NORTH FIRE EMERGENCY BURNED AREA

REHABILITATION MONITORING PLAN

Gila National Forest

by

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North Fire Emergency Burned Area

Rehabilitation Monitoring Plan

The North Fire is located in Sec. 35, T10S, R18W on the Glenwood Ranger District, Gila National Forest (see attached map). The fire began at 1517 on June 17, 1985 and was controlled at 1000 on June 19, 1985 (see Burned Area Report, Form FS-2500-8 for further information). The fire burned approximately 420 acres of the Middle San Francisco River Watershed (WRS Watershed Number 15040004136).

Approximately 150 acres of the 420 acres burned under high intensity flames creating complete cover loss. The emergency rehabilitation objective was to enhance natural revegetation in order to reduce on-site soil loss (quantity and time), maintain soil productivity, and protect the cold water fisheries of Mineral Creek from siltation. Emergency treatment consisted of aerially seeding the 150 acres of hot spots with a mixture of 60% orchard grass, 30% smooth brome, and 10% yellow blossom sweet clover at a rate of 10-12 lbs./acre.

The objective of this monitoring plan is to evaluate the effectiveness of the burned area emergency treatment. The primary goal of the study will be to evaluate the revegetation of the hot spots. A secondary goal will be to evaluate the soil movement within the hot spots. This study is not meant to be comprehensive in nature (as research is), but is designed only to educate the Forest about the emergency burned area rehabilitation treatment used. Knowledge gained from this study will aid us in any future treatments of burns.

Location of Study Area

The study area selected is shown in the attached map. The area is shown in solid orange on the map and is the largest of four hot spots and consists of approximately 90 acres. Access to the site can only be accomplished by either horseback or foot. Trail heads are located at the headwaters of the North Fork of Mineral Creek (Trail No. 201) or the South Fork of Mineral Creek (Trail No. 798). Either trail may be used to get into the burned area. Walk either trail until the intersection of both trails is met. Just upstream of this intersection is the interior fireline (east flank). Care must be taken not to go too far to the exterior fireline (east flank). The exterior line will not direct the sampler to the reference markers established. The interior fireline can be easily identified as it was constructed directly on the outer perimeter of the fire itself.

Once the interior fireline is located, walk the fire line uphill approximately 1/2 mile. The terrain is very steep (60% slopes) and will require a vertical climb of about 800-1000 feet. Continue walking uphill until a fence post is located on the fireline. The post will be found just below a rock outcrop. The walk will require roughly one hour to reach the post. Stand on the rock next to the fence post and shoot a bearing of 196 degrees to the saddle. The saddle should be visible from this point even through the timber due to the light on the edge of the horizon.

Walk approximately 100 yards toward the saddle and locate a second reference marker (fence post) in the opening on the top of the saddle. Shoot a bearing of 282 degrees toward the hot spot. Walk 215 feet towards the reference marker (fence post) located

on the edge of the hot spot near a large ponderosa pine. The ponderosa pine has an irregular forked top.

Selection of Parameters

Two parameters were selected for measurement on the North Fire. The parameters are ground cover and soil loss or movement. These parameters should indicate the success of the aerial seeding by evaluating revegetation (return of cover) and soil erosion.

Selection of Monitoring Site

The large hot spot was selected as the monitoring site due to the access and because it was considered most representative of the burned area. Sampling of all four hot spots was not feasible due to the limitations of money and time. The sampling area consisted of a mixed conifer vegetation type on a 50% slope. After the burn there was no vegetative cover, only dead standing or dead and down logs.

Sampling Frequency

The study area will be sampled for 3-5 years. Data will be collected twice a year. Once after the spring runoff (April-May) and once after the summer rains (September).

Sampling Techniques

The sampling techniques used in this study will be very basic. Ground cover will be sampled using randomly located 50-pace transects. Procedures used will correspond to the watershed condition analysis sampling strategies discussed by Rhey Solomon. "Watershed Condition Analysis Sampling Strategies." Unpublished Paper, SW Regional Office, USDA Forest Service, Nov. 1982. The number of samples collected will vary depending upon variability in ground cover. Sample size will be calculated using the attached exhibit which shows sampling statistics.

A sampling transect was established at the reference marker (fence post). The transect consists of 10 rebar markers which will be used as sampling points for ground cover and soil erosion. The sampling plot layout is shown in Diagram 1.

Photo points will be taken at four points. The photo points are identified and located as shown on Diagram 1 (P1-P4). Two carpenter's scales are laid over the rebar, with the rebar composing the center point of the 3 by 3 foot square. Photos will then be taken framing the square within the photo. One photo will be taken looking to the west, the second photo will be taken looking north (upslope).

The photo points will be used to show revegetation over time and can also be used to evaluate the density, vigor, and species diversity of the new vegetation. Each site was left undisturbed and contains branches and rocks which were located on site.

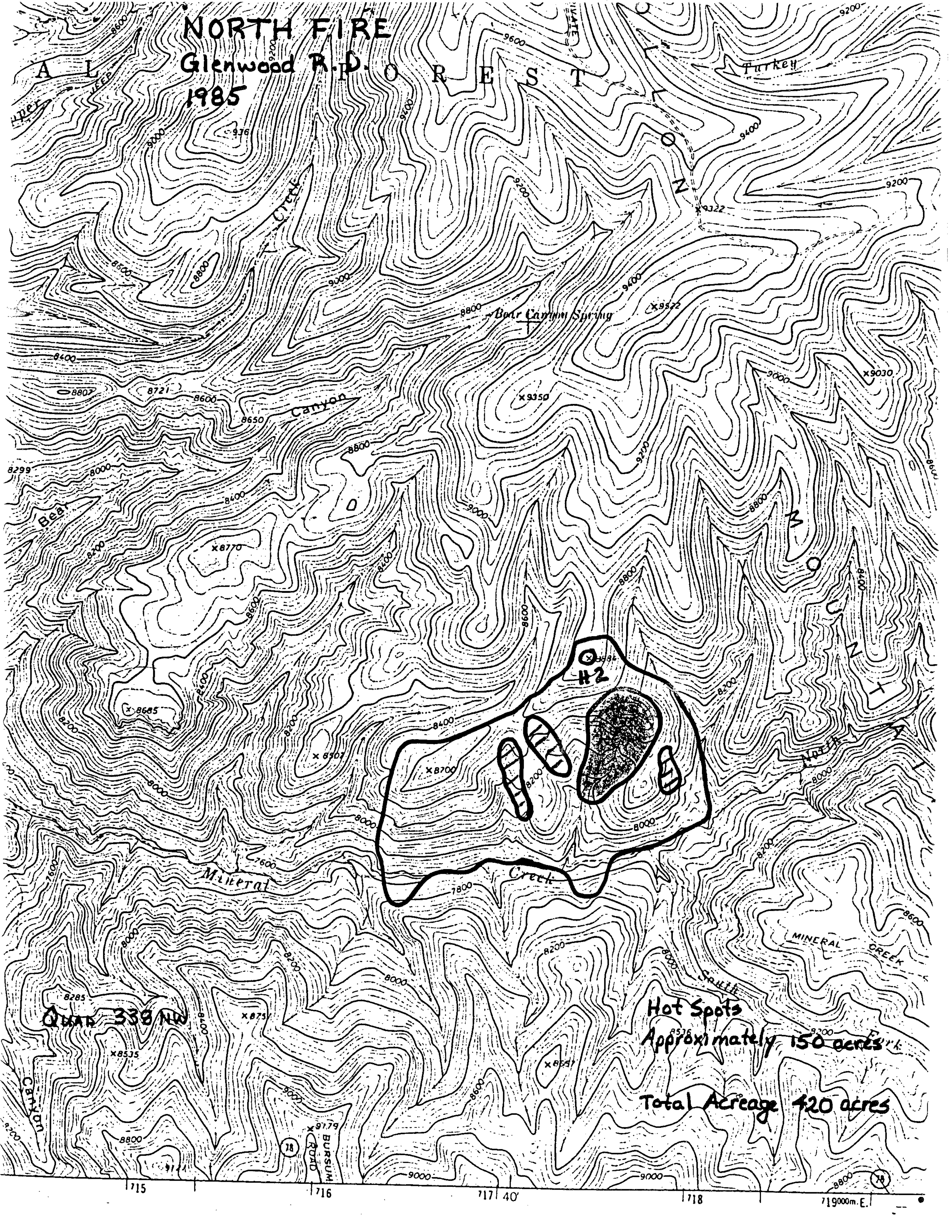
Soil loss will be measured at all 10 points (4 at P1-P4, 6 at A-F). Soil loss will be measured by measuring the distance between ground surface and the top of the rebar (uphill side). Each rebar will be pounded into the ground so approximately 15 cm. will show above the ground surface. Measurements will be taken the first time to use as a baseline height. Erosion will vary at each of the 10 points due to surface roughness, rock, debris and obstructions. A few of the points will lie behind rocks

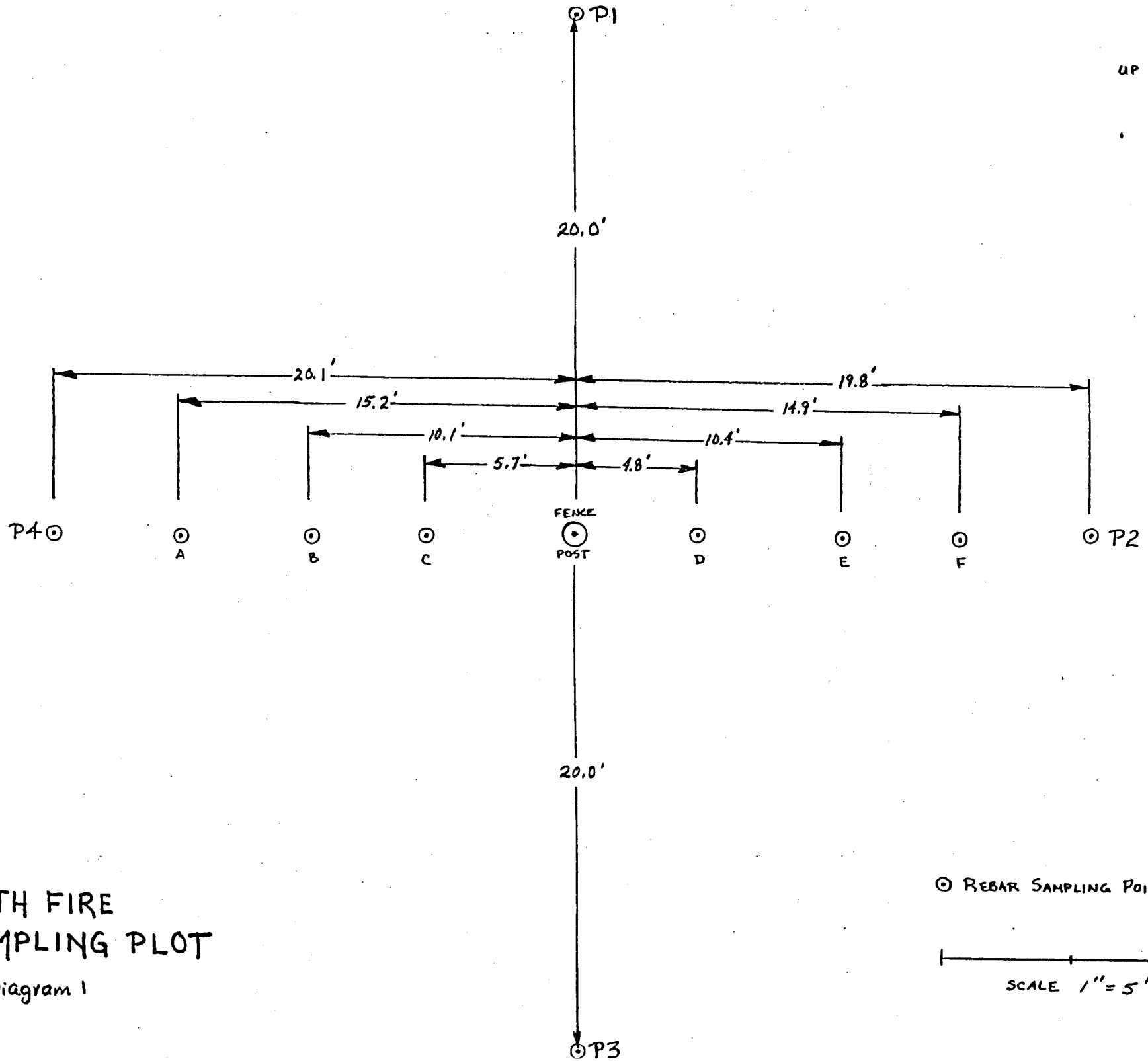
Data Analysis and Interpretation

Data analysis and interpretations will be based upon the changes noticed in the photo points, ground cover and soil loss measurements.

No statistical analysis need be done. Much of the information derived will come from the changes over time (increases in ground cover, reductions in soil loss). Interpretations of the success of the aerial seeding may be drawn from the germination and revegetation success and the evaluation of planted versus natural revegetation.

There will be no commitment of District time. Sampling will be conducted by the Forest Hydrologist bi-annually. The Forest Hydrologist may require the assistance of the District in collecting data and making evaluations and interpretations.


NORTH FIRE
Glenwood R.D.
1985
Bear Canyon Spring
Canyon
Bear
Creek
Mineral
Creek
#2
Turkey
North
MINERAL CREEK
South
Fork
Hot Spots
Approximately 150 acres
Total Acreage 420 acres
QUAD 338 NW
BURSUM ROAD
715
716
717 40'
718
719000m.E.



NORTH FIRE SAMPLING PLOT

Diagram 1

EXHIBIT 18

Sampling Statistics

Equation: $N = \frac{s^2 \ t^2}{E^2}$ where

N = sample size

S^2 = sample variance $s = \sqrt{\frac{\Sigma X^2 - \frac{(\Sigma X)^2}{n}}{n-1}}$

t = value from t Table for n-1 d.f. and prob. level

E = desired error(between ± 5 to ± 10% cover)

STEP 1: Take preliminary samples within sampling unit (at least 6)

STEP 2: Calculate $\bar{x}$ and S^2 for preliminary sample.

STEP 3: Determine E (example, 0.10 X $\bar{x}$ = E).

STEP 4: Find appropriate t value from t Table below.

STEP 5: Calculate for N in above equation.

STEP 6: If N is larger than the sample size, go to STEP 7 -- otherwise enough samples have been taken.

STEP 7. Continue to collect more samples. As samples are collected the S value and t value value will decline. Therefore, it is not necessary to collect up to N samples before recalculating N.

STEP 8: Repeat STEPS 2 - 6

Table 2.—*Distribution of t*

df	Probability								
	.5	.4	.3	.2	.1	.05	.02	.01	.001
1	1.000	1.376	1.963	3.078	6.314	12.706	31.821	63.657	636.619
2	.816	1.061	1.386	1.886	2.920	4.303	6.965	9.925	31.598
3	.765	.978	1.250	1.638	2.353	3.182	4.541	5.841	12.941
4	.741	.941	1.190	1.533	2.132	2.776	3.747	4.604	8.610
5	.727	.920	1.156	1.476	2.015	2.571	3.365	4.032	6.859
6	.718	.906	1.134	1.440	1.943	2.447	3.143	3.707	5.959
7	.711	.896	1.119	1.415	1.895	2.365	2.998	3.499	5.405
8	.706	.889	1.108	1.397	1.860	2.306	2.896	3.355	5.041
9	.703	.883	1.100	1.383	1.833	2.262	2.821	3.250	4.781
10	.700	.879	1.093	1.372	1.812	2.228	2.764	3.169	4.587
11	.697	.876	1.088	1.363	1.796	2.201	2.718	3.106	4.437
12	.695	.873	1.083	1.356	1.782	2.179	2.681	3.055	4.318
13	.694	.870	1.079	1.350	1.771	2.160	2.650	3.012	4.221
14	.692	.868	1.076	1.345	1.761	2.145	2.624	2.977	4.140
15	.691	.866	1.074	1.341	1.753	2.131	2.602	2.947	4.073
16	.690	.865	1.071	1.337	1.746	2.120	2.583	2.921	4.015
17	.689	.863	1.069	1.333	1.740	2.110	2.567	2.898	3.965
18	.688	.862	1.067	1.330	1.734	2.101	2.552	2.878	3.922
19	.688	.861	1.066	1.328	1.729	2.093	2.539	2.861	3.883
20	.687	.860	1.064	1.325	1.725	2.086	2.528	2.845	3.850
30	.683	.854	1.055	1.310	1.697	2.042	2.457	2.750	3.646
40	.681	.851	1.050	1.303	1.684	2.021	2.423	2.704	3.551
60	.679	.848	1.046	1.296	1.671	2.000	2.390	2.660	3.460
120	.677	.845	1.041	1.289	1.658	1.980	2.358	2.617	3.373
∞	.674	.842	1.036	1.282	1.645	1.960	2.326	2.576	3.291