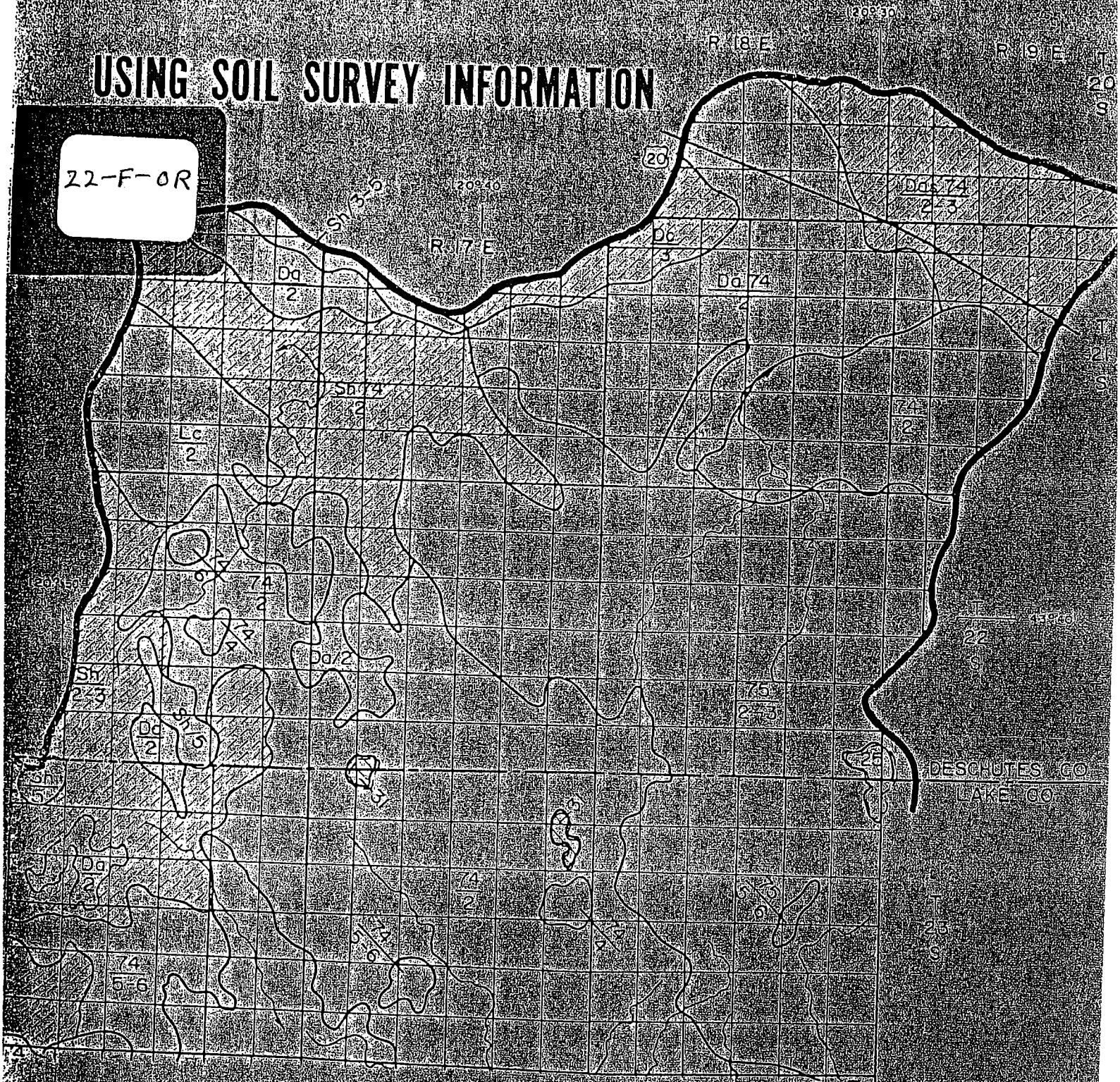
Corresponds to OAR 629-610-0020

A TECHNIQUE FOR MAPPING FOREST LAND BY SITE PRODUCTIVITY USING SOIL SURVEY INFORMATION

EXHIBIT 11

22-F-OR



OREGON STATE DEPARTMENT OF FORESTRY

RESOURCE STUDY TEAM

11-1

A TECHNIQUE FOR MAPPING FOREST LAND BY SITE PRODUCTIVITY USING SOIL SURVEY INFORMATION

Oregon State Department of Forestry
Salem, Oregon
August, 1978

This work was carried out as part of the Oregon Forest Productivity Study supported partially by a grant from the Pacific Northwest Regional Commission.

11-2

FOREST SITE CLASS MAPPING

Introduction

Statewide Land Use Planning Goal #4 charges the counties with the responsibility for determining and mapping their forest land by cubic foot site classes. The U. S. Forest Service manual, "Field Instructions for Integrated Forest Survey and Timber Management Inventories - Oregon, Washington, and California, 1974", is designated as the common source document for these site class determinations. One of the main items of technical assistance the Department of Forestry can provide to counties in development of their comprehensive land use plans is some methodology to meet this inventory responsibility. General and detailed soil maps, prepared by the Soil Conservation Service, Forest Service, and Bureau of Land Management are readily available sources of this land productivity information. This appendix describes how these soil maps can be used to develop an initial inventory of forest lands as needed by county planners to satisfy statewide Land Use Planning Goal #4.

This method is not the sole source of forest land productivity information, but it is the most commonly available source. Other sources include Department of Revenue site class mapping of western Oregon, detailed soil maps done by the various agencies, mapping done by industrial private forest landowners, and local field surveys. These are applicable where available and should be used when they provide more precise information than the general soil maps.

General Soil Map Reports of Oregon's Major Drainage Basins

Drainage basin general soil maps are contained in a series of fifteen separate appendices published by the OSU Agricultural Experiment Station and USDA Soil Conservation Service in cooperation with the Oregon State Water Resources Board as part of a study called "Oregon's Long-Range Requirements for Water". The development of these general soil map reports for each of the major drainage basins reflects current surveys of soils in each area as of 1969.

Each report consists of a general soil map and supporting soil descriptions, interpretations, and acreage figures for the drainage basins. The information in each report is based on published and unpublished soil survey work of the National Cooperative Soil Survey in Oregon with some additional field work. The inventory provides soil information needed for general planning of resource development. A key is included in each report that may be helpful for identifying a soil series on the ground. The key briefly describes those soil series identified in that basin in relation to physiographic features.

Acreage estimates of each soil series or phase occurring within the river basins or within a particular sub-basin or county can be found in tabular form within each general soil map report. Groupings and acreages of soils with similar suitabilities or limitations for particular uses are tabulated. Interpretive ratings for selected soil properties and qualities are summarized and offer a source of comparative data for evaluating impact of proposed changes of forest land to other uses.

The soil interpretations made in these reports relate primarily to water use and management; however, other useful interpretations can be made. The soils can be grouped and rated for additional objectives, such as forestry, in conjunction with the OR-SOILS-1 forms (see Exhibit F for example).

OR-SOILS-1 Forms (OR-1's)

OR-1's, as they are usually called, are prepared for each soil series in Oregon. Each OR-1 describes various soil characteristics (e.g. road fill material, predicted yield, woodland suitability, etc.). A Woodland Suitability section is on the back of the OR-1 form. If the soils described are not rated as suitable for forest production, no information will be entered in the Woodland Suitability section, as is the case for the Snell series in Figure 1.

Figure 1

CONTINUATION SHEET OR-SOILS-1 12/72 SNELL SERIES

WOODLAND SUITABILITY

SOIL	POTENTIAL PRODUCTIVITY		WOOD SUIT. GROUP	MANAGEMENT PROBLEMS					NATIVE SPECIES
	SPECIES	SITE INDEX		EROSION HAZARD	EQUIPMENT LIMIT.	SEEDLING MORTALITY	WINDTHROW HAZARD	PLANT COMPET.	
None									

If the soil type is rated for forest production, the section includes productivity, species, and management information. The excerpt from the Witzel soil series OR-1 in Figure 2 illustrates the information, some of which will be available for a forest soil.

Figure 2

CONTINUATION SHEET OR-SOILS-1 10/76 WITZEL SERIES

WOODLAND SUITABILITY

Soil	POTENTIAL PRODUCTIVITY		WOOD SUIT. GROUP	MANAGEMENT PROBLEMS					NATIVE SPECIES
	SPECIES	SITE INDEX		EROSION HAZARD	EQUIPMENT LIMIT.	SEEDLING MORTALITY	WINDTHROW HAZARD	PLANT COMPET.	
1,3,4,5	Douglas-fir	114	4d	Moderate	Moderate	Severe	Moderate	Severe	Oregon white oak Douglas-fir Incense Cedar Ponderosa Pine
2	Douglas-fir	114	4d	Severe	Severe	Severe	Severe	Severe	

Site index is given in the third column for the species listed in the second column. Site index is an indication of potential productivity without man's management and is based on the average total height of the dominant and codominant trees in the natural stand at the age of 100 years.

Average site index, based on sampling, is given for the listed species. The standard deviation (±) is shown when four or more plots were measured on the listed soil. This is the site information that is used to identify the productivity of an area; its conversion to cubic foot site classes is described later.

The woodland suitability group, in the fourth column, sometimes lists a two-part symbol representing class and subclass. The first element is an arabic numeral representing the site quality class for the species listed in column two. This site quality class should not be confused with cubic foot site class. It is the arbitrary grouping of site indexes found in USDA Technical Bulletin 201 and is not used in the procedures of the methodology section. The second element is a letter expressing selected soil properties associated with moderate or severe hazards or limitations in woodland use or management as follows:

Subclass c represents clayey soils
d restricted rooting depth
f fragmental or skeletal soils
o slight or no limitations
r relief or slope steepness
s sandy soils
t toxic substances
w excessive wetness
x stoniness or rockiness

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In the columns under management problems, the ratings used include slight, moderate, and severe. Definitions of these ratings are as follows:

> Slight soil limitation is the rating given soils that have properties favorable for the rated use. This degree of limitation is minor and can be overcome easily. Good performance and low maintenance can be expected.
>
> Moderate soil limitation is the rating given soils that have properties moderately favorable for the rated use. This degree of limitation can be overcome or modified by special planning, design, or maintenance. During some part of the year the performance of the structure or other planned use is somewhat less desirable than for soils rated slight. Some soils rated moderate require treatment such as artificial drainage, runoff control to reduce erosion, extra excavation, or some modification of certain features through manipulation of the soil.
>
> Severe soil limitation is the rating given soils that have one or more properties unfavorable for the rated use, such as steep slopes, bed-rock near the surface, flooding hazard, high shrink-swell potential, a seasonal high water table, or low bearing strength. This degree of limitation generally requires major soil reclamation, special design, or intensive maintenance. Some of these soils, however, can be improved by reducing or removing the soil feature that limits use. In many situation, however, it is difficult and costly to alter the soil.

Erosion hazard is based on the condition of the woodland following cutting or logging operations, or where the soil is exposed along roads, trails, or log-yarding areas.

Equipment limitations reflect constraints on the use of equipment commonly employed in managing or harvesting of the crop. Major criteria are slope, rockiness, or wetness.

Seedling mortality is the degree of expected loss of natural or planted tree seedlings.

Windthrow hazard is the degree of expected blowdown during periods of high wind and excessive soil wetness.

Plant competition indicates the potential for invasion of undesirable species, usually brush, when openings are made in the tree cover.

Basic Data Requirements and Availability

The items required to identify and locate site classes include general soil maps, OR-1 forms, and tables to convert site indexes to cubic foot site classes. These are available as follows:

General soil maps for each county or copies of "Oregon's Long-Range Requirements for Water", which include the general soil maps for each drainage basin, are available at SWCD or SCS offices. Copies of "Oregon's Long-Range Requirements for Water" can also be purchased for $2.50 per drainage basin appendix by contacting:

Water Resources Department
Attn: Policy and Planning
Mill Creek Office Park
555 13th Street, NE
Salem, OR 97310

Copies of the OR-1 forms for each woodland soil indicated on the appropriate maps are available from local field offices of the Soil Conservation Service. A list of the Soil Conservation Service field offices is attached (Exhibit A). OR-1 forms do not exist for unnamed soils; a problem addressed in the procedural section.

Conversion tables for transforming SCS site index to cubic foot site class are in Exhibit H. Their use is demonstrated in the procedural section.

Transformation of Soils Data into Forest Productivity Information

This section presents a procedure for estimating the location and general productivity of forest lands. Until more precise inventories are done, this method will be considered a viable method of accomplishing this requirement. The examples used are from the drainage basin general soil maps found in the publication, "Oregon's Long-Range Requirements for Water". The procedure and use of information found on OR-1 forms is the same whether general soil maps or more recent, detailed soil maps are used. Where available, the detailed soil maps should be used since they provide the most accurate mapping. A list of soil surveys available and a map showing their coverage is included as Exhibit B. The soil classifications used in these surveys are all compatible with those on the OR-1's except those used by Weyerhaeuser Company to map Oregon State Department of Forestry lands. The Weyerhaeuser Company soil types do not directly relate to the characteristics described on the OR-1's. The site class

information provided on these lands is based on height of dominant and codominant trees at 50 years of age rather than at 100 years of age as used in the Forest Survey manual. On Douglas-fir-producing lands, the 50-year site index information can be converted to 100-year site index using the conversion table on page 32 of Weyerhaeuser Forestry Paper No. 8, by James E. King (included as Exhibit I). On Department of Forestry lands bearing major species other than Douglas-fir, mapping should be footnoted to indicate the 50-year site index basis for productivity on those lands.

The general soil maps delineate soil type by area. The OR-1's identify those lands suitable for woodland production and give a general rating of the productivity of the area. By comparing the areas of the soil types with the actual forested areas identified on aerial photographs, or forest type maps, such as those available from the Oregon State Department of Revenue, or by field observation, the existing forest lands can be mapped. Some judgement may have to be exercised to relate the information on soils suitable for woodlands with that on areas actually in forest production. When areas rated suitable for forest production are not in forest cover, or vice versa, the soil productivity should be classified as rated and the actual use of the land noted. The amount of land suitable for reforestation is of particular interest.

Procedural Steps

The following steps outlining procedures for interpreting the general soil map are illustrated with examples from the map covering Wallowa County. Each major step is followed by a detailed discussion of the procedure and an example.

I. Locate the Drainage Basin(s) Covering the Area to be Mapped

The appropriate drainage basin(s) for a jurisdiction can be identified from the drainage basin key found in the margin of any one of the general soil maps. Each specific drainage basin general soil map will have a county key with the drainage basin superimposed on county boundaries. In Exhibit C these two keys are presented and show the Grande Ronde drainage basin as it relates to Wallowa County political boundaries. The numbers associated with each drainage basin name on the key indicate the appendix to "Oregon's Long-Range Requirements for Water" which contains data on that basin. The information for these examples comes from "Oregon's Long-Range Requirements for Water" General Soil Map Report with Irrigable Areas, Grande Ronde Drainage Basin, Appendix I-8, State Water Resources Board, 1969.

II. *Identify the Soil Series of Each Area Delineated on the General Soil Map*

A symbol in each area delineated on the general soil map (see Exhibit D) identifies the soil series or the association of soil series within that area. The soil series name can be found in the Identification Legend, and the average slope over the area is found in the Slope Groups table. For example, the symbol To-K1/4-5 (see arrow in Exhibit D) indicates the association of soil series Tolo and Klicker on moderately steep to steep slopes.

III. *Determine the Woodland Suitability of the Soil From the Information on the OR-1 for that Soil Series*

From the last paragraph of the narrative introduction on the OR-1 forms for the Tolo and Klicker soils we find that the map area we are examining in Exhibit D has a combination of timber production, range and forest/range uses. Soil productivity may be expected to reflect a combination of these forest-related uses. If a soil series is rated as a forest soil, there will be data in the Woodland Suitability section on the back of the OR-1.

IV. *Determine the Site Index of the Major Species on Forest Soils and Convert to Cubic Foot Site Class*

A. *Single Soil Series Areas*

After identifying the soil series and slope class from the map legend we find the OR-1 for each soil series. In the upper righthand corner on the front of the OR-1 (see Exhibit F) is a numbered list of further classification, or phases, of the soil series. The applicable soil phase for the map area is determined by locating the soil phase which has a slope <u>most nearly</u> corresponding to the slope class indicated in the map symbol. This provides the soil identifier number to look for in the "SOIL" column of the Woodland Suitability section on the reverse side of the OR-1 form, if the soil is suited to forest production. The next two columns list the major species and site index rating for that soil phase. From the appropriate conversion table for the species (Exhibit H), the cubic foot site class which corresponds to the site index is found. These procedures are illustrated in the following examples.

11-

Example: Soil not rated suitable for woodland production.

The Snell soil series OR-1 (see Exhibit E) has no information in the Woodland Suitability section. It would not be expected to support forest. If an area having the Snell soil series does prove to have forest cover evident on Department of Revenue forest type maps or aerial photos, productivity would have to be determined from Department of Revenue productivity maps, other productivity rating, or field measurements. Such areas should be identified in a separate class as well as in the forest land productivity class for future planning.

Example: Soil rated suitable for woodland production.

The Tolo soil series, represented in the map symbol marked by an arrow in Exhibit D, has a moderately steep slope (12-20%) to a steep slope (20-35%) according to the map legend. On the Tolo series OR-1 we find that a Tolo silt loam phase #2 with a slope of 12-35%, most closely matches the map conditions. On the second page on the OR-1 we find Tolo phase #2 rated to produce Douglas-fir with a site index of 95-120 at 100 years of age. In the conversion table for Douglas-fir in Exhibit H, a site index of 95-120 corresponds to cubic foot site class 4 or high site class 5. This soil would be rated as site class 4.

B. Multiple Soil Series Areas

Complexities are introduced into this process when an area has an association of two or more soil series, as in the Tolo-Klicker example in Exhibit D, or when a soil phase has more than one species listed in the Woodland Suitability section. Since the major species must be determined first in order to assess the soil phase productivity, the multiple-species case is discussed first, followed by the multiple-soil association case.

1. Determining The Dominant Species on Which to Base Site Productivity

The Woodland Suitability section may indicate more than one species and range of site index. In such a case the dominant species type should be used to determine the productivity of the forested area. The dominant species may be determined in several ways, such as using Oregon State Department of Revenue forest type maps, private industrial owners' type maps, aerial photographs, or field observation.

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Example: Areas with multiple tree species listed on the OR-1.

For instance, the Klicker soil series (Exhibit G), phase #1, is a stony silt loam on 1-12% slopes. This is an example of a soil growing two main species -- ponderosa pine and Douglas-fir. We cannot assume that the first species listed is the dominant species even though ponderosa pine is a major species in the Wallowa County area. One of the alternate sources mentioned above must be used to positively identify the dominant species.

In situations of both multiple species occurrence and associatons of two or more soils, as in the Tolo-Klicker example (arrow, Exhibit D), the dominant cover type of the soils should be determined before the productivity of the soils in the area is determined, as described next.

2. Determining Site Productivity of Multiple-Soil Associations

Frequently two or more soil series will occur in one of the areas delineated on the soil map. When this situation is encountered, each soil series should be traced separately through the procedure to determine its productivity; but then it is necessary to determine an aggregate productivity class for the mapping unit as a whole. In this process recognize that the dominant soil series is listed first in the soil symbol followed, in order, by other soil series of diminishing occurrence. Soil series which make up less than 15% of the mapping unit area are not indicated.

When the cubic volume site classes are close to identical, it is easy to assign an overall site class to the mapping unit. However, when the primary and subordinate soil series represent a wide range of site classes, it is necessary to use judgement in assigning an aggregate site class. The dominance of each soil series and its range of site indexes must be compared to the limits of the cubic foot site classes.

Example: Multiple-soil associations.

For instance, in the Tolo-Klicker associaton, the Tolo series #2 soil (identified in the upper righthand corner of Exhibit F) has a site index range of 95-120 (from the second page of the OR-SOIL-1 form, Exhibit F). From the conversion table (Exhibit H) we see this Tolo series soil productivity takes in cubic foot site class 4 and overlaps slightly into cubic foot site class 5. The Klicker series #2 soil has a site index range of 76-82 (Exhibit G). On the conversion table (Exhibit I) this is within cubic foot site class 5. Since the productivity of the primary soil lies mainly within the range of cubic foot site class 4, the association would be classified as cubic foot site class 4.

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When a primary soil is only slightly within the range of a cubic foot site class, the productivity of the second or third soil may cause the aggregate cubic foot site class of the unit to either increase or decrease depending upon the range of productivity of the subordinate soil(s). When this happens, it is useful to keep a list of the productivity class determinations for mapped areas to save the time of reevaluating recurring soil associations and to maintain uniformity in productivity classifications.

3. *Determining Productivity of Unnamed Soil Series*

Another situation may arise, that of areas on the general soil map, with unnamed soil series. There are no OR-1 forms for unnamed soils, so the productivity for these areas is more difficult to determine. One method is to consult the local SCS soil scientist. He can determine whether properties of unnamed soils are close enough to a named series to apply the named series productivity.

A second method is to physically sample the area in question using the procedures outlined in the USFS Forest Survey manual, "Field Instructions for Integrated Forest Survey and Timber Management Inventories -- Oregon, Washington, and California, 1974", designated in the LCDC Forest Lands Goal. This is not a preferred method because it is time-consuming and the extent of sampling required to attain adequate reliability goes beyond the capability of most planning departments.

A third method is to locate existing productivity or site index information from other sources, such as industrial forest landowners or management plans available from Department of Forestry Service Foresters, for areas where soils are not named or where the general soil maps are not complete. While this is a useful approach, care must be taken to insure compatibility of the data in terms of site tables (50 years to 100 years) and site graphs used. Any alternative method of site productivity inventories should be carefully examined to guard against inconsistencies in background data used to arrive at site productivity classes. For example, some productivity assessments are based on projected implementation of intensive forest management practices, such as precommercial thinning, rather than actual measurements of standing trees. Such assessments are not compatible with the standards set in LCDC Goal #4.

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V. Cross-Check Soil-Based Forest Mapping With Existing Forest Cover

After mapping the forest soils by productivity, it is necessary to confirm the actual vegetation cover of those areas. There may be pockets of forest vegetation that occur on non-forest soils or forest soils that are not in fact occupied by forest cover. This necessitates comparison of the map produced with up-to-date forest type maps, county classification maps, or high altitude aerial photographs. Type maps might be obtained from large private landholders, other agencies, such as the Department of Revenue or the Department of Forestry (for state lands). County land classification maps can be obtained from the County Assessor. High altitude photography is available from Department resources and the Department of Revenue. Where the general soil in an area is non-forest, the productivity of forested areas can be determined by reference to the actual condition of the existing forest cover.

This comparison of soil woodland suitability and actual forest cover of an area will no doubt reveal discrepancies between the rated capabilities of the land and its current use. The Statewide Forest Land Goal addresses the land currently in forest production and land suitable for forest production. Soil suitability is a tool for identifying land which has the capability to produce forest products no matter what its current use.

The procedure described here is only a method of obtaining an initial, approximate forest land productivity inventory. It is not meant to infer that soil maps are the sole source or even the best source of such information. Soil mapping is, however, generally available. Where other sources of land productivity can be found to be more accurate, they should be used. It is important, however, that productivity be determined in common terms, that is cubic volume site classes, for the entire state.