

Out of Region

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UNITED STATES
DEPARTMENT OF
AGRICULTURE

FOREST
SERVICE R5

REPLY TO: 2550 Soil Management
2470 Timber Stand Improvement
SILVICULTURAL PRACTICES off

DATE: JAN 21 1985

Silvicultural Practices

SUBJECT: Timber Stand Nutrient Status - Soil Management Support

TO: Forest Supervisors

Enclosed is a Timber Stand Fertilization Analysis Inventory from the Modoc National Forest. It represents an excellent example of how soil management support can assist Timber Management in identifying TSI needs and opportunities.

During 1983, fertilization was added to the reforestation and TSI needs reporting process (see TM 2490 letter of August 11, 1983). The enclosure represents a systematic procedure for providing meaningful information to help evaluate TSI needs. The inclusion of this information in the analysis of the management situation for Forest Planning is also noteworthy. This provides a common document for continuous reference by Forest users.

Please circulate this information among your forest and soil management people. Forests that are doing, or planning to do this type of work, are encouraged to utilize similar approaches. We support the combined efforts of silviculturists and soil scientists in the evaluation of TSI needs and opportunities.

Andrew A. Leven
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Watershed Management Staff

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Timber Management Staff

Enclosure (18 sheets)

**Raymond G. Weinmann, Director
Timber Management Staff**

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JAN 22 1985



REPLY TO: 2550 Soil Management Services
2470 Timber Stand Improvement
1920 Land Management Planning

DATE: DEC 27 1984

SUBJECT: Current Modoc National Forest Timber Stand Nutrient
Status Inventory to the Soils AMS

TO: District Rangers

Enclosed is a Timber Stand Fertilization Analysis Inventory from soil and foliar samples collected during FY82, 83 and 84. This inventory also contains economic analysis for potential TSI fertilization projects, or other recommendations plus some general conclusions.

This inventory updates and supercedes last years inventory which should be discarded.

WILLIAM E. BRITTON
Range, Wildlife and Watershed Officer

Enclosures

cc: Chuck Goughnour
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Luckow/DB 12/19/84 2cc inventory Luckow

Luckow/DB 12/19/84 2cc inventory Luckow

APPENDIX _____.

Current Modoc National Forest Timber Stand
Nutrient Status Inventory to the Soils AMS
December 1984
Prepared by: Ken Luckow, Forest Soil Scientist

Below is a table of soil and foliar analysis results from samples taken during FY 82, 83, and 84. This inventory updates and superceeds last year's inventory which should be discarded.

The numbers in the expected nitrogen fertilizer response column were determined using the PPM soil mineralizable nitrogen analysis results and figure 3 on page 10 of the paper by Scott Miles and Robert Powers entitled "Fertilizing California Forests with Nitrogen...Preliminary Guidelines", November 1983, USDA - Forest Service, Pacific Southwest Region. The proposed critical levels for ponderosa pine and true fir were taken from table 3 on page 6 of this same paper (see Attachment 1).

Remarks or comments and recommendations were mainly from field observations and investigations.

During October and November 1984 about 2,600 acres of timber stands were fertilized with 550 pounds per acre of 36-0-0-20 urea-sulfur fertilizer. In addition 155 of these same acres were also fertilized with 185 pounds per acre of 11-55-0 mono-ammonium phosphate fertilizer. About 20 of these fertilized timber stands are having plots set up to monitor growth response to fertilization over the next 5 to 10 year period.

Below is a table showing the R5 proposed critical levels of foliar Nitrogen (N), Phosphorus (P), Potassium (K), Sulfate Sulfur (SO₄-S), Calcium (Ca) and Magnesium (Mg) for both the ponderosa pine stands and the true fir stands. It also includes the number and percentage of timber stands which were either at or below these levels in current or last year's needles, or both.

Timber Stand Type	Nutrient (R5 Proposed Critical Level)	No. of Stands at or Below Critical Level	% of Stands at or Below Critical Level
<u>Ponderosa Pine</u> (33 stands analyzed)	N (0.95%)	5 of 33	15
	P (0.08%)	1 of 33	3
	SO ₄ -S (50 PPM)	11 of 33	33
	K (0.48%)	5 of 22	23
	Ca (0.05%)	0 of 22	0
	Mg (0.05%)	0 of 22	0
<u>True Fir</u> (17 stands analyzed)	N (1.15%)	14 of 17	82
	P (0.15%)	17 of 17	100
	SO ₄ -S (100 PPM)	8 of 17	47
	K (0.58%)	0 of 9	0
	Ca (0.12%)	0 of 9	0
	Mg (0.06%)	0 of 9	0

Economic analysis was determined using:

- (1) The average Modoc National Forest \$1.27 per cubic foot ponderosa pine stumpage value, the \$0.75 per cubic foot true fir, or the \$0.85 per cubic foot mixed conifer values;
- (2) The paper by Richard E. Miller and Roger Fight entitled "Analyzing Forest Fertilization: Study Evaluates Costs, Benefits", from Forest Industries (see Attachment 2), September 1979;
- (3) Table 6 on page 11 of Miles and Powers paper mentioned above using a five-year volume response to fertilization.
- (4) Total cost per acre for nitrogen fertilization was figured at \$60.00, nitrogen and sulfur fertilization \$75.00, nitrogen and phosphorus fertilization \$115.00, and nitrogen, phosphorus, and sulfur fertilization \$130.
- (5) Dick Phillips, Modoc National Forest Economist, suggested using a 4 percent annual rate of interest (see Figure 1. Cumulative Cost of Fertilizing).
- (6) The economic break-even year analysis in Table 1 was based on final harvest date when all trees would be harvested. The break-even year figures would need to be adjusted down accordingly if, as an example, a commercial thinning entry were planned and only 50 percent of the volume harvested, or if some other silvicultural cutting alternative were used and not all the trees harvested.

It is important to note that the break-even year figures are only estimates (for most of the stands) since much of the needed stand growth data is not available at this time.

Listed below are some conclusions which can be drawn from this inventory:

- Many of our timber stands show promise that a fertilization project would give favorable economic return if these stands are fertilized somewhere between 10 years and up to about 50 years of final harvest. On some stands it is suspected that a second fertilization application, spaced about 10 years or so from the first application, would show an even better economic return.
- Fertilization Growth Response Analysis indicates that the normal timber stand rotation age can be reduced one or more decades on some stands thru fertilization to produce a given size tree or amount of wood per acre.
- On some of our poorly growing plantations a fertilization application when used with other forms of site release may prove to be a very effective approach in capturing sites faster and speeding crown closure.
- Soil mineralizable nitrogen analysis has consistently shown a 20 to 50 percent potential reduction in conifer growth rate in our 10 to 30 year old ponderosa pine plantations where 2 to 8 inches of top soil has been removed and windrowed. Respreding these windrows should eliminate this reduction and return soil productivity back to its natural level.
- In some of our soils, particularly the pumice phase, or pumice overburden phase soils, most of the soil nutrients are concentrated in the top 2 to 5 inches of soil. On these soils any top soil displacement or nutrient loss thru other means can be particularly devastating to soil productivity.
- The foliar analysis indicates that:

A. Ponderosa Pine stands:

Foliar Nitrogen - Nitrogen tends to be more deficient in plantation areas where top soil has been displaced, or in soils which are suspected as being inherently low in fertility. Only about 15 percent of the ponderosa pine stands analyzed showed a foliar nitrogen deficiency (i.e., foliar nitrogen at or below the R5 proposed critical level of 0.95 percent).

Foliar Phosphorus - Only 1 stand of 33 analyzed was at or below critical level. This indicates that phosphorus is seldom, if ever deficient on our ponderosa pine stands based on the 0.08 percent R5 proposed critical level. This is in sharp contrast to our true fir stands which indicate phosphorus is always deficient based on the 0.15 percent R5 proposed critical level for true fir.

Foliar Sulfur - Our ponderosa pine stands tend to be deficient in sulfur in and around the Medicine Lake Highlands area on the Doublehead Ranger District and in the northeast corner of the Big Valley Ranger District. Other areas where a sulfur deficiency has shown up is around the Rail Fire area on the Devil's Garden Ranger District, and Sugar Hill plantation area on the Warner Mountain Ranger Dis-

trict. Additionally, where soils have been scalped of top soil as in the Mears Burn area on the Doublehead Ranger District and Devil's Garden Ranger District sulfur deficiencies show up quite regularly.

Foliar Potassium - Potassium was found to be deficient in 5 of 22 stands tested. Potassium, as in nitrogen, tends to be more deficient in plantations where top soil was displaced, or in soils suspected as being inherently low in fertility.

Foliar Calcium and Magnesium - Twenty-two stands were analyzed for these nutrients and none have shown up as being deficient.

B. True Fir stands:

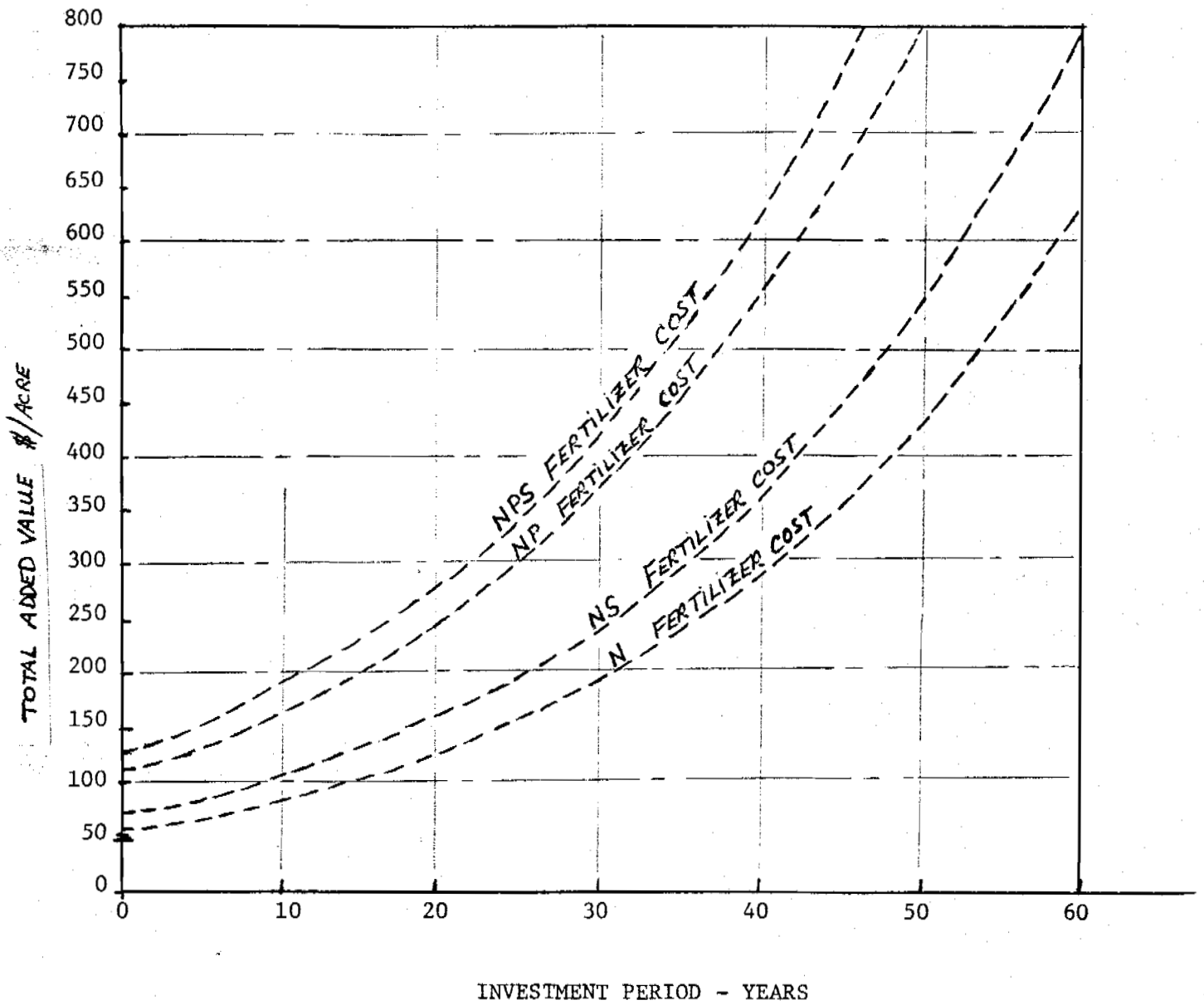
Foliar Nitrogen - Eighty-two percent of the true fir stands analyzed are showing nitrogen deficiencies. This tends to show up quite uniformly in true fir stands growing on all soil types on all districts.

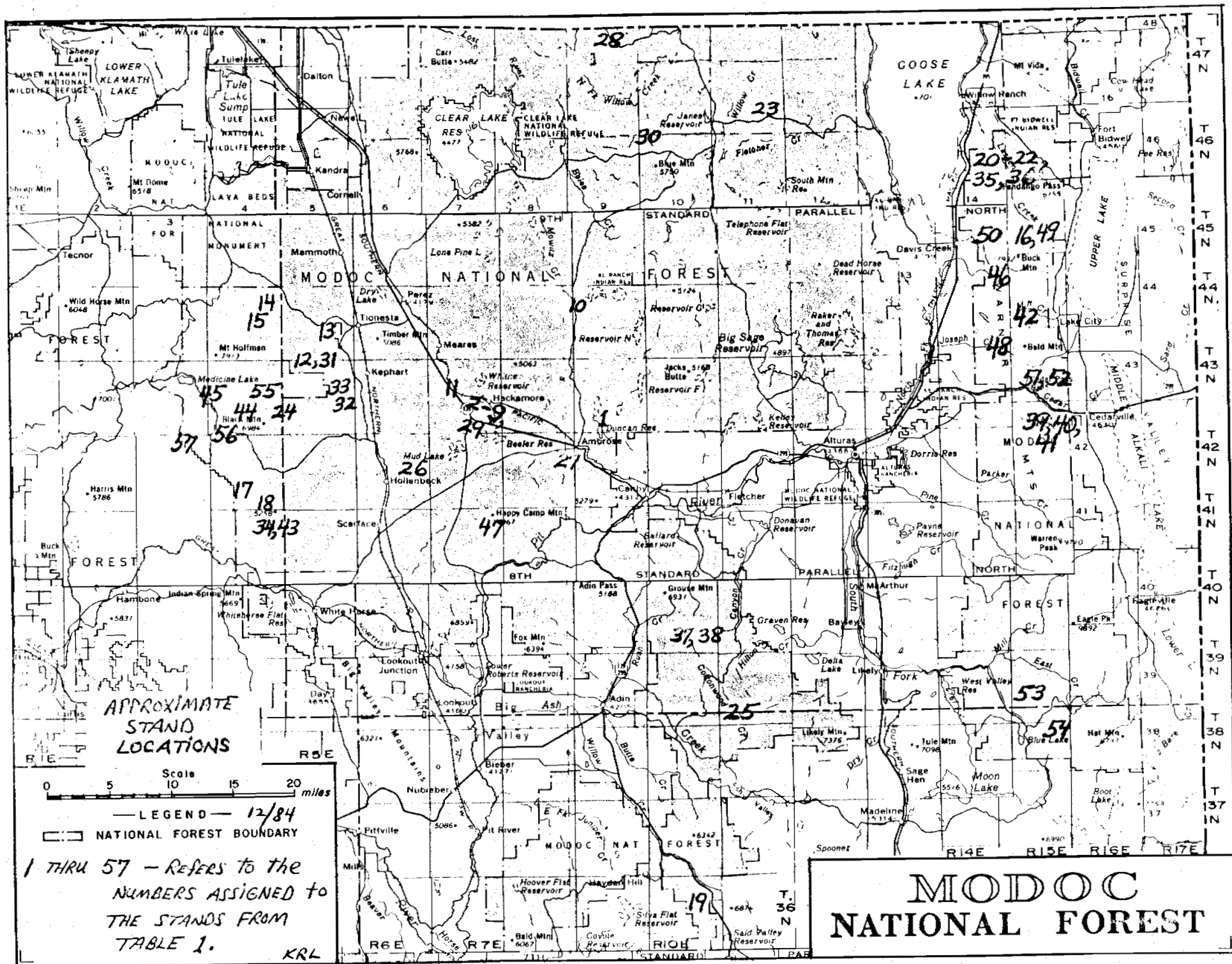
Foliar Phosphorus - All 17 (100 percent) of the true fir stands analyzed are showing phosphorus deficiencies. Fourteen of these stands were deficient in both current and last year's needles. These true fir stands were analyzed from many different soil types and from all four districts.

Foliar Sulfur - True fir stands are consistently showing sulfur deficiencies around the Medicine Lake Highlands on the Doublehead Ranger District and in the northeast corner of the Big Valley Ranger District. Other areas of sulfur deficiency have shown up on Happy Camp mountain on the Devil's Garden Ranger District and above Parsnip Springs on the south end of the Warner Mountain Ranger District.

Foliar Potassium, Calcium and Magnesium - Nine true fir stands have been analyzed for these nutrients and none have shown up as being deficient. As a matter of interest our true fir stands on the Modoc National Forest are generally showing higher foliar calcium concentrations than anywhere else in R5.

Figure 1. Cumulative cost of fertilizing (4% interest rate).





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Table 1. Modoc National Forest timber stand fertility analysis and some comments and/or recommendations.

#	Timber Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey Potent. SRI Site Class #	M.U. Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS			
								% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Favr.	Break Even Year
TIMBER STANDS WITH PONDEROSA PINE SAMPLED OR ARE SUITABLE FOR PONDEROSA PINE																		
R5 Proposed Ponderosa Pine Critical Levels																		
								.95	.08	.48	50	.05	.05					
1	527-017	046-231	PLG	Rail Mtn.	5	201	Natural Good	*C1.14	.15	.80	104	.08	.09	17.9	5%	-	No	
								*L1.16	.11	.51	177	.16	.10					
COMMENT: Trees about 16 years old and 10-15 feet tall. Legal Location: SW1/4 of NE1/4, Section 19, T.43N., R.9E.																		
2	532-001	044-127	PLP	Whitney Res.	5	201	Scalped Poor	C1.14	.15	.74	47	.09	.11	6.9	70+%	-	No	
								L1.09	.10	.50	78	.18	.13					
												Top Soil	17.8	5%	-			
COMMENT: Respread top soil and possibly rip for compaction. Trees about 18 years old and 5-9 feet tall. Legal Location: SE1/4 of NE1/4, Section 15, T.43N., R.7E.																		
3	534-001	044-164	PLG	HWY 139 Hackamore	5	201	Natural Good	C1.23	.22	.89	92	.07	.12	11.8	20-25%	N	Yes	15
								L1.19	.16	.66	340	.15	.11					
COMMENT: Trees currently about 28 years old and about 28 feet tall. Legal Location: NE1/4 of SW1/4, Section 22, T.43N., R.7E.																		
4	534-001	044-183	PLG	HWY 139 Hackamore	5	201	Scalped Poor	C1.32	.16	.71	37	.09	.11	7.5	60-70%	-	No	
								L1.22	.10	.50	37	.18	.10					
												Top Soil	27.2	0%	-			
COMMENT: Respread top soil and possible rip for compaction. Trees about 18 years old and 6-9 feet tall. Legal Location: NW1/4 of SW1/4, Section 22, T.43N., R.7E.																		
[Two acres of the ponderosa pine plantation immediately north of Hackamore Road (about 100' x 800' strip) was fertilized with 200#N, 110#S, and 200#P ₂ O ₅ /acre in November 1984. Refer to unit #46 in the 1984 fertilization contract. During early summer of 1984 the top soil was respread by tractor and area was pre-commercially thinned.]																		
5	534-000	044-180	PLG	Spaulding Butte	5	201	Natural Good	C1.45	.17	.62	170	.12	.11	-	N/A	-	No	
								L1.34	.13	.50	275	.16	.10					
Comment: Trees about 20 years old and 12-17 feet tall. Legal Location: NW1/4 of NW1/4, Section 26, T.43N., R.7E.																		

Table 1. Continued.

Timber Compt./ # Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey		Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min.	FERTILIZATION ANALYSIS				
				Potent. Site Class	SRI M.U. #			% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Fav.	Break Even Year	
6	534-000	044-202	PLG Spaulding Butte	5	201	Scalped	Poor	C1.29 L1.25	.14 .11	.60 .47	155 130	.10 .17	.13 .13	6.3	70+%	-	No		
							Top Soil						24.8	0%	-				
COMMENT: Respread top soil and rip for compaction. Trees about 18 years old and 6-9 feet tall. Legal Location: SE1/4 of NW1/4, Section 26, T.43N., R.7E.																			
7	534-000	044-195	PLG HWY 139 Spaulding Butte	5	201	Natural	Poor	C1.49 L1.25	.16 .12	.54 .40	75 120	.13 .16	.15 .13	12.7	15-20% N,K,(S?)	-	?		
COMMENT: Only one set of samples taken from very small isolated stand of trees about 60 years old and about 28-30 feet tall. Large amount of subsurface rock fragments limiting root development. Legal Location: SW1/4 of NW1/4, Section 26, T.43N., R.7E.																			
8	534-000	044-195	PLG HWY 139 Spaulding Butte	5	201	Natural	Good	C1.16 L1.22	.15 .12	.77 .58	140 200	.13 .13	.14 .10	10.3	30%	N(S?)	Yes	25	
COMMENT: Taken from well stocked small stand about 30 years old and 30-38 feet tall. Legal Location: Near center of Section 26, T.43N., R.7E.																			
9	534-000	044-195	PLP HWY 139 Spaulding Butte	5	201	Scalped	Poor							8.6	50%	-	No		
							Natural	-						10.2	30%	N	Yes	25	
							Top Soil	-						28.6	0%				
COMMENT: Respread top soil and rip for compaction (later N. fert. within 2 ¹ / ₂ years of harvest). Samples taken from 91 acre Spaulding Butte FY 83 soil improvement project site. Refer to that soils report for additional information. Legal Location: SW1/4, Section 26, T.43N., R.7E.																			
10	524-000	033-196	PLP Mowitz Butte Tank	5	201	Scalped	Poor	C1.28 L1.00	.19 .10	1.01 .59	94 99	.12 .22	.11 .12	5.1	70+%	-	No		
							Top Soil	Fair	C1.08 L1.01	.17 .11	.95 .58	77 47	.08 .13	.09 .09	16.3	5-10%			
COMMENT: Respread top soil and rip for compaction. Trees about 20 years old and 4-6 feet tall. Legal Location: SW1/4 of SW1/4, Section 7, T.44N., R.9E.																			
11	533-000 and 627-000	044-120 PLG 044-125 PLG	HWY 139 Plum Ridge	5-6	204	Scalped	Poor	C1.02 L .96	.14 .10	.86 .57	59 47	.10 .23	.10 .12	5.1	70+%	-	No		
							Natural	Fair	C1.04 L1.07	.17 .10	.92 .58	63 67	.11 .16	.11 .09	10.0	35%	N	Yes	20
							Top Soil	Good	C1.00 L1.04	.18 .12	.98 .67	66 61	.10 .16	.09 .09	20.3	0-5%			
COMMENT: Respread top soil and rip for compaction (later N. fert. within 20 years of harvest). In Scalped area trees about 15 years old and 5-8 feet tall. In Natural (undisturbed) soil area trees about 25 to 28 years old and 23 feet tall. Legal Location: On both sides of Hwy 139 and common boundary of Section 8/17, T.43N., R.7E. [About 60 acres on East side of Hwy 139 on DGRD was FY 1984 092 soil improvement project. Top soil windrows were respread over most of the area and ripped to about 20-inch depth during early summer 1984. This area will be inter-planted to ponderosa pine seedlings in spring 1985. For additional information refer to the soils report "Plum Ridge Soil Improvement Project".]																			

Table 1. Continued.

#	Timber Compt./ Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey Potent. SRI Site Class	M.U. #	Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS				Break Even Year
									% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Needed	Mix Is Fert. Econ. Fav.		
12	613-033	042-007	P3P	Cougar Fire	5	104	Natural	Good	C1.06	.16	.73	98	.09	.09	4.6	70+(50)%	N	Yes	40	
									L1.00	.14	.59	91	.18	.09						
COMMENT: Mineralizable N test to predict N. fert. response may not be entirely reliable in pumice. Probably a 50 percent N. fertilization response is more realistic here. A two story timber stand aggregation here. Trees sampled were about 36 years old and 42 feet tall. Legal Location: NE1/4 of NW1/4, Section 33, T.44N., R.5E.																				
13	617-007	036-173	PLG	Twin Fire	5	183	Natural	Good	C .95	.16	.65	230	.10	.11	8.5	50% N	(K?)	Yes	30	
									L1.26	.12	.42	160	.17	.10						
COMMENT: Mineralizable N test to predict n fert. response may not be entirely reliable in pumice. Samples were taken from a small isolated natural stand about 50 years old and about 50 feet tall. Legal Location: SE1/4 of NW1/4, Section 23, T.44N., R.5E.																				
14	620-000	037-065	LXX	Cougar Butte	6-7	260	Natural	Very Poor	C .85	.13	.55	410	.16	.10	2.9	70+% N	(K?)	No		
									L .77	.11	.45	433	.31	.09						
COMMENT: This is very marginal to non-commercial land mainly due to very low soil fertility. Timber is mostly poorly growing lodgepole pine with about 5% ponderosa pine. Ponderosa pine trees are about 115-200 years old and 47-55 feet tall. Legal Location: SW1/4 of NE1/4, Section 15, T.44N., R.4E.																				
15	619-000	038-108	LXX	Indian Butte	6	186	Natural	Poor	C .95	.15	.61	353	.12	.10	3.0	PP70+% N	(K?)	No		
									L1.04	.12	.45	270	.23	.09		WF 130+%				
COMMENT: Timber is presently about 40% lodgepole - 10% ponderosa pine - trace of white fir. Ponderosa pine trees are about 50 to 230 years old and about 40-70 feet tall. If, in the future, this area was managed only for ponderosa pine then the economic analysis may be favorable. Currently it is not economical to fertilize this mixed conifer stand. Legal Location: NE1/4, Section 21, T.44N., R.4E.																				
16	310-000	028-035	M1X	Needle Grass Spring	6	281	Natural	Poor	C .77	.10	.83	230	.09	.07	7.6	PP 65%	N	-		
									L1.19	.11	.56	170	.21	.07		WF 90%				
COMMENT: Understocked ponderosa pine on marginal CAS land. Soil is low in natural fertility. Legal Location: SW1/4 of NW1/4, Section 28, T.45N., R.15E.																				
17	410-541, 542	065-022	PLG	Burnt Lava Flow	5-6	174	Scalped	Fair to Poor	C1.32	.18	.84	102	.16	.09	5.6	70+%	N	?		
									L1.26	.11	.48	65	.27	.10						
							Top Soil	Good	C1.21	.21	1.05	101	.10	.09	4.8	70+%	N	?		
									L1.23	.18	.69	67	.20	.11						
COMMENT: Respread top soil. Low mineralizable N but good foliar N. This high foliar N. content may be due to the presence of N. fixing snowbrush which is present. Probably won't get 70% response here due to possible ponderosa pine-snowbrush symbiotic relationship. Legal Location: NE1/4, Section 28, T.42N., R.4E. [Ten acres of this ponderosa pine plantation adjacent to the Burnt Lava Flow was fertilized with 200#N and 110#S/acre in November 1984. Plots were set up to monitor response. Refer to unit #33 in the 1984 fertilization contract.]																				
18	410-520	065-026	P1X	Snell Butte	5-6	(28b) 263	Natural	Poor	C1.16	.16	.91	65	.13	.09	4.8	70+%	NS	Yes	25-30	
									L1.06	.09	.49	38	.21	.09						
					3-4		Top Soil	Exlnt	C1.58	.20	1.22	30	.24	.10	1.1	70+%(?)	None	?		
									L1.38	.11	.68	63	.47	.10						
COMMENT: 1-2 acres of natural ponderosa pine regeneration area on Snell Butte and on the Cinder Pit top soil bank. Probably a high amount of available nutrients below 24 inch soil depth of the top soil bank which was not sampled. the very high foliar N. would indicate a N. fert. response would be low on the top soil area. Ponderosa pine trees on Natural site are 7 years old and 4-6 feet tall. Ponderosa pine trees on Top Soil area are 7 years old and 10-15 feet tall. Legal Location: NW1/4 of NW1/4, Section 34, T.42N., R.4E.																				

Table 1. Continued.

Timber Compt./ Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey		Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS			
				Potent. Site Class	SRI M.U. #		Where Sampled	% N	% P	% K	PPM SO ₄ S	% Ca		% Mg	Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Fav.
19	453-000	100-025	P3P HWY 139 Upper McBride Spr.	6	230	Natural Poor							4.2	70+%	N(+?)	?	
COMMENT: Sparse stocking on most areas. Low natural soil fertility. Foliar samples were not taken. Legal Location: SE1/4 of NE1/4, Section 3, T.36N., R.10E.																	
20	309-042	025-102	PLG Sugar Hill Plantation	5+	230	Natural Good	C .93 L .95	.17 .11	.75 .59	111 133	.13 .26	.10 .10	11.1	25-30%	N	Yes	25
COMMENT: Low foliar N. suggests a very high N. fert response. Samples taken adjacent to plot 2018 on Gleason soil type in alluvial drainage. Ponderosa pine trees 48 years old and about 50-58 feet tall. Legal Location: NW1/4 of NW1/4, Section 13, T.46N., R.14E.																	
21	309-002	025-102	PLG Sugar Hill Plantation	5	230	Natural Good	C1.02 L .96	.21 .13	.89 .62	146 167	.16 .18	.12 .10	21.1	0-5%	(N)	?	
COMMENT: Low foliar N. suggests a high response to N. fert. Samples taken on Gleason/Patio soil type upslope from #20 above. Ponderosa pine trees 46 years old and 36-42 feet tall. Legal Location: SE1/4 of SE1/4, Section 11, T.46N., R.14E. [Twenty acres of pre-commercially thinned ponderosa pine plantation in this general vicinity was fertilized with 200#N and 110#S/acre in October 1984. Refer to unit #2 in the 1984 fertilization contract.]																	
22	309-032	025-121	PLG Sugar Hill Plantation	6	230	Natural Fair	C .97 L1.09	.12 .08	.79 .59	26 25	.17 .21	.10 .09	41.9	0%?	NPS	?	
COMMENT: High snowbrush probably giving high mineralizable soil N. values. Low foliar N. suggest a high N. fert. response expected. Phosphorus and sulfur are also at or below critical levels. Samples taken from Wapal/Zeb soil types which are low in natural soil fertility. If snowbrush is removed foliar N. and Soil N. levels would probably be lower. As it is now, however, the brush understory is also highly competitive for soil moisture. Ponderosa pine trees are 38-40 years old and 24-37 feet tall. Legal Location: NW1/4 of SW1/4, Section 24, T.46N., R.14E.																	
23	509-011 509-010	006-159 006-221	P2G Rail Meadow- mouse Spring	5	252	Natural Poor/ Fair	C1.12 L1.09	.17 .12	.73 .51	34 49	.14 .27	.12 .13	10.5	30%	NS	Yes	25
COMMENT: Current growth rate is FSSC 6. Therefore, sulfur may be limiting growth by about 1 site class from potential. Ponderosa pine trees are about 80-90 years old and 47-60 feet tall and have recently been pre-commercially thinned to about 110 square feet basal area. A FY 85 Advent 200 acre fertilization project has been proposed for this area. Legal Location: SE1/4, Section 22 and NE1/4, Section 27, T.47N., R.11E. [580 acres of pre-commercially thinned ponderosa pine stands as above were fertilized with 200#N and 110#S/acre in October 1984. Plots were set up in Section 27 to monitor response. Refer to Units #40, 41, 42, and 43 in the 1984 fertilization contract.]																	
24	606-000	042-095 042-104	PLG Black Mtn. Plantation	4	261	Scalped Poor	C1.16 L1.09	.15 .10	.78 .58	91 75	.16 .29	.10 .11	8.8	45-50%	NS	Yes	35
Top Soil Good/ Fair C1.23 L1.37 .19 .10 1.08 .51 26 .17 .06 .07 .17 .06 22.0 0%																	
COMMENT: Do either: (1) respread top soil or (2) after controlling brush follow with NS fertilization - followed in 10-20 years with additional N. fert. appl. Very high levels of brush in Scalped areas consisting mainly of 80% greenleaf manzanita and 10-15% snowbrush. About 6-8 inches of top soil displacement is suspected to have occurred on this area. Ponderosa pine trees in scalped area are about 19 years old and 6-12 feet tall. Ponderosa pine trees adjacent to top soil windrows and benefitting from the top soil are about 19 years old and 18-24 feet tall. Legal Location: E1/2 of SE1/4, Section 24, T.43N., R.4E., and SW1/4, Section 19, T.43N., R.5E. [6-7 acres of this ponderosa pine plantation consisting of 2 scalped strips were fertilized with 200#N, 110#S, and 100#P2 O ₅ in November 1984. Earlier, competing brush was mechanically killed on 3 small plots both in and outside of the fertilized area. This will allow us to study effects of fertilization in this unit with and without brush competition, and site release by the elimination of brush competition alone. Response plots will be set up to monitor results. Refer to unit #30 in the 1984 fertilizer contract.]																	

Table 1. Continued.

Timber Compt./ Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey Potent. Site Class	SRI M.U. #	Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS				Break Even Year
								% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ.	Favr. Year	
25	442-000	084-162 -170	M4G M3G	Knox Flat	4	148	Natural Fair	C 1.37 L 1.16	.21 .13		69 140	13.4	15-20%	N (S?)	Yes	20			
<p>COMMENT: Pre-commercially thinned pole size ponderosa pine stand, 60-85% crown closure, average 40-50 feet tall and 60-80 years old. Soil is DeMasters loam on 5-20% slope and S-NE aspect. 5,600-5,800' elevation. Legal Location: West 1/2 of common intersect of Sections 29/32, T.39N., R.11E. [This unit was fertilized with 200#N/acre and 110#S/acre fertilizer in November 1984. Plots were set up to monitor response. Refer to unit #35 in 1984 fertilization contract.]</p>																			
26	415-007	063-014	PLG	Hollenbeck Butte	5	164	P.Pine PL Poor					13.9	15%		No				
<p>COMMENT: This 15 acre site was mechanically site preped and planted in spring 1980 with 1-0 and 2-0 P. Pine. It was treated with 2-4D and Atrazine in 1980 and again in 1983 for site release treatments. As of September 1984 a large amount of squaw carpet was still alive. Soil is Elmore gravelly loam. Trees are mainly 6-24 inches tall. Elevation is 4,500'; 0-5% slope; S-SE aspect. Legal Location: NE1/4 of NE1/4, Section 15, T.42N., R.6E. [This site was fertilized with 200#N/acre and 110#S/acre fertilizer in November 1984 as a pilot study to test effects of fertilization to capture the site faster and possibly eliminate need for site site release treatment. Refer to unit #32 in 1984 fertilization contract.]</p>																			
27	541-002	060-028	P2G	Hwy 139/ Loveness Rd.	5	164	Natural Fair	C 1.17 L 1.18	.17 .13		67 86	13.6	15%	N (S?)	Maybe	10			
<p>COMMENT: Pre-commercially thinned pole size ponderosa pine stand, 60-70% crown closure, average 35-60 feet tall and 70-90 years old. Mostly ponderosa pine with some incense-cedar and very few white fir. Soil is Lawyer and Elmore loam, gravelly loam and cobbly loam on 5-10% slope; N-W aspect; 5,000 foot elevation. Legal Location: SE1/4, Section 12, T.42N., R.8E. [This unit was fertilized with 200#N/acre and 110#S/acre in October 1984. Plots were set up to monitor response. Refer to unit #45 in 1984 fertilization contract.]</p>																			
28	624-000	008-130 -144	P3P KXX	Four Mile Valley	5	166, 225	Natural Fair	C 1.30 L 1.30	.19 .15		88 184	12.4	20%	N	Maybe	15			
<p>COMMENT: Pre-commercially thinned pole size ponderosa pine stand, 60-70% crown closure, 50-80 feet tall and 80-110 years old. Soil is Lawyer and Elmore loam, cobbly loam and very cobbly loam on 2-13% slopes; S-W aspect; 5,000-5,100 feet elevation. Legal Location: SW1/4, Section 28 and East 1/2, Section 33, T.48N., R.9E.</p>																			
29	534-000	044-195	PLG	Spalding Butte	5	201	Scalped Fair	C 1.15 L 1.16	.17 .12		48 60	5.8	70+%	NS	Yes	30			
<p>COMMENT: This 8 acre unit is a 1964 ponderosa pine plantation that was machine planted after site was mechanically scalped of top soil to control competing vegetation. There is some evidence of insect damage. Trees are well stocked and average 10-20 feet tall. Soil is Elmore and Lawyer gravelly loam on nearly level ground; elevation is about 4,750 feet. Legal Location: SE1/4 of SE1/4, Section 27, T.43N., R.7E. Fertilization would be economically favorable if done within 30 years of final harvest. [Eight acres was fertilized with 200#N, 110#S, and 100#P₂O₅/acre in November 1984. Plots were set up to monitor response. Refer to unit #47 in 1984 fertilization contract.]</p>																			
30	625-000	020-012	P4P	E of Bird Spr. Ridge	6	204	Natural Poor	C 1.29 L 1.31	.20 .15		108 125	9.2	40+%	N	Yes	15-20			
<p>COMMENT: Pre-commercially thinned pole size ponderosa pine stand, 30-50% crown closure, trees 30-60 feet tall and about 70-90 years old. Soil is Lawyer very cobbly loam on 5% slope; S-SE aspect; 5,000 to 5,100 feet elevation. Legal Location: Center of Section 36, T.47N., R.9E.</p>																			

Table 1. Continued.

Timber Compt./ # Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey		Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS				Break Even Year
				Potent. Site Class	SRI M.U. #			% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Fav.		
31	613-032	042-007	P3P	Tionesta Bench	5	104	Natural Fair	C 1.23 L 1.22	.19 .15		53 67		3.5	70+%	NS	Yes	50		
COMMENT: Pre-commercially thinned pole size and saw timber size ponderosa pine stand, 30-40% crown closure, trees average 30-80 feet tall. Soil is Alcot extremely gravelly loamy sand (20-40 inch pumice overburden phase) on nearly level ground; elevation is 4,600 to 4,700 feet. Legal Location: Center of Section 32, T.44N., R.5E. [This unit was fertilized with 200#N and 110#S/acre in November 1984. Plots were set up to monitor response. Refer to unit #24 in 1984 fertilization contract.]																			
32	604-001	043-103	P3G	Tionesta Bench	4	107	Natural Good	C 1.08 L 1.14	.17 .13		45 70		9.2	40+%	NS	Yes	35		
COMMENT: Pre-commercially thinned pole size ponderosa pine stand, 50-65% crown closure, trees average about 30-100 feet in height. Soil is Alcot or Sadie gravelly or very gravelly sandy loam on nearly level ground. Elevation is about 4,300 feet. Legal Location: Center to east on common boundary of Sections 13/24, T.43N., R.5E. [This unit was fertilized with 200#N and 110#S/acre in November 1984. Plots were set up to monitor response. Refer to unit #27 in 1984 fertilization contract.]																			
33	613-051 -053	043-067	P3P	Tionesta Bench	5	183/107	Natural Fair	C 1.18 L 1.29	.17 .15		34 37		13.0	15-20%	NS	Yes	15		
COMMENT: Pre-commercially thinned pole size and saw timber size ponderosa pine stand, trees average 30-100 feet in height, 30-60% crown closure. Soil is Sadie gravelly sandy loam with no pumice overburden, on nearly level ground. Elevation is about 4,400 feet. Legal Location: West center of Section 14, T.43N., R.5E. [This unit was fertilized with about 150#N and 83#S/acre in November 1984. Refer to unit #25 in 1984 fertilization contract.]																			
34	410-120	064-129	PLG	S. of Round Mountain	5-6	174	Scalped Fair	C 1.38 L 1.17	.20 .10		70 63		7.3	70+%	N(S?)	Yes	30		
COMMENT: This is a 1968 ponderosa pine plantation that was machine planted with 2-0 stock after site was mechanically scalped of top soil to control competing vegetation. There have been no chemical release treatments. Soil is Germany and Washougal gravelly and very gravelly sandy loam on 0-5% slope; S aspect. Elevation is about 4,500 feet. Legal Location: SW1/4, SE1/4, Section 2, T.41N., R.4E. [Fifteen acres of this unit was fertilized with 200#N and 110#S/acre in November 1984. Plots were set up to monitor response. Refer to unit #34 in 1984 fertilization contract.]																			
35	309-000	025-101	PLG	N or Sugar Hill	5	230	Sugar Hill BPine Pl.	C 1.28 L 1.22	.19 .11		70 70		11.7	25%	N(S?)	Maybe	15-20		
COMMENT: Approximately 45 year old ponderosa pine plantation; unthinned; trees about 30-50 feet tall. Soil is Patio gravelly loam on 8-15% slopes. SW-NW aspect; elevation is 5,400 to 5,800 feet. Legal Location: Mainly in south 1/2, Section 10, T.46N., R.14E. [This unit was fertilized with 200#N and 110#S/acre in October 1984. Plots were set up to monitor response. Refer to unit #1 in 1984 fertilization contract.]																			

Table 1. Continued.

Timber Compt./ # Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey Potent. SRI		Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS				Break Even Year
				Site Class	M.U. #			% N	% P	% K	PPM SO ₄ S ⁴	% Ca	% Mg		Expected Response	Probable Fert. Mix Needed	Is Fert. Econ. Fav.		
36	309-39	025-200 PLG	E. of Sugar Hill	5	230/282	Sugar Hill RPine Pl.	Good C	1.22	.18		94		10.5	30%	N(S?)	Maybe	20		
							L	1.17	.11		106								

COMMENT: Approximately 40-45 year old ponderosa pine plantation. Pre-commercially thinned. Trees about 30-45 feet tall. Soil is Wapal or Zeb gravelly sandy loam on 27-41% slopes. N-NE aspect. Elevation is 5,600-6,200 feet. Legal Location: SE1/4 of NE1/4, Section 25, T.46N., R.14E. [This unit was fertilized with 200#N and 110#S/acre on all parts in October 1984. In addition, 100#P₂O₅/acre was fertilized above the road on the upper end of unit in November 1984. Response plots were set up to monitor results. Refer to unit #3 in the 1984 fertilizer contract.]

Table 1. Continued.

Timber Compt./ # Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey		Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min.	FERTILIZATION ANALYSIS				Break Even Year
				Potent. Site Class	SRI M.U. #			% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Fav.		
TIMBER STANDS WITH WHITE FIR OR RED FIR SAMPLED OR ARE SUITABLE FOR TRUE FIR.																			
<u>R5 Proposed Red Fir/White Fir Critical Levels</u>																			
								<u>1.15</u>	<u>.15</u>	<u>.58</u>	<u>100</u>	<u>.12</u>	<u>.06</u>						
37	435-301, 371, 390 441-000	072-233 W3G	Manzanita Mountain	4	195	Natural Fair	C1.05 L1.24	.14 .12	.84 .83	247 285	.49 .78	.12 .16	24.6	Low	NP	?			
COMMENT: The low foliar N. suggests a high N. fert. response is possible even though Soil N. levels indicate a low response would be expected. White fir trees about 50-70 years old and about 56-70 feet tall. Legal Location: N2/3, Section 27, T.40N., R.10E., and W1/2NW1/4, Section 35, T.40N., R.10E.																			
38	435-282	072-309 W4G	Manzanita Mountain	4	194	Natural Good	Not Sampled					18.7	Low	?	No				
COMMENT: Soil samples taken under old growth white fir stand about 100-150 years old and about 90-120 feet tall. Legal Location: Center of S1/3, Section 27, T.40N., R.10E.																			
39	322-000	051-492 M3G	Deep Ck. Log Grading Plot	4-5	231	Natural Good	Not Sampled					29.4	Low	?	No				
COMMENT: A three stage timber stand aggregation consisting of mostly white fir with less ponderosa pine. Legal Location: NE1/4 of SE1/4, Section 5, T.42N., R.15E.																			
40	322-020	051-438 W3G	Deep Ck.	4	231	Natural Good	C1.03 L1.10	.13 .11	.86 .63	287 167	.67 1.14	.14 .17	30.9	Low	NP	?			
COMMENT: Low foliar N. suggests a high N. fert. response is possible even though soil N. levels indicate a low response would be expected. White fir trees about 60-70 years old and about 50-60 feet tall. Legal Location: Center, Section 5, T.42N., R.15E.																			
41	322-022	051-435 M4G	Deep Ck.	4	452b	Natural Good	Not Sampled					30.4	Low	?	No				
COMMENT: Soil samples taken from a deep, nutrient rich Bertag soil type under white fir trees about 120 years old and about 120 feet tall. Legal Location: West Center, Section 4, T.42N., R.5E.																			
42	313-000	028-393 M3G	Lake City Canyon	4	(196) WAF	Natural Fair	C1.17 L1.26	.14 .12	.74 .67	247 233	.86 1.24	.16 .19	19.0	Low	P(N?)	No			
COMMENT: Current year foliar N is close to critical level indicating a possible good response to N. fert. Soil is Lamondi family on a 35-50 percent NE aspect with white fir about 70-90 years old and about 70-80 feet tall. Legal Location: NE1/4 of SE1/4, Section 20, T.44N., R.15E.																			
43	410-533	064-102 M4P	Round Mtn.- Snell Butte	4	(34a)	Natural Good	C1.03 L1.06	.12 .10	.95 .72	103 94	.63 1.03	.13 .18	6.2	70+%PP N(Pine)(S?) 105%WF NPS(WF)	Yes	35			
COMMENT: 40-80% crown closure of mostly ponderosa pine, therefore, fertilize for ponderosa pine - use N. fert. only. Legal Location: SE1/4 of SE1/4, Section 34, T.42N., R.4E.																			

Table 1. Continued.

Timber Compt./ # Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey Potent. SRI Site M.U. Class #	Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS				Break Even Year
							% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Favr.		
44	612-043	042-091	W3G Black Mtn. Road	4	263	Natural Fair/ Good	C .98 L .97	.13 .09	.92 .67	43 51	.54 .73	.10 .12	4.4	125-130%	NPS	Yes	40	
COMMENT: Needs thinned. Two fert. appl. at 10-20 year intervals should be very cost effective. Fertilize with NPS first appl. and may need only N fert. for second appl. timber consists of white fir and red fir about 55-70 years old and about 60-80 feet tall. Legal Location: East Center, SEction 22, T.43N., R.4E. [Fifteen acres of this stand was fertilized with 200#N, 110#S and 100#P ₂ O ₅ /acre in November 1984. Plots will be set up to monitor response. Refer to unit #29 in the 1984 fertilization contract.]																		
45	628-035	041-185	RIX Paynes Springs	5	199	Natural Poor	C 1.30 L .95	.22 .11	1.14 .68	170 89	.33 .50	.11 .07	3.6	130+	NPS	Yes	30	
COMMENT: Samples were taken from a 3 acre, thinned natural red fir regeneration site on either side of road. Legal Location: SW1/4 of SE1/4, Section 18, T.43N., R.4E.																		
46	312-006	028-209	W2G South Fork Davis Creek	4-5	196	Natural Fair	C .94 L .98	.13 .10	.92 .80	117 125	.72 1.40	.14 .17	10.7	65%	NP	Yes	20	
COMMENT: Recently thinned 15 acre white fir stand on Lamondi soil family on a 40-55 percent NW aspect. White fir trees are 79 years old and about 40 feet tall and have been thinned to 110 square feet basal area. Legal Location: Center of NE1/4, Section 35, T.45N., R.14E. [Twelve acres of this unit was fertilized with 200#N, 110#S and 100#P ₂ O ₅ /acre in October and November 1984. Plots will be set up to monitor response. Refer to unit #8 in the 1984 fertilization contract.]																		
47	545-009	061-359	W3G Happy Camp Mountain	4	194	Natural Fair	C .87 L .98	.12 .10	.87 .66	74 44	.63 1.56	.12 .16	11.3	60%	NPS	Yes	20	
COMMENT: White fir trees about 60-75 years old and about 60-80 feet tall. Soil is of the Lamondi family. Legal Location: NE1/4 of SW1/4, Section 1, T.41N., R.7E.																		
48	315-000	051-068	W3G Joseph Creek Basin	5	116	Natural Fair	C 1.02 L 1.01	.16 .13	.97 .73	123 123	.74 1.51	.14 .17	14.2	45%	N(P?)	Yes	20	
COMMENT: Needs thinned. Phosphorus fert. may also be needed but current level probably is sufficient for good N. fert. response without phosphorus fertilization. Soil is of the Lawyer family on a 25-40 percent NW aspect. Legal Location: NE1/4, Section 36, T.44N., R.14E.																		
49	311-000	028-031	PLP Upper Lassen Creek	4-5	195	Scalped Poor Natural Top Soil	Not Sampled Not Sampled Not Sampled						6.0 23.9 24.8	110% WF 70+% PP Low WF 0% PP Low WF 0% PP	-	No No		
COMMENT: this area consists of an old scalped ponderosa pine plantation site which has failed. Currently, it is in an active state of gully erosion. The soils are mostly of the Lamondi and Smarts families on 5-30 percent slopes on a west to southwest aspect. A FY 85 ADVENT 90 acre soil improvement project has been proposed for this area. Legal Location: West Center of Section 22/27 Intersect, T.45N., R.15E. [This 90 acre unit was rehabilitated with 092 dollars during summer 1984. Terraces were outsloped and existing gullies were filled in. This site will be planted to ponderosa pine seedlings in spring 1985. Refer to the Upper Lassen Creek Soil Improvement Project report for additional information.]																		

Table 1. Continued.

#	Timber Compt./ Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey Potent. SRI Site M.U. Class #	Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS					PPM Soil Min. N.	FERTILIZATION ANALYSIS			
								% N	% P	% K	PPM SO ₄ S	% Ca		% Mg	Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Favr.
50	312-004 312-003, -005	028-019 M4P 028-065 MIX -072 M3P	M4P	3 miles E. of Davis Ck.	5	282	Natural Fair Regen.	C 1.11 L 0.98	.16 .12		128 113	16.9	35%(WF)	NP(S?)	No	-	
							Ponderosa pine - C	1.29	.20		87	16.9	5-10%(PP)		No	-	
							Ponderosa pine - L	1.22	.14		71						
COMMENT: Natural regeneration sites consisting of about 60% white fir and 40% ponderosa pine seedlings and pole size trees. Trees average about 8-30 feet tall and 15-35 years old. Soil is Patio very gravelly and extremely gravelly loam on 30-45% slopes. NW-NE aspects. Elevation is 6,100-6,500 feet. Legal Location: 12 acre unit on NE1/4 of NE1/4, Section 13, T.45N., R.14E. and 35 acre unit in NW1/4 of SW1/4, Section 13, T.45N., R.14E. [These units were fertilized with 200#N and 110#S/acre in October 1984. Refer to units #6 and #7 in 1984 fertilization contract.]																	
51	320-021	051-241 SM -249 W3G	SM	Stough Campground	4	LYF/WAF	Natural Fair	C 0.98 L 1.04	.14 .11		187 142	15.3	40%	NP(S?)	Yes	20	
COMMENT: Pre-commercially thinned pole size white fir stand. Trees about 40-70 feet tall. Moderate Modoc budworm damage to current year needles. Soil is Childs or Lamondi loam and gravelly loam on 10-30% slopes. E-W aspect. Elevation is 6,400-6,600 feet. Legal Location: Center of common boundary section 27/28, T.43N., R.15E. [This unit was fertilized with 200#N, 110#S, and 100#P ₂ O ₅ /acre in October and November 1984. Plots were set up to monitor response. Refer to unit #9 in 1984 fertilization contract.]																	
52	320-020	051-255 M3P 052-121 M3P	M3P	Stough Campground	4	LYF/WAF	Natural Fair	C 0.96 L 1.08	.14 .09		184 135	21.3	Low	NP(S?)	No	-	
COMMENT: Pre-commercially thinned pole size white fir stand, trees about 40-80 feet tall. Slight Modoc budworm damage to current years needles. Low foliar N. suggests a high N. fertilizer response is possible even though soil N. levels indicate a low response would be expected. Soil is Childs or Lamondi loam and gravelly loam on 5-15% slopes. SE-W aspect. Elevation is 6,400 to 6,600 feet. Legal Location: South center, Section 27, T.43N., R.15E. [This unit was fertilized with 200#N and 110#S/acre in October 1984. Plots were set up to monitor response. Refer to unit #10 in 1984 fertilization contract.]																	
53	339-001	081-129 W3P -145 W3G	W3P	Mahogany Ridge	5	232	Natural Poor	C 1.01 L 1.06	.14 .11		217 152	19.7	Low	NP	No	-	
COMMENT: Pre-commercially thinned pole size white fir stands. Trees average 20-50 feet tall and 40-70 years old. Slight Modoc budworm damage to current years needles. Soil is Patio gravelly loam and very gravelly loam on 30-45% slopes. WNW-NE aspect. Elevation is 6,200-6,800 feet. Legal Location: Mainly in NE1/4, Section 21, T.39N., R.15E. Low foliar N. suggest a high N. fertilizer response is possible even though soil N. levels indicate a low response would be expected. [These units were fertilized with 200#N and 110#S/acre in October 1984. In addition the 59 acre unit was also fertilized with 100#P ₂ O ₅ /acre in November 1984. Plots were set up to monitor response. Refer to units #13 and #14 in the 1984 fertilization contract.]																	
54	341-001	080-710 W3G	W3G	E. of Parsnip Springs	4	195	Natural Fair	C — L 1.08	— .11		— 87	26.2	Low	NPS	No	-	
COMMENT: Pre-commercially thinned pole size white fir stand. Severe Modoc budworm damage - most fir trees top 3 or 4 feet have been defoliated. Not enough current year needles to collect for foliar analysis. Soil is Lamondi gravelly loam on 15-20% slopes. W-NW aspect. Elevation is 6,800-7,000 feet. Low foliar N. suggests a high N. fertilizer response is possible even though soil N. levels indicate a low response would be expected. LEGAL LOCATION: MAINLY IN E 1/4 of SE 1/4, SECTION 15, T.38N., R.15E.																	

Table 1. Continued.

Timber Compt./ # Stand #	LMP Quad # /CA #	Dom Veg	Approximate Location	Forest Survey		Where Sampled	Present Tree Growth Rate	FOLIAR ANALYSIS						PPM Soil Min. N	FERTILIZATION ANALYSIS				Break Even Year
				Potent. Site Class	SRI M.U. #			% N	% P	% K	PPM SO ₄ S	% Ca	% Mg		Expected N. Fert. Response	Probable Fert. Mix Needed	Is Fert. Econ. Fav.	Yes	
55	612-001	042-046 - 086	M3P W2G	Black Mtn.	4	261	Natural Fair	C 0.96 L 1.03	.14 .11		97 68		6.7	100%	NPS	Yes	35		
<p>COMMENTS: Pre-commercially thinned 80% white fir and 20% ponderosa pine pole size and young saw timber size trees. Trees are about 30-100 feet tall and 50-70% canopy closure. Soil is Stonewell very gravelly to extremely gravelly loamy sand and sandy loam (7-10% ^{wood} pumice overburden) on 10-22% slopes. NW-SSE aspect. Elevation is 5,800-6,000 feet. Legal Location: SW1/4, SEction 14, T.43N., R.4E. [This unit was fertilized with 200#N and 110#S/acre in November 1984. Plots were set up to monitor response. Refer to Unit #28 in 1984 fertilization contract.]</p>																			
56	607-026	041-397 -418	W3G M4P	Shotgun Peak	4	263	Natural Fair	C 1.20 L 1.29	.14 .12		97 54		11.5	60%	NPS	Yes	25		
<p>COMMENTS: Un-thinned pole size and small saw timber size white fir stand. 80-100% crown closure, trees average 70-90 feet tall and 50-90 years old. Soil is Stonewell and Yallani very gravelly sandy loam (loamy phase) on 20-30% slopes. S-W aspect. Elevation is 5,800-6,100 feet. Legal Location: On common boundary of Section 32, T.43N., R.4E., and Section 5, T.42N., R.4E.</p>																			
57	609-010, 011*012	041-419 -445	M4G W3G	Six Shooter Butte	4	277/262	Natural Fair	C 1.20 L 1.29	.13 .11		101 80		11.5	60%	NPS	Yes	25		
<p>COMMENT: Un-thinned pole size and saw timber size mixed conifer stand consisting of mainly white fir, moderate to high amounts of Knobcone pine in areas, and some ponderosa pine. This unit is scheduled for a FY 1985 commercial thinning. Soil is Zynbar or Stonewell (loamy phase) gravelly loam or gravelly sandy loam. some Yallani very cobbly sandy loam also present. Slopes are 10-30% and on NE-SSE aspect. Elevation is 5,600-6,000 feet. Legal Location: NE1/4, Section 3, T.42N., R.3E.</p>																			

*C = Current year foliage samples.

**L = Last years foliage samples.