

PLANTING RECONNAISSANCE IN DISTRICT I.

By F. J. Poeh, Chief of Party.

Due to the great devastation to reproduction and young growth caused by fire and lumbering (the former by far the greater cause) District I of the United States Forest Service has for a number of years past, resorted to artificial regeneration or forest planting.

In order that work of forest reforestation may be carried out in an efficient and economic manner, some method whereby the deforested areas might be located, mapped, and recorded had to be devised. To this end Planting Reconnaissance was developed.

The work divides itself into two departments namely: Extensive and Intensive Reconnaissance, the former a forerunner for the latter. To explain the organization of, methods of procedure, and forms used in this work I will resort, from time to time thruout this article to the "Extensive and Intensive Planting Survey Instructions" as used in District I.

Reconnaissance for planting was first taken up in District I in 1916 and was during that year, more of an experiment in both organization and operation. The methods used however, were so effective that the organization and operation of the party remained practically the same for the following years.

During 1918, due to war conditions, no reconaissance work was carried on, but in June, 1919, the work was again resumed. The following report, taken from the "1920 Annual Planting Report, District I", shows the number of acres covered and costs per acre for the years 1916-1919 inclusive.

SUMMARY OF PLANTING SURVEY ON DISTRICT I.

Extensive Survey

In 1916, 20,480 acres were examined of which 9,220 were found to be plantable, the total cost of survey amounting to \$.011 per acre.

In 1917, 169,513 acres were examined, 32, 923 acres of plantable acreage found and the total cost of survey calculated to be \$.0082 per acre.

In 1919, 118,620 acres were examined, 2,764 of which were plantable and the cost of survey was \$.0048 per acre.

The total acreage examined in the three years amounted to 314,613 acres of which 44,907 were found to be plantable. The average cost of survey per acre for the three years was \$.0071.

Intensive Survey



Campus at Iowa State.

In 1916, 34,669 acres were mapped of which 20,861 were plantable. The total cost per acre was \$.0730.

In 1917, 14,107 acres were mapped of which 4,761 were plantable, the total cost of survey being \$.083 per acre.

In 1919, 19,993 acres were mapped of which 4,686 were plantable. The total cost per acre was \$.0613.

The total acreage mapped was 68,709 acres, of which 30,308 were plantable. The total cost being \$.0717 per acre.

OBJECTS OF WORK.

The chief objects and aims of extensive surveys are:

- (1) To obtain a general knowledge of the country in question.
- (2) To obtain information relative to reproduction (whether sufficient or not).
- (3) To locate all available planting ground.

Intensive surveys are a direct result of the data collected from extensive, for, from the information gathered, provided sufficient planting ground has been found to warrant the expense involved in planting) the next step is to obtain in detail the information for the actual planting. In order that a better understanding may be had of the work, I shall take up each phase separately, explaining first the organization of the party, then the methods used in the reconnaissance.

ORGANIZATION OF PARTY.

CONTROL.

The planting survey organization is maintained and controlled by the District Forester in the best interests of efficiency and economy. The crew is assigned to the Forest on which the work is to be done, and the Supervisor is responsible for the transportation of supplies, for handling the accounts and purchase of supplies, and for the general conduct of the men of the party, and in emergency, has complete control of the crew. The Chief of Party is held directly responsible to the District Forester for the quality and quantity of work performed.

All correspondence between the District Office and the field is carried on through the Supervisor's office. All vouchers are initialed by the Chief of Party before payment, in order that he may be currently informed as to the project finances. The officer in charge is held responsible for the proper care of all equipment supplied to him.

The organization of the party is the same for both the extensive and intensive surveys and is as follows:

Organization of Party.

District Forester

Supervisor

Chief of Party (Topographer)

1. Compassman.
2. Cook and Packer
3. Compassman
4. Topographer

The District Forester has control over all parties in the district, the supervisor controls all parties on his forest, and the chief of party supervises the work of the party in the field and generally is chief topographer.

EXTENSIVE SURVEYS

When a *U. S. G. S. or other good contour map is available no control is necessary for the mapper can determine at all times his approximate altitude and direction. If however, no topographic map is available the following steps must be observed:

1. Both horizontal and vertical control must be run with abney chain and compass.
2. Stations should be left at least every cardinal mile, preferably in the center of each section.
3. If however, the country is of such a nature that it be advisable to cover the area more intensively, stations should be set at more frequent intervals.
4. Strips will be run at least once through a section.

DUTIES OF MEMBERS OF EACH CREW.

Compassman.

The compassman runs compass, drags chain and collects the following planting data and records it on diagrams scaled $\frac{1}{4}$ inch to the mile.

1. Soil:

S—sandy, G—gravelly, R—rocky, L—loam, C—clay

2. Brush, Windfall, Standing Dead Timber.

L—light, M—moderate, H—heavy.

Mapper.

The mapper "snubs" chain and carries elevations when necessary, and makes the map. When a U. S. G. S. or other good topographic map is available, mapping should be done directly on it as a base. If no such map can be had, mapping should be done on the following in order of preference:

1. White photostat reductions or lithograph copies of G. L. O. plats on a scale 1 inch=1 mile.
2. Blank township sheets, Form 974, scale 1 inch=1 mile.

*United States Geological Survey.

TYPES.

The following types and their symbols should be shown on this field map:

Plantable areas by species	Y. P.
Green timber	
(seed producing trees)	G
Brush prohibitive to planting	B
Reproduction sufficient	R
(-00 trees per acre)	
Too rocky for planting	K
Alienations	A

FINAL MAP

The final map should be similar to the one made in the field. The boundaries of all types should be indicated by dotted lines and the types themselves colored according to the following legend:

Type	Crayon Color No.	
G—Green timber	63	green
B—Brush prohibitive to planting	87	brown
R—Reproduction sufficient	2	yellow
A—Alienations	72	pink
Plantable areas	—	y. p.

COSTS AND REPORTS

All costs are compiled on the "Planting Survey Cost Sheet," a plan of which is as follows:

Name	Forest										Watershed		Date
	2	2	3	4	5	6	7	8	9	10	30	31	Salary
Total													(a)



Central and Morrill Hall.

The work is divided into two classes, namely; Effective and Non-effective.

Names	TOTAL	
	Days	Amount
Effective		
Rate per day		
Office Work—Mapping	(e)	(e')
Control	(e)	(e')
Field Mapping	(g)	(g')
Supervision and Inspection	(h)	(h')
TOTAL	(i)	
Non-effective		
Bad Weather	(j)	(j')
Moving	(k)	(k')
Sick Leave	(l)	(l')
Annual Leave	(m)	(m')
Sundays and Holidays	(n)	(n')
TOTAL		
Total (Effective Non-effective)	(o)	

- (p) Total No. days covered by report.....
- (q) Ave. crew (exclusive of cook, packer, etc).....
- (r) Ave. No. days effective work per pan per month
 $(i \div q) + 30$
-
- p

EXPENSES

COSTS

Travel	(N)	Control per acre
Wages—Cook		$(B \div K)$
Wages—Packer	(O)	Mapping per acre
(t) Subsistence		$(C \div K)$
Material and Equipment	(P)	Supervision per acre
Freight, express and hauling..		$(D \div K)$
Misc.	(R)	Total office cost per acre
		mapping $(E \div K)$
		Total cost per acre,
Total		$(N + O + P \div R)$

TOTAL EXPENSES OF PROJECT

(u)	Total expenses	
(v)	Ave. exp. per day effect. work ($u \div i$)	
(x)	Total No. rations served	
(y)	Ave. cost per ration ($t \div x$)	
(z)	Total cost of party ($a \div u$)	
(A)	Ave. cost per day effect work ($z \div i$)	
(B)	Total cost control ($e \times aA$)	
(C)	Total cost field mapping ($g \times A$)	
(D)	Total cost supervision ($h' + h \times v$)	
(E)	Total cost office work mapping ($e \times A$)	
(F)	Miles control	
(K)	Total acres mapped	

Following is a copy taken from the 1920 Annual Planting Report of District I showing the costs of the various projects of the year 1919.

On the Cabinet Forest in the Swamp Creek locality, 19,230 acres were examined, 481 found plantable and the total cost per acre determined to be \$.003. In the Little Beaver and Big Beaver localities, 18,088 acres examined with cost of \$.003 per acre.

On the Lolo Forest, 13,721 acres were examined in the Twin and Rock Creek localities, of which 0 plantable acres were found the cost being \$.0090 per acre. In the Silver Creek locality, 10,051 acres were examined of which 768 acres were plantable, the cost being \$.0017 per acre.

On the St. Joe Forest in the St. Joe River locality, 57,600 acres were examined of which 1515 were plantable, the cost amounting to \$.0072 per acre.

A total of 118,620 acres were examined of which 2,764 or 2.3% were plantable. The average cost of both field and office work amounted to \$.0048 per acre.

All maps and reports are submitted in triplicate for the Ranger's, Supervisor's and District Forester's files. The following General Summary Sheet is submitted with the Planting Survey Cost Sheet.

.....National Forest Date.....
 Watershed

T.R.Meridian

1. Location and Accessibility.
 (Geographic location with reference to towns, rivers, etc., and brief discussion of trails or roads to area.)
2. Condition of Area. Discuss briefly the following)
 - a Soil.
 - b Brush.
 - c Windfall.

- d Standing Dead Timber.
 3. Area Examined.

Species. (Scientific Name)	Acreage
Total acreage to be planted.	
Green timber mapped.	
Reproduction sufficient.	
Too rocky for planting.	
Brush prohibitive to planting.	
Alienations mapped.	
Total acreage mapped.	
Total cost per acre.	

4. Remarks.

INTENSIVE SURVEYS.

All topographic planting surveys will be made in accordance with the instructions given in the "Topographic Surveys" manual.

Strips will ordinarily be run 20 chains apart or once through a "forty". Exception may be made to this where the Chief of Party deems it advisable to cover the area more intensively or where non-plantable areas are covered merely to complete the map.

Ties must be made to a Land Office corner at the end of each day's work in surveyed country.

The topographer will keep the record of closure of each strip on the "Error of Closure" sheets. He will also keep a record on the map of all corners, for which search has been made, and record the data as follows:

Solid diamond for corners found.

Hollow diamond for witness trees found but no corners.

Circle where search reveals neither witness trees nor corner.

DUTIES OF MEMBERS OF EACH CREW.

Compassman.

The duties of the compassman are similar to those mentioned in extensive surveys except that planting data is kept by "forties."

Topographer.

The topographer carries elevations with the Abney, "snubs" chain and makes the map and tracing, using standard atlas symbols. The map will be made on a scale of 4 inches=1 mile with either 100 foot contour interval and 50 foot intermediate, or 50 foot contour and 25 foot intermediate. The intermediate contour will be used only to bring out additional detail.

MAPS AND TRACINGS.

The symbols used in the field tracing are similar to those mentioned under "Types" in the extensive surveys, with these additions:

Proposed camp sites Y Y p. e. s.
 Proposed trails —x—x—x—x—x—x—x
 (Trails should be shown to the p. e. s.)

Proposed roads —x—x—x—x—x
 (If existing roads run near the p. e. s. they should be continued to the site.)

Planting areas.

The planting areas should be outlined according to the species, age-classes, and spacings to be used.

Y.P.
 Example—1-2
 8x8

Species in order of importance	Age Classes.	
	Best sites	Medium and poor sites
White Pine	2-0	1-2
Yellow Pine	2-0	1-2
Engelmann Spruce	3-0	2-2
Western Red Cedar	3-0	2-2
Western Larch	3-0	2-2
Douglas Fir	3-0	2-2

Spacing should be as follows:

Best sites 8'x8'	680 trees per acre
Poorer sites (7'x7')	890 " " "
Poorer sites (6x6)	1210 " " "

The 8'x8' spacing will be used on the best sites for all species except Spruce. Spruce will be spaced 7'x7' on best and increased accordingly on the poorer ones.

When ready for the engineering department, the final field or base map and the tracing, which have been done by the Chief of Party (who is also topographer in charge) should be in colored ink and on tracing cloth respectively, and should show all detail as gathered in the field. From the tracing all planting work is done.

COSTS.

Costs are kept on the "Planting Survey Cost Sheets." The following report taken from the "1920 Annual Planting Report" of District I gives in detail the costs of the various projects during 1919.

LOLO FOREST.

Location	Total	Plantable	Cost per Acre		
	acrage mapped	acrage mapped	Field	Office	Total
Saltese area	2891	567*	.0610	.002	.0630
Randolph-Brimstone	9372	1588	.0500	.002	.0520
W. Fork Big Cr.	3190	2128	.0797	.002	.0817
Loop Cr.	4030	347**	.0541	.002	.0561

ST. JOE FOREST.

Sec. 26	450	56	.1583	.002	.1603
Totals and averages	19933	4686***	.0593	.002	.0613

*An additional 174 acres have already been planted.

**An additional 347 acres have already been planted.

***26.1% of total acreage mapped.

Canyon Creek area, Cabinet Forest (mapped in 1916) was typed in 1919 at a cost of .037 per acre.

REPORTS.

Monthly Report.

Monthly reports are submitted in duplicate to the Supervisor, the original being sent by him to the District Office.

If work on a project occupies six weeks or less, no Monthly Report need be made the Project Report being sufficient. In case the work extends beyond a period of six weeks, the Chief of Party should submit a progress report at the end of each month. The monthly report is a concise statement of the progress made, the number of acres covered, and the approximate cost per acre.

Project Reports.

Reports (a) and (b) should be submitted in triplicate for the Ranger's, Supervisor's and District Forester's files.

Report (a) is an Intensive Planting Survey Report showing the condition of the area in the amount of distribution of brush, windfall, and standing dead timber by forty acre tracts.

Report (b) summarizes the planting area as to the proposed species to be planted, the age class, the spacing to be followed, the character of the soil, the number of acres to be planted and the number of trees necessary. Questions are to be answered as to the amount of green timber mapped, the amount of brush prohibitive to planting, the amount of reproduction on the area and the several soil distinctions mapped. The total number of acres mapped with the cost is included.