

United States Department of Agriculture
Forest Service
North Pacific District

S R-6
Timber Surveys, Malheur
Malheur River Project

January 7, 1931

The Forester,
Washington, D. C.

Dear Sir:

The Forest Supervisor's copy of the descriptive report covering this project, dated May 24, 1928, was loaned to prof. Matthews, of the Forest School of the University of Michigan, in the fall of 1928, to be used by Junior Forester Hulett, who was then working for his Master's degree. This report was lost.

Prof. Matthews has now offered to copy the report for us, but before asking him to undertake it I am writing to inquire whether you have use for the report, or whether your copy might be returned to us for the use of the Supervisor. The report contains a large number of detailed tabulations which make it a very heavy job of stenographic work and I am rather reluctant to accept Prof. Matthews' offer unless it is necessary.

Very truly yours,

C. J. BUCK, Regional Forester

By J Kavanagh Acting.

United States Department of Agriculture
Forest Service
North Pacific District

S R-6
Timber Surveys-Malheur
Malheur River Project

April 26, 1929.

The Forester,
Washington, D. C.

Dear Sir:

There is forwarded, herewith, a memorandum which is self-explanatory and which should be attached to the timber survey project report in this case.

Very truly yours.

C. M. GRANGER,
District Forester

By Kavanuagh Acting

United States Department of Agriculture
Forest Service
North Pacific District

S R-6,
Timber Surveys, Malheur
Malheur River Project.

December 15, 1928

The Forester,
Washington, D. C.

Dear Sir:

You may recall that in 1927 we did not quite complete the field work of the Malheur River timber survey project, which is a cooperative project with the Eastern Oregon land Company and correlated with grazing reconnaissance. The project has been completed in 1928, covering a somewhat greater area than we had anticipated. We believe it is most practicable to combine the data from the two seasons' work in a single report, and I am enclosing, herewith, a set of numbered sheets for your copy of the report. The duplicate pages in your present report should be removed and the new sheets inserted in their proper places. There is also enclosed for inclusion in the report a one-quarter inch scale map showing the area covered in 1928.

As indicated on the supplemental sheet, page 107, a single cost report covering the 1927 and 1928 work is now being prepared and a copy will be mailed to you as soon as completed.

Very truly yours,
C. M. GRANGER,
District Forester.

Enclosures.

S
Timber Surveys, D-6, Malheur
Malheur River Project

Ref. letter
December 15, 1928

New pages inserted in report
(Received with letter of Dec. 15, 1928)

<u>Page No.</u>	<u>Page No.</u>
40	87
42	88
42a	88a
56	88b
57	91
57a	92
57b	93
61	93a
72	102
73	104
73a	105
73b	107
76	
77	
78	
78a	

United States Department of Agriculture
Forest Service
North Pacific District

S D-6
Timber Surveys-Malheur
Malheur River Project

October 3, 1928.

The Forester,
Washington, D. C.

Dear Sir:

Your letter of September 24 is received.

The cost report pertaining to this project has not been prepared.

The data concerning the costs for the work done last season are now available but have not been compiled in condensed form for the reason that we wish to combine these costs with those incurred this season while completing project. Under this procedure the cost report for the completed project will be available soon after the office compilations for the 26,000 acres covered this season are finished. This work should be finished about the end of the present calendar year and the revised descriptive and cost reports will be sent you soon after. However, should you desire a separate report for the work done last season, it will be prepared as soon as possible upon receipt of your request.

Very truly yours,

C. M. GRANGER,
District Forester.

By C. J. Buck Acting.

S
Timber Surveys, D-6, Malheur
Malheur River Project

September 24, 1928

District Forester
Portland, Ore.

Dear Sir:

Reference is made to the timber survey report covering this project which was received here June 23, 1928:

This report appears to be very complete and presents the data collected in very usable form. The report states that a further report covering the costs of the project will be submitted in the near future. This supplemental report does not appear to have been received to date.

Very truly yours,
J. A. FITZWATER,
Acting Assistant Forester.

United States Department of Agriculture
FOREST SERVICE

S d-6
Timber Surveys-Malheur
Malheur River Project

Portland, Oregon,
May 24, 1928.

DESCRIPTIVE REPORT¹
Malheur River Timber Survey Project
Malheur National Forest Service
1927

Fred A. Matz,
Chief of Timber Surveys.

¹ This document was transcribed from a photocopy of the original, which is located in the Supervisor's Office Silviculture Library Archives. To the greatest extent possible, this version is an exact duplicate of the original text.

Malheur River Block.
Yellow Pine Type. - area.

<u>74</u>	<u>73</u>	<u>72</u>	<u>71</u>
26,695	1,226	441	2,130

26695					
1226					
441					
2,130					
30,492	26695.00	.875			
	243936				
	230140				
	213444				
	166960				

30,492) 2,130.00 (.07

.875
 .040
 .014
 .071

 .999
 100.0%

<u>30492</u>	1,226.000	.0402			
	219,680				
	11476				
	1124				
	63200				

<u>30492</u>	441.000	.014			
	30492				
	136080				

70 - water (74)

1,585

7,347

8,932

26,695) 8932.0 (.34 plants per 4"-11" per acre
80085
 92350

182,914

128,549

~~184,419~~

311,463

1,226

441

2,130

3,797

3,797) 311,463 (.82) plants per 4"-11" per acre.

20376

7703

7594

S
Timber Surveys-Malheur
Malheur River Project.

Portland, Oregon,
May 24, 1928

DESCRIPTIVE REPORT
Malheur River Timber Survey Project
Malheur National Forest Service
1927

Fred A. Matz,
Chief of Timber Surveys.

With letter of April 26, 1929

S D-6
Timber Surveys-Malheur
Malheur River Project.

April 8, 1929

Memorandum for Forest Management

Compilations resulting from the grazing reconnaissance of the area included in this project by Assistant Range Examiner F. G. Renner, indicate that cumulative errors amounting in all to 5.82 acres occur in the acreage of forest types tabulations for the Eastern Oregon Land Company's land, as shown in the timber survey Descriptive Report pertaining to this project. It is believed not justifiable to make these corrections in the typed tabulations, and that if a reference mark be placed at the points mentioned later the corrections may readily be made should occasion arise:

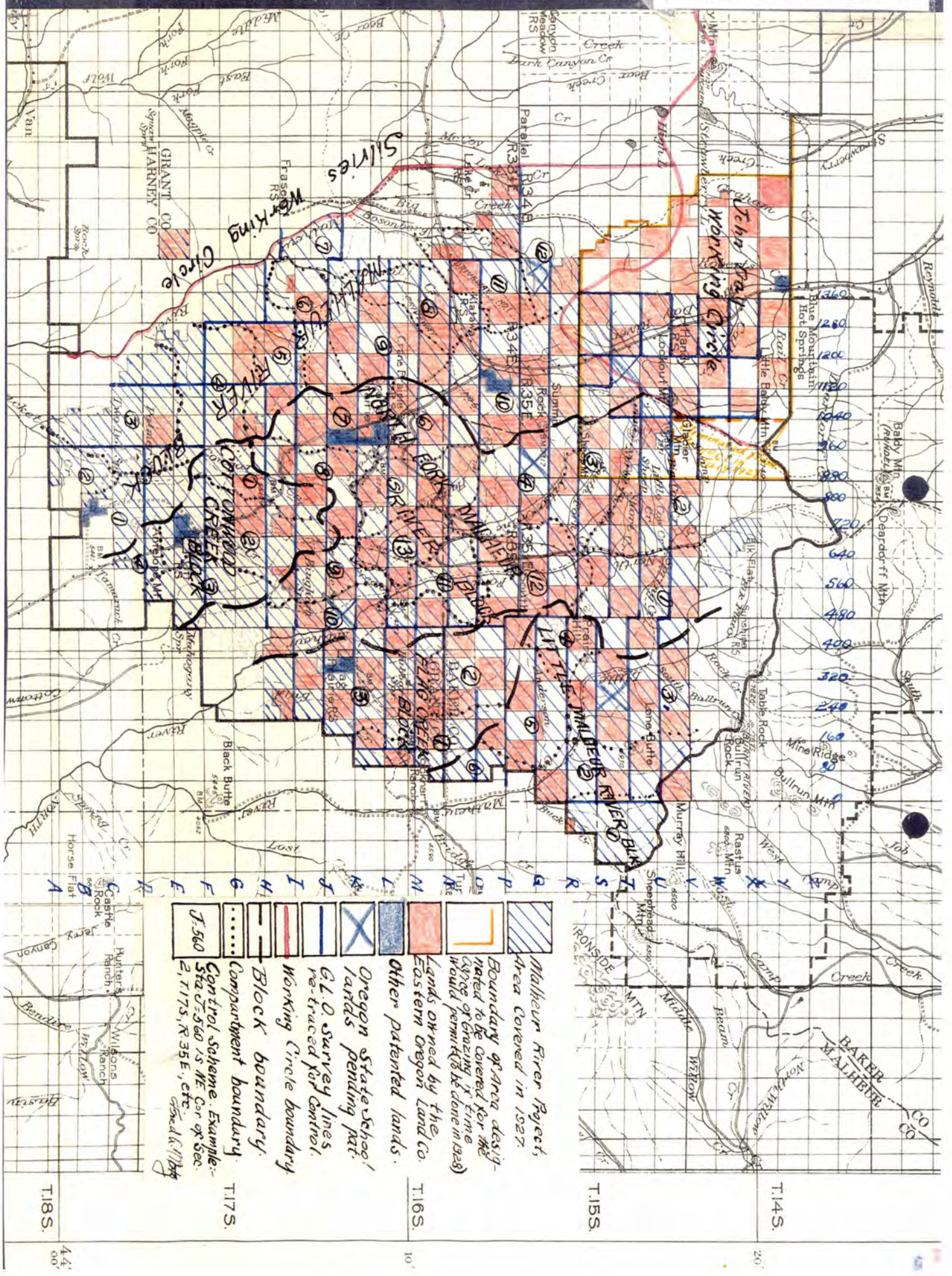
Reference: The Descriptive Report, Malheur River
Timber survey project, dated May 24,
1928, by Fred A. Matz.









Corrections follow:

1. Page No. 59
Malheur River Block, Compartment 9, T. 16 S., R. 34E., W.M., Sec. 27 – To the mature yellow pine type (Y-4) add 2.00 acres.
2. Page No. 60
Malheur River Block, Compartment 10, T. 16 S., R. 34 E., W.M., Sec. 1 – To the mature yellow pine type (Y-4) add 3.00 acres.
3. Page No. 63
North Fork Malheur River Block, Compartment 4, T. 15 S., R.35 ½ E., W.M., Sec. 29. – To the mature yellow pine type (Y-4) add 0.50 acres.
4. Page No. 66
North Fork Malheur River Block, Compartment 9, T. 17S., R.35 E., W.M., Sec. 11 – To juniper type add 2.00 acres.
5. Page No. 73
John Day River Block, Compartment 1, T. 15 S., R. 35 E., W.M., Sec. 3 – From sub-alpine type subtract 0.68 acres.

The above corrections must also be applied to the corresponding township, compartment, block and project totals.

Fred A. Matz,
Chief of Timber Surveys



-  Malheur River Project, Area Covered in 1927.
-  Boundary of area designated to be covered for the purpose of grazing if time would permit (to be done in 1928).
-  Lands owned by the Eastern Oregon Land Co. other patented lands.
-  Oregon State School lands pending pat.
-  G.L.O. Survey lines, re-traced for control.
-  Working Circle boundary.
-  Block boundary.
-  Compartment boundary. Example: Sta 2560 vs NE Cor of Sec. 2, T.17S., R.35E., etc. (See also R.17S.)

T.18S.
44'
00

T.16S.
10'

T.17S.

T.15S.

T.14S.
20'

TABLE OF CONTENTS

I. Introduction 13
Maps 13
History of project:..... 13
Personnel 14
Location and area:..... 15
Unit divisions 16
Status and Ownership: 18
II. Field Work and Computations..... 25
Field work: 25
 Control methods: 25
 Cruising methods:..... 25
 Check cruises: 25
Office computations: 28
Defect and breakage correction factors:..... 30
III. Silvicultural Description 31
Forest types: 31
 Yellow pine: 31
 White Fir-Larch-Douglas Fir type: 36
 Lodgepole pine types: 39
 Juniper type: 39
 Mountain mahogany type: 39
 Grass and sagebrush types:..... 39
Site classification: 39
Description of timber:..... 40
 Yellow pine: 40
 Douglas fir: 40
 White fir: 40
 Western larch: 40
 White pine:..... 40
 Engelmann spruce:..... 40
 Reproduction: 40
Silvicultural management: 41
 Injurious factors: 41
 Growth and yield data:..... 41
IV. Logging Data..... 41
V. Statistical Summary 42
 Acreage of forest types:..... 42
 Conclusion:..... 43

DESCRIPTIVE REPORT

I. Introduction

Maps

A map on the scale of $\frac{1}{4}$ inch equals 1 mile forms the frontispiece of this report. On it are shown the project boundaries, the area covered to date and various other data in accordance with the accompanying legend.

Four inch to the mile township plats showing the topography by contours and the forest types in accordance with the stand legend, have been prepared and are bound in the regulation folders. There were also prepared timber estimate plats on which are shown the timber estimates by 40-acre subdivisions, compartments and blocks and the boundaries of same.

History of project:

The project is traversed by The Dalles Military Road, grant for which was given on February 25, 1867. The route of this road was defined as from The Dalles via Canyon City to Fort Boise. The total length of this road is 357 miles, 35 miles of which are within the project boundaries. The grant provided for giving the odd sections on a strip 3 miles in width on each side of the road, and further provided indemnity limits of ten miles on each side of the road, odd sections. The final location of the road was filed on November 1, 1869, and the grant is now considered as practically adjusted but not closed.

Inasmuch as there are but about 35 miles of this military road in the project and about 86,000 acres of land patented under the grant, it is quite evident that a considerable acreage was acquired within the indemnity limits.

About one-half of the length of the old military road in the Malheur Forest has been replaced by forest roads, following in general the original location. The remainder of the old road east from Crane Prairie is in very poor condition and is almost impassable with automobile.

Throughout the project and for several miles southeast thereof, all the lands patented under the Road Grant are now owned by the Eastern Oregon Land Company, with main offices in San Francisco and a branch office in Portland. The company issues grazing permits on all their lands in the project, chiefly to sheepmen. Practically every other section of land many of the original state school sections are owned by this company. They have desired for many years to dispose of the timber on their lands and it is understood have been the backers of one or more preliminary railroad surveys with the idea to place the timber on the market. The grazing policy of the company directly affects the National Forest and therefore both the company and the Forest Service are interested in getting a uniform survey of the forage resources on all the lands which must of necessity be grazed on a cooperative basis. As a preliminary step in making a survey of the forage resources, it was decided that a timber survey with the resultant timber cover maps was highly desirable, and for this reason a cooperative agreement was entered into between the company and the Service whereby the Service would make surveys of the company's lands, showing on finished contour maps the timber cover in accordance with the stand legend, the costs of the work to be paid by the company at the rate of five cents per acre. The agreement provides that completed forage survey maps will be furnished to the company at the rate of one cent per acre additional. No estimate of the timber was made on the company's land.

The work was conducted during the past season with two crews having separate headquarters. One crew started work on June 11 and the other on July 1. On September 5, the majority of the students comprising the crews having left to return to school, the remainder from both crews was consolidated in one party and the work carried on until the close of the season, November 4. Forest Ranger H. C. Hulett was in direct charge of the crew beginning work on June 11, and Junior Forester Jack B. Hogan in charge of the other.

The camps established by Mr. Hulett's crew were along the roads, where moving was done with trucks. Mr. Hogan's crew was in rougher country and was dependent upon pack-horse transportation. Packing was done by the McLeod and Stanfield sheep outfits, both of whom are permittees in the region.

There still remain about 18,000 or 20,000 acres of both government and private lands to be covered in the project, which it is hoped will be completed during the next field season.

Personnel

The work was under the general supervision of Fred A. Matz, chief of timber surveys, who was on the project continuously throughout the assignment of the two crews and was in direct charge after the consolidation in September.

The Office of Engineering contributed the services of H. M. Perritt for the control work on the project. This he finished and returned to Portland a few weeks before the party disbanded.

Following is a list of the field assistants who served on the party and period of service. With the exceptions of Messrs. Manlove, Turner and Quigley, all were students of forestry at various schools named:-

1. Branch, W. C., University of Michigan – Compassman -
July 1 to Sept. 4 - \$70 per Mo.
2. Hansen, Nat. B., Iowa State College – Estimator -
July 1 to Sept. 4 - \$70 per Mo.
3. Hutchinson, R. D., Oregon Agricultural College – Compassman
July 1 to Sept. 15 - \$80 per Mo.
4. Manlove, W. B., No forestry training – Compassman
June 15 to Oct. 25 - \$80 per Mo.
5. McCain, R. D., University of Michigan – Compassman -
July 1 to Sept. 4 - \$70 per Mo.
6. McGlade, Jim; Iowa State College – Compassman -
July 1 to Sept. 10 - \$70 per Mo.
7. McPherson, Lester; Oregon Agricultural College – Compassman
June 11 to Sept. 15 - \$70 per Mo.
8. Melichar, Charles; University of Michigan – Estimator
July 1 to Sept. 4 - \$70 per Mo.
9. Poust, Ashley A; Oregon Agri. College – Estimator -
July 1 to Nov. 6 - \$70 per Mo.
10. Queroau, B. F.; Syracuse University – Compassman -
June 11 to Sept. 4 - \$70 per Mo.
11. Quigley, Clayton C' No forestry training – Estimator -
June 11 to Sept. 4 - \$70 per Mo.
12. Rudolf, Paul; University of Minnesota – Compassman -
July 1 to Sept.4 - \$80 per Mo.
13. Schortinghuis, S. W; Colorado University – Estimator -
June 11 to Sept. 4 - \$70 per Mo.

14. Turner, Kelly; No forestry training – Estimator -
June 11 to Sept. 4 - \$70 per Mo.
15. Weaver, Harold; Oregon Agri. College – Compassman -
June 15 to Sept. 15 - \$90 per Mo.
16. Whitney, Fenton; University of Minnesota – Compassman -
June 11 to Nov. 6 - \$90 per Mo.

R. L. Hargrove was cook for the crew of which Mr. Hulett was in charge, and D. H. Tripp cooked for Mr. Hogan's crew. Both cooks gave very satisfactory service. After the consolidation of the crews, Mr. Tripp was retained as cook, the following additions were made to the crew, and all served until the conclusion of the work:-

1. Lloyd J. Wirth; lumberman; transferred from Whitman N.F.
@ \$1920 per year.
2. Earl A. Young, lookout; transferred from Whitman N.F.
@ \$70 per month.
3. Eugene Conaughty, field assistant; transferred from Cascade N.F.
@ \$70 per month.
4. John Lund Owe, Norwegian Scholarship Foundation student; transferred from Cascade N.F.
@ \$80 per month.
5. Floyd L. Moravets, field assistant; appointed Sept. 6
@ \$100 per month.
6. Monte Moore, assistant ranger on the Malheur N.F. assisted the crew a couple of weeks at
the conclusion of the work @ \$80 per month.

Location and area:

Area: The total area mapped is apportioned as follows:

National Forest lands	*113,239 acres
Eastern Oregon Land Co. lands	78,659 acres
Other patented lands	<u>400 acres</u>
Total -	192,298 acres

*Includes 2,960 acres State School lands, pending.

Location: The project lies chiefly in the Malheur River drainage, although a goodly portion of it is in the John Day River drainage. Prairie City is the nearest post office and trading station and is about thirteen miles north of the project. Prairie City is the terminus of the Sumpter Valley Railroad, a narrow gauge line which connects with the O.W.R.&N. Ry. at Baker. The Oregon Short Line, connecting Burns with Vale, passes about 30 miles south of the project.

A fair automobile road known as the Drewsey road divides the project about equally, running in a north and south direction. A branch road leads from this road easterly about 14 miles from a point near Crane Prairie to the North Fork of the Malheur River. Another road runs westward from Summit Prairie across the western portion of the project to Logan Valley. The Dalles Military Road crosses the southeast portion of the project in its original location from Crane Prairie. This road is in poor condition and is not suitable for auto travel although it is possible to get a lightly loaded car over it. With the exception of a few bad hills, the location of this road is fairly good and it is the writer's opinion that

Forest funds should be used in bettering its condition, since it is possible in this way to reach points on the Little Malheur and the Ironside Mountain country with automobile. In addition to the few bad hills mentioned, the big drawback to this road is the very rough rocky condition of the road-bed. To put the road in even fair condition would require considerable expense but it is believed worth while.

All or portions of the following townships are involved in the project:-

- T. 14 S., R. 34 E., W.M.
 - R. 35 1/2 E., W.M.
- T. 15 S., R. 34 E., W.M.
 - R. 35 E., W.M.
 - R. 35 1/2 E., W.M.
- T. 15 S., R. 36 E., W.M.
 - R. 37 E., W.M.
- T. 16 S., R. 33 1/2 E., W.M.
 - R. 34 E., W.M.
 - R. 35 E., W.M.
 - R. 36 E., W.M.
- T. 17 S., R. 33 1/2 E., W.M.
 - R. 34 E., W.M.
 - R. 35 E., W.M.
 - R. 36 E., W.M.
- T. 18 S., R. 34 E., W.M.
 - R. 35 E., W.M.

Unit divisions:

The boundaries of the management units are graphically shown on the map sheet forming the frontispiece of this report.

The project covers portions of both the John Day River Working Circle and the Malheur River Working Circle, the greater acreage being in the latter. The units are briefly described as follows:-

John Day Working Circle: The portion covered in this working circle lies in the John Day River drainage. Since there is considerably more work to be done in this working circle, it has not been divided into blocks and compartments for the purpose of this report.

Malheur River Working Circle: The Malheur River Working Circle is divided into five blocks, described as follows:-

Little Malheur River block: As its name implies, this block comprises the area in the Little Malheur River drainage. It occupies the northeast portion of the project and is divided into 6 compartments. With the exception of the southwest portion, this block is of rather steep, rough topography.

North Fork Malheur River block: This block consists of most of the area in the North Fork drainage, including its main tributaries, Crane Creek and Little Crane Creek. Should a logging road be built up the river from Juntura, this block would be cut first. Throughout the lower portion of the

block the North Fork flows through a narrow valley, the hill-sides starting almost at the water's edge until a short distance below the mouth of Crane Creek. Upstream from there the floor of the valley widens somewhat, forming flats or low benches on either side until about four miles farther where the valley widens out considerably, although the hills on the south side of the river rise abruptly from the water's edge. However, from this point on upstream the topography of the country on the north side is very gentle, sloping gradually to the river and would permit of easy road construction.

Crane Creek, which drains from Crane Prairie in the western portion of the block, flows through a rocky, narrow valley for most of the seven miles between the Prairie and the North Fork; it would, however, permit the construction of a feasible logging railroad spur along its course. The Block has been divided into thirteen compartments and is practically complete in this project, the portions omitted being the areas of unmerchantable lodgepole pine and occasional areas of white fir-larch-Douglas fir type at the headwaters of the North Fork.

Flag Creek Block: This block comprises the area in Flag Creek drainage and is situated immediately south of Little Malheur River block and east of North Fork Malheur River block. It embraces all of Flag Prairie and additional timbered acreage north of there. The block is rightfully a part of the North Fork drainage but has been separated therefrom because of the fact that all the merchantable timber on the block is at the north end in Compartments 1 and 2, and it is questionable whether that timber will be logged as a part of the North Fork block or with the Little Malheur River block timber. There are only three compartments in the block, the larger of these being Compartment 3. This compartment contains Flag Prairie and all the open sagebrush, juniper and mountain mahogany types on the west branch of Flag Creek. In the southern portion of the compartment on the steep slopes of the canyon through which Flag Creek flows, there is a strip of merchantable timber. It is, however, a very light stand and being on steep, rocky ground it is not likely that it will be taken when the rest of the block is logged.

Malheur River Block: Only the greater portion of the east side of the Malheur River watershed was covered in this project. This block when completed will be the largest in the Malheur River Working Circle. The portion covered in this block forms a strip of from five to eight miles in width along the entire west side of the project. The compartments have been designated 1 to 12 inclusive and are so arranged that the numbers may be increased as additional compartments are laid out. The south end of the block is cut by deep, narrow canyons and the river there is flanked on the east by very steep, rocky slopes which are covered with a growth of mountain mahogany and brush. All the merchantable timber in Compartments 1 to 4 inclusive must be reached from the summits of the broad, flat-topped ridges, leaving off operations at the breaks into the Malheur River canyon. The remaining compartments in the south portion can be reached from spur lines on the ridges and from a spur line on adverse grades along the banks of the Malheur River. Summit Creek is the longest tributary, draining through Summit Prairie from the John Day River divide, and will permit the location of a road-bed along its course.

Cottonwood Creek Block: This block is at the south end of the project and borders on the Malheur River and North Fork blocks. It is divided into four compartments, the largest of which is Compartment 2 occupying the central portion of the block. Some cutting of timber was done years ago on patented lands in this block, -at the Ott millsite about two miles northeast of Antelope Mountain. The lumber from this operation was hauled with wagons to the Drewsey settlement, where it was consumed locally. This long haul would not be a feasible proposition for all the timber on the block, and it is believed that when logging is done the timber must be moved northward into the Crane Prairie basin, which must be considered as the final objective regardless of whatever route is to be taken for the logging railroad.

The acreages of types and age classes and timber stands for each block and compartment are to be found in the summaries at the back of this report.

Status and Ownership:

The acreage within that portion of the project covered to date is segregated into the following classes of ownership:-

National Forest land	110,279 acres
Eastern Oregon Land Co.	78,659 acres
Other patented land	1,714 acres
Oregon State School land (pending)	<u>2,960</u> acres
Total	193,612 acres

The above acreage of lands owned by the Eastern Oregon Land Company is obtained by allowing only 610 acres for Sec. 36, T. 17 S., R. 33 ½ E., W.M. The discrepancy is due to the fact this section was found by our survey to be irregular in shape and has the form shown on our plat of the township.

Most of the project area has a checker-board effect, each odd numbered section and some of the original state school lands belonging to the Eastern Oregon Land Company. To distinguish this ownership from other patented lands, the letter "E" has been placed at the center of each forty, as outlined on the four inches to the mile township plats. No improvements exist on the lands owned by this company and the lands are leased out each year for grazing purposes. An acreage summary of the types and age classes pertaining to the Eastern Oregon Land Company lands is found in Tables 16 to 21 inclusive at the back of this report.

The acreage of other patented lands occurs in several small compact bodies, which were not mapped in connection with our work.

The state school lands which were not acquired by the Eastern Oregon Land Company are now in pending status, but it is expected they will sooner or later become the property of the Government. For this reason the acreage and timber applicable to those lands have been carried into the final summaries just as though they were now under government ownership. The type acreage and timber stand on these lands have been computed separately and are shown in the following tables, No. 1 and No. 2.

TABLE 1
ACREAGE SUMMARY OF FOREST TYPES
OREGON STATE SCHOOL LANDS (PENDING)

Section and Township	Yellow Pine				WF-Larch-DF			Lodgepole		Hard-wood Acres	Juniper Acres	Mt. Mahogany Acres	Brush Acres	Sage Acres	Pending Total Acres
	Y4 Acres	Y3 Acres	Y2 Acres	Y1 Acres	FL3 Acres	FL2 Acres	FL1 Acres	LP2 Acres	LP1 Acres						
Sec. 36, T.15 S., R.34 E., W.M.	68				312				20						400.00
Sec. 16, T.15 S., R.35 E., W.M.	70	29			516		11	6					5	3	640.00
Sec. 36, T.15 S., R.35 E., W.M.					542	10		7	81						640.00
Sec. 16, T. 15 S., R.36 E., W.M.	590				6						10			34	640.00
Sec. 36, T.16 S., R.35 E., W.M.	175	24	5	232						5		17		182	640.00
Totals	903	53	5	232	1,376	10	11	13	101	5	10	17	5	219	2,960.00

Table No. 2
Oregon State School Lands (Pending)
Compartment 12 of Malheur River Block.

Sec. 36, T. 15 S., R. 34 E., W.M.

Forty No.	Acreage	Yellow Pine			M. feet B.M. for Species				
		Mature	Immat.	Total	LP	D	WF	WL	Total
NE $\frac{1}{4}$ NE $\frac{1}{4}$	40	-	-	-	5	54	113	54	226
NW $\frac{1}{4}$ NE $\frac{1}{4}$	40	69	-	69	-	583	136	34	822
SW $\frac{1}{4}$ NE $\frac{1}{4}$	40	201	50	251	-	583	136	34	822
SE $\frac{1}{4}$ NE $\frac{1}{4}$	40	92	-	92	-	138	160	265	655
NE $\frac{1}{4}$ NW $\frac{1}{4}$	40	-	-	-	10	165	206	78	459
NW $\frac{1}{4}$ NW $\frac{1}{4}$	40	81	4	85	-	-	110	22	217
SW $\frac{1}{4}$ NW $\frac{1}{4}$	40	49	-	49	13	52	141	151	406
SE $\frac{1}{4}$ NW $\frac{1}{4}$	40	188	-	188	-	183	99	246	716
NE $\frac{1}{4}$ SW $\frac{1}{4}$	40	598	188	786	6	81	132	81	1086
NW $\frac{1}{4}$ SW $\frac{1}{4}$	40	571	96	667	-	50	80	8	805

Table No. 2 (Continued)
Oregon State School Lands (Pending)
John Day River Working Circle.

Sec. 16, T. 15 S., R. 35 E., W.M.

Forty No.	Acreage	Yellow Pine			M. feet B.M. for Species					
		Mature	Immat.	Total	LP	D	WF	WL	AF	Total
NE $\frac{1}{4}$ NE $\frac{1}{4}$	40	-	-	-	-	-	-	-	12	12
NW $\frac{1}{4}$ NE $\frac{1}{4}$	40	-	-	-	3	49	18	-	14	84
SW $\frac{1}{4}$ NE $\frac{1}{4}$	40	17	60	77	0	135	68	-	8	288
SE $\frac{1}{4}$ NE $\frac{1}{4}$	40	11	-	11	11	163	11	-	25	221
NE $\frac{1}{4}$ NW $\frac{1}{4}$	40	-	-	-	3	87	106	101	-	297
NW $\frac{1}{4}$ NW $\frac{1}{4}$	40	26	72	98	6	16	36	40	-	196
SW $\frac{1}{4}$ NW $\frac{1}{4}$	40	383	46	429	1	68	26	24	-	548
SE $\frac{1}{4}$ NW $\frac{1}{4}$	40	32	232	264	-	8	-	-	-	272
NE $\frac{1}{4}$ SW $\frac{1}{4}$	40	212	79	291	-	37	70	35	-	433
NW $\frac{1}{4}$ SW $\frac{1}{4}$	40	55	-	55	-	33	79	26	-	193
SW $\frac{1}{4}$ SW $\frac{1}{4}$	40	244	66	310	9	107	50	4	-	480
SE $\frac{1}{4}$ SW $\frac{1}{4}$	40	977	22	999	2	66	70	17	-	1154
NE $\frac{1}{4}$ SE $\frac{1}{4}$	40	-	25	25	41	102	9	-	87	264
NW $\frac{1}{4}$ SE $\frac{1}{4}$	40	179	57	236	5	188	52	-	4	485
SW $\frac{1}{4}$ SE $\frac{1}{4}$	40	232	151	383	-	54	52	15	-	504
SE $\frac{1}{4}$ SE $\frac{1}{4}$	40	53	29	82	9	159	132	20	-	402
Totals for section	640	2,421	839	3,260	90	1,272	779	282	150	5,833

Table No. 2 (Continued)

Oregon State School Lands (Pending)

Compartment No. 4 of N. Fk. Malheur River Block.

Sec. 36, T. 15 S., R. 35 E., W.M.

Forty No.	Acreage	Yellow Pine			M. feet B.M. for Species				
		Mature	Immat.	Total	LP	D	WF	WL	Total
NE¼NE¼	40	-	-	-	16	88	117	54	275
NW¼NE¼	40	-	-	-	3	103	51	96	253
SW¼NE¼	40	-	-	-	-	35	42	86	163
SE¼NE¼	40	-	-	-	6	67	19	144	236
NE¼NW¼	40	-	-	-	12	70	197	4	283
NW¼NW¼	40	-	-	-	26	64	193	125	408
SW¼NW¼	40	-	-	-	23	17	80	127	247
SE¼NW¼	40	-	-	-	5	-	32	89	126
NE¼SW¼	40	-	-	-	-	18	69	63	150
NW¼SW¼	40	-	-	-	-	22	136	124	282
SW¼SW¼	40	-	-	-	6	441	26	-	473
SE¼SW¼	40	44	-	44	12	305	53	8	422
NE¼SE¼	40	-	-	-	11	131	94	16	252
NW¼SE¼	40	-	-	-	-	43	154	103	300
SW¼SE¼	40	-	-	-	21	197	102	33	353
SE¼SE¼	40	-	-	-	12	72	105	45	234
Totals for Section	640	44	-	44	153	1,673	1,470	1,117	4,457

Table No. 2 (Continued)

Oregon State School Lands (Pending)

Compartment No. 3 of Little Malheur River Block.

Sec. 16, T. 15 S., R. 36 E., W.M.

Forty No.	Acreage	Yellow Pine			M. feet B.M. for Species				
		Mature	Immat.	Total	D	WF	WL	AF	Total
NE¼NE¼	40	530	21	551	12166	25	117	-	654
NW¼NE¼	40	185	30	215	178	37	18	3	451
SW¼NE¼	40	427	3	430	38	20	-	-	488
SE¼NE¼	40	412	7	419	77	47	17	-	560
NE¼NW¼	40	406	27	433	76	10	8	-	527
NW¼NW¼	40	433	48	481	101	13	-	-	595
SW¼NW¼	40	509	47	556	14	4	-	-	574
SE¼NW¼	40	646	62	708	15	15	-	-	738
NE¼SW¼	40	263	25	288	58	7	-	-	353
NW¼SW¼	40	527	54	561	57	22	23	-	663
SW¼SW¼	40	458	39	497	25	-	-	-	520
SE¼SW¼	40	999	101	1100	30	-	-	-	1,130
NE¼SE¼	40	859	304	1163	84	35	17	-	1,299
NW¼SE¼	40	957	51	1008	89	14	-	-	1,111
SW¼SE¼	40	495	37	532	3	-	-	-	535
SE¼SE¼	40	926	34	960	-	1	-	-	961
Totals for Section	640	9,032	870	9902	855	291	108	3	11,159

Table No. 2 (Continued)
Oregon State School Lands (Pending)
Compartment 10 of N. Fk. Malheur River Block

Sec. 36, T. 16 S., R. 35 E., W.M.

Forty No.	Acreage	Yellow Pine			M. feet B.M. for Species					
		Mature	Immat.	Total	LP	D	WF	WL	AF	Total
NE¼NE¼	40	511	133	644	-	114	-	-	-	758
NW¼NE¼	40	241	39	280	-	67	-	-	-	347
SW¼NE¼	40	-	34	34	-	-	-	-	-	34
SE¼NE¼	40	327	130	457	-	-	-	-	-	457
NE¼NW¼	40	91	18	109	-	-	-	-	-	109
NW¼NW¼	40	-	-	-	-	-	-	-	-	-
SW¼NW¼	40	-	-	-	-	-	-	-	-	-
SE¼NW¼	40	-	-	-	-	-	-	-	-	-
NE¼SW¼	40	-	-	-	-	-	-	-	-	-
NW¼SW¼	40	-	-	-	-	-	-	-	-	-
SW¼SW¼	40	-	-	-	-	-	-	-	-	-
SE¼SW¼	40	-	5	5	-	-	-	-	-	5
NE¼SE¼	40	209	46	255	-	28	-	-	-	283
NW¼SE¼	40	67	11	78	-	-	-	-	-	78
SW¼SE¼	40	286	80	366	-	-	-	-	-	366
SE¼SE¼	40	409	108	517	-	72	-	-	-	589
Totals for section	640	2,141	604	2,745	-	281	-	-	-	3,026

Totals for all School Lands (Pending)

15,407 2,651 18,138 277 5472 3,903 2,512 153 30,455

II. Field Work and Computations

Field work:

Control methods:

The field work in connection with all the control, both vertical and horizontal, was done in accordance with the special instructions issued by the Office of Engineering.

Base lines for control were established by retracing, with chain and compass, the G.L.O. survey lines. Because of the checker-board nature of the ownership of the land, it was not possible to lay out the base lines throughout most of the project to permit more than one mile of continuous strip survey. Therefore, it was found necessary to establish control along the section lines one mile apart.

Transit stadia elevations were carried along some of the roads and a few of the control lines along the section line retracements. Elevations were carried over some of the control lines with abney readings over chained distances and on others with precision altimeters.

Horizontal positions along the strip surveys were determined by pacing, using the Forest Service standard compass for alignment. Aneroid barometers were used for obtaining the elevations of points on the strip surveys, adjustments for the readings being made after closing in on the control lines.

Cruising methods:

Only the government timber was cruised. Type maps were made for the Eastern Oregon Land Company lands, and it is believed that a comparatively close estimate of the timber on those lands may be obtained by applying the sample acre stands of the government timber, Tables Nos. 4 to 9 incl., to the Eastern Oregon Land Company acreage of each type.

All the areas of merchantable yellow pine were covered on a 10 per cent cruise, running 2 strips through each forty, the strips being one chain in width. In the W.Fir-larch-D.F., subalpine, woodland and non-timbered types, the cruise strips were run on a 5 per cent basis, that is one strip through each forty.

The acreage of government land covered by these two methods of cruise is as follows.-

10% cruise	80,919 acres
5% cruise	<u>32,320 acres</u>
Total	113,329 acres

All the yellow pine trees 12 inches and more d.b.h., both mature and immature, were tallied by number of logs in height and by diameter sizes.

Species other than yellow pine were tallied by diameter sizes only.

Check cruises:

Check cruising was done on about 3 per cent of the area covered by each estimator, and was confined to the better portions of the timbered areas. Following are comparative lists of the results of the check cruises. These are based on gross volumes.-

(a) Original Cruise by Ashley A. Poust; check cruise by F.A. Matz

E ½ E ½ Sec. 18, T. 15 S., R. 36 E.

Species	Original Cruise		Check Cruise		Difference		
	No. of trees	Vol. Dec. C	No. of trees	Vol. Dec. C	No. of trees	Vol. Dec. C	Per cent
Y	114	15,667	106	14,727	+8	+940	+6.3
Y-I	65	1,903	73	3,121	-8	-1,218	-39.0
LP	2	16	3	31	-1	-15	-48.4
D	44	1,443	46	2,033	-2	-590	-29.0
WF	148	7,019	161	8,986	-13	-1,967	-21.8
WL	25	940	26	1,169	-1	-229	-19.6
Totals	398	26,988	415	30,067	-17	-3,079	10.2

(b) Original Cruise by Charles Molichar; check cruise by F. A. Matz

W1/2W1/2 Sec. 23, T. 15 S., R. 36 E.

Species	Original Cruise		Check Cruise		Difference		
	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	Per cent
Y	124	14,369	89	10,145	+35	+4,224	+41.6
Y-I	54	992	100	4,171	-46	-3,179	-76.2
LP	1	8	-	-	+1	+8	-
D	21	591	24	794	-3	-203	-25.6
WF	31	610	39	1,101	-8	-491	-44.5
WL	18	854	18	675	-	-	-
Totals	249	17,424	270	16,888	-23	+356	+3.2

(c) Original Cruise by N.B. Hanson; check cruise by F. A. Matz

W1/2W1/2 Sec. 6, T.15 S., R.36 E., and
E1/2E1/2 Sec. 28, T.15 S., R.36 E.

Species	Original Cruise		Check Cruise		Difference		
	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	Per cent
Y	207	21,090	176	18,158	+31	+2,952	+10.7
Y-I	234	6,862	165	5,820	+69	+1,042	+17.8
LP	3	41	2	16	+1	+25	-
D	84	3,554	111	4,258	-27	-704	-16.5
WF	167	3,741	123	4,079	+44	-338	-8.2
WL	88	2,724	106	3,977	-18	-1,253	-31.3
Totals	783	38,012	683	36,288	+100	+1,724	+4.7

(d) Original Cruise by S. W. Schortinhuis; check cruise by F.A. Matz

W1/2W1/2 Sec. 24, T. 16 S., R.34 E.

Species	Original Cruise		Check Cruise		Difference		
	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	Per cent
Y	168	14,755	146	17,061	+22	-2,306	13.5
Y-I	131	5,475	104	3,905	+27	+1,570	40.2
LP	11	110	5	47	+6	+63	-
D	2	295	3	170	-1	+125	-
WF	11	108	6	53	+5	+55	-
WL	7	808	5	491	+2	+317	64.5
Totals	330	21,551	269	21,727	+61	-176	0.8

(e) Original Cruise by Kelly Turner; Check cruise by F. A. Matz.

E1/2W1/2 Sec. 10, T.16 S., R. 35 E.

Species	Original Cruise		Check Cruise		Difference		
	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	Per cent
Y	287	37,471	257	30,524	+30	+6,947	+22.7
Y-I	141	4,546	180	8,154	-39	-3,608	-44.2
D	17	427	10	513	+7	-86	-16.7
WF	31	2,065	48	2,873	-17	-808	-28.1
WL	29	1,494	32	1,424	-5	+70	+4.9
Totals	505	46,003	527	43,488	-22	+2,515	+5.8

(f) Original Cruise by C. Quigley; check cruise by F. A. Matz

W1/2W1/2 Sec. 24, T. 16 S., R. 34 E. and

E1/2E1/2 Sec. 4, T. 16 S., R. 35 E.

Species	Original Cruise		Check Cruise		Difference		
	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	No. of trees	Volume Dec. C	Per cent
Y	429	51,327	424	56,657	+5	-5,330	-9.4
Y-I	160	6,012	302	14,542	-142	-8,530	-58.4
LP	9	87	11	171	-2	-84	-49.1
D	18	1,716	38	3,735	-28	-2,019	54.0
WF	129	10,000	120	10,300	+9	-300	-2.8
WL	33	2,841	37	2,342	-4	+499	+21.3
Totals	778	71,983	932	87,747	-154	-15,764	-17.9

(g) Check for all above cruises

Cruise	No. of trees	Volume, all species, Dec. C
Originals	3,043	221,961
Checks	3,096	236,205
Difference	-53	-14,244 = 60%

John Lund Owe, L. J. Wirth, and Earl A. Young did estimating toward the end of the season. No check cruising was done against either of the men but they were given careful supervision at regular intervals throughout their work. From tests it was found that Mr. Owe was inclined to take too wide a strip and for this reason many of the tally sheets submitted by him were reduced 15% to 20% where excessive volumes were shown. The other two men stated above did excellent work.

Office computations:

Only a small amount of the timber volume was computed in the field and then only for check-cruise purposes.

Height measurements for all the principal species other than yellow pine were taken on the project and special volume tables were made based on the general volume table for each species.

Western juniper was computed into cord volume, using the same table prepared on the Fremont in 1925, which is based on Table No. 7 in U.S.D.A. Circular 197.

The Blue Mountain Volume table for western yellow pine was used in making the computations of volume for that species.

The volumes for the different d.b.h. sizes and species are given in Table No. 3 which follows:-

Table No. 3
Volume Tables Used

D.B.H. Inches	Feet, Board Measure					Cords
	Wn. Larch	D.Fir and W.Fir	Engelmann spruce	Lodgepole pine	White fir	Western juniper
4-7						.06
8-11						.12
12	90	70	50	80	Same	.18
14	130	100	100	150	Volumes	.23
16	200	140	160	180	as for	.28
18	280	200	240	230	D. fir used	.34
20	400	280	340	300	to	.42
22	520	360	460	400	26 inches	.50
24	650	460	620	520	diameter	.60
26	810	600	860	660	only.	.72
28	990	750	1,130			.84
30	1,190	900	1,410			.96
32	1,460	1,110				1.10
34	1,640	1,300				1.23
36	1,900	1,420				1.36
38	2,140	1,730				1.50
40	2,420	1,970				1.65
42	2,670	2,200				1.80
44	2,930	2,600				
46	3,180	3,000				
48	3,430					
50	3,680					
52	3,960					
54	4,260					
56	4,560					
58	4,860					
60	5,160					
62	5,460					
64	5,760					
66	6,060					

Defect and breakage correction factors:

The amount of deduction for both of these factors is expressed on the tally sheets in one number, as for instance 15% indicating that an allowance of 15% is to be made for both factors taken together. The greater portion of the variations is due to breakage and not so much because of changes in condition of the timber.

The range of the correction factors for the breakage and defect combined in the different species follows:-

Mature yellow pine,	5% to 10%
Immature yellow pine,	None
Douglas fir,	10% to 25%
Western larch,	10% to 25%
White fir,	10% to 25%, and furthermore no volume was computed for trees more than 26" d.b.H.
White pine,	10%
Lodgepole pine,	5% to 10%

III. Silvicultural Description

Forest types:

Yellow pine:

Throughout all of the mature age class of this type, there is a fair sprinkling of trees of all age classes which is highly desirable for cutting under the selection system. There is usually a mixture of inferior species of varying density along with the pine in this type. There are, however, a number of areas where there is a pure stand of pine, the largest of which contains about 5100 acres and is situated in the northwest portion of T. 18S., R. 35 E. and in the township immediately adjacent to the west. Another pure stand of about 2500 acres occurs in the northeast portion of T. 17 S., R. 33 ½ E. and in the township joining on the east. Smaller areas of pure pine stands one section and less in size occur in other parts of the project, but throughout most of the area typed as pine there is a representation of Douglas fir, white fir, larch and lodgepole pine.

Of the national forest acreage covered, 65 per cent is in the yellow pine type, most of which is in the mature age class. In the younger age classes the Y-1 acreage takes the lead, followed by Y-3 in second place and Y-2 having the least area.

The average per acre stand throughout the mature age class (150 years plus) and the immature age class (80 to 150 years) was obtained by a selection of the tally sheets from all parts of the projects for each age class. The acreage represented by the estimate sheets selected is about one-fourth of the entire acreage in each age class. Since the greater portion of the John Day River Working Circle remains to be done, a sample acre for that portion was not prepared. Two sample acre tabulations were prepared for each age class in the Malheur River Working Circle, one for the area embracing the Little Malheur, North Fork Malheur and Flag Creek blocks, the other including the Malheur and Cottonwood Creek blocks. The results are shown in the following tables, 4 to 7 inclusive:-

TABLE NO. 4
SAMPLE ACRE IN MATURE YP TYPE (Y-4)
MALHEUR RIVER and COTTONWOOD CREEK BLOCKS

D.B.H. Inches	Y – Mat.		Y-Immat.		L. P.		D		WF		WL		Total	
	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.
4-7	.076		4.731		.341		.72		1.230		.123		7.073	
8-11	.348		4.170		.189		.581		.905		.136		6.329	
12	.373	20	1.750	80	.078	6	.264	18	.426	30	.107	10	2.998	164
14	.406	40	1,159	105	.016	2	.173	17	.312	31	.070	9	2.136	204
16	.499	80	1,121	163	.010	2	2.07	29	.237	33	.086	17	2.160	324
18	.572	129	1,027	216	.004	1	.187	37	.216	43	.057	16	2.063	442
20	.912	303	1.048	321			.176	49	.208	58	.075	30	2.419	761
22	1.234	554	.897	389			.158	57	.229	82	.077	40	2.595	1,122
24	1.509	90	.824	487			.157	72	.208	96	.088	57	2.786	1,612
26	1.321	1,086	.475	364			.130	78	.166	100	.045	36	2.137	1,664
28	1.287	1,243	.344	325			.078	58			.030	30	1.739	1,656
30	1.215	1,493	.241	278			.096	87			.028	34	1.580	1,892
32	1.059	1,597	.126	180			.063	69			.020	30	1.268	1,876
34	.916	1,656	.054	93			.058	75			.024	40	1.052	1,864
36	.581	1,285	.024	48			.043	62			.012	23	.660	1,418
38	.395	973	.011	27			.020	35			.005	10	.431	1,045
40	.234	658	.004	10			.023	45			.002	6	.263	719
42	.166	546	.004	12			.016	34			.004	10	.190	602
44	.101	349	.002	9			.012	31			.006	18	.121	407
46	.039	145					.010	29			.001	4	.050	178
48	.062	187					.007	26					.069	213
50	.011	52					.001	5					.012	57
52	.007	34					.001	6					.008	40
54	.011	53					.002	13					.013	66
56	.004	19											.004	19
58	.001	7											.001	7
60	.002	15					.001	7					.003	22
62	.001	7											.001	7
64	.001	9											.001	9
Totals	12.919	13,440	9.111	3,107	0.108	11	1.883	939	2.002	473	.737	420	26.760	18,390

TABLE NO. 5

SAMPLE ACRE IN MATURE YP TYPE (Y-4)
NORTH FORK MALHEUR RIVER-LITTLE MALHEUR RIVER-FLAG CREEK BLOCKS, MALHEUR N. F

D.B.H. Inches	Y – Mat.		Y-Immat.		L. P.		D		WF		WL		Total	
	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.
4-7	.034		4.864		.333		1.077		2.015		.313		8.636	
8-11	.170		3.784		.217		1.121		1.935		.365		7.582	
12	.226	11	1.369	63	.030	2	.372	26	.777	54	.153	14	2.927	170
14	.235	22	1.074	102	.027	4	.277	28	.427	43	.121	16	2.161	215
16	.308	42	1.119	158	.007	1	.267	37	.312	44	.114	23	2.127	305
18	.564	115	1.212	251	.003	1	.216	43	.258	56	.105	29	2.358	495
20	.846	269	.930	286			.205	58	.244	68	.076	31	2.301	712
22	1.117	476	.774	315			.148	53	.222	70	.093	48	2.354	962
24	1.563	914	.699	417			.189	87	.252	116	.088	58	2.791	1,592
26	1.570	1,189	.393	290			.135	81	.289	125	.052	43	2.439	1,728
28	1.401	1,349	.279	249			.130	98			.048	47	1.853	1,743
30	1.176	1,387	.103	131			.099	89			.037	45	1.415	1,652
32	1,093	1,461	.058	88			.072	79			.028	42	1.251	1,670
34	.849	1,507	.036	63			.055	72			.018	30	.958	1,672
36	.550	1,134	.019	41			.036	51			.015	28	.620	1,254
38	.424	1,024	.006	13			.028	49			.012	26	.470	1,112
40	.276	758	.003	7			.015	30			.007	18	.301	813
42	.188	526	.001	5			.012	26			.001	4	.202	563
44	.102	336					.015	39			.001	4	.118	379
46	.070	260					.012	36					.082	296
48	.034	147					.003	11			.001	5	.038	163
50	.016	70					.004	19					.020	89
52	.007	32					.001	7			.001	6	.009	45
54							.001	8			.001	6	.002	14
56	.06	32											.006	32
58	.001	8											.001	8
60	.001	9											.001	9
Totals	12.623	13,080	8.070	2,479	.967	8	2.292	1,027	2.781	576	.972	523	26.805	17,693

TABLE NO. 6
SAMPLE ACRE IN MATURE YP TYPE (Y-3)
MALHEUR RIVER and COTTONWOOD CREEK BLOCKS

D.B.H. Inches	Y – Mat.		Y-Immat.		L. P.		D		WF		WL		Total	
	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.
4-7	.023		8.500		1.535		.807		1.407		.163		12.435	
8-11	.140		7.740		.407		.784		.970		.221		10.262	
12	.037	2	2.935	159	.086	7	.270	19	.307	21	.147	13	3.782	221
14	.172	14	2.333	230	.061	9	.258	26	.270	27	.061	8	3.155	314
16	.110	18	2.210	306	.025	4	.098	14	.221	31	.098	20	2.762	393
18	.074	15	2.677	597			.123	25	.307	61	.025	7	3.206	709
20	.135	37	2.235	710			.147	41	.196	55	.012	5	2.725	844
22	.184	81	2.345	977			.160	57	.135	49	.049	26	2.873	1,190
24	.307	164	2.480	1,404			.221	102	.221	102	.037	24	3.266	1,796
26	.442	325	1,731	1,331			.098	59	.184	111	.025	20	2.480	1,846
28	.381	363	1,142	1,073			.061	48			.037	36	1,621	1,520
30	.538	607	.602	740			.037	33			.012	15	1,179	1,395
32	.393	555	.282	397			.049	54			.037	54	.761	1,060
34	.454	780	.393	682									.847	1,462
36	.270	503	.221	483			.025	35					.516	1,021
38	.221	524	.074	157			.012	21					.307	702
40	.110	304	.049	123			.025	46					.184	475
42	.025	123	.012	36			.012	27					.049	186
44	.074	204					.025	64					.099	268
46	.049	165					.012	37					.061	202
48	.012	47											.012	47
50														
52														
54	.012	56											.012	56
56	.012	66											.012	66
Totals	4.002	4,953	21.721	9,405	.172	20	1.633	710	1.841	457	.540	228	29.909	15,773

TABLE NO. 7

SAMPLE ACRE IN MATURE YP TYPE (Y-3)
NORTH FORK MALHEUR RIVER-LITTLE MALHEUR RIVER-FLAG CREEK BLOCKS, MALHEUR N. F

D.B.H. Inches	Y – Mat.		Y-Immat.		L. P.		D		WF		WL		Total	
	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.
4-7	.020		7.156		.276		.753		3.016		.143		11.373	
8-11	.122		4.853		.404		.943		3.012		.224		9.558	
12	.102	5	1.429	70			.408	29	1.286	90	.082	7	3.307	201
14	.061	6	1.714	164			.327	33	1.000	100	.082	11	3.184	314
16	.122	19	1.694	247	.02	4	.245	34	.796	111	.122	24	2.999	439
18	.061	15	1.857	400			.286	57	.612	122	.102	29	2.918	623
20	.122	45	1.939	524			.245	69	.592	166	.061	24	2.959	828
22	.184	83	1.592	688			.347	125	.327	118	.020	11	2.470	1,025
24	.204	126	1,653	917			.245	113	.224	103	.020	13	2.346	1,272
26	.204	154	1,347	973			.163	98	.265	159	.020	17	1999	1,401
28	.429	427	1.000	909			.143	107					1.572	1,443
30	.408	518	.429	478			.061	55					.898	1,051
32	.347	54	.224	335			.020	22					.591	891
34	.265	473	.204	330			.061	80					.530	883
36	.143	426	.122	245									.265	671
38	.020	43	.020	47									.040	90
40	.102	267	.041	106			.020	40					.163	413
42	.082	312											.082	312
44	.020	65	.041	137			.020	53					.081	255
46	.082	282											.082	262
48	.020	96											.020	96
50														
52														
54														
56	.020	110											.020	96
Totals	2.998	4,006	15.306	6,570	.020	4	2.591	915	5.102	969	.509	136	26.526	12,600

White Fir-Larch-Douglas Fir type:

This type occurs in three age classes on the project and is found mostly on the north slopes or along cool stream beds. It is composed of a mixture of practically all of the commercial species found in the region, and western larch is almost always in evidence. White fir is the most prominent species in the type. Most of the larger trees of this species are unmerchantable because they are rotten and shaky. When computing the volume of this species, trees indicated as more than 26 inches d.b.h. were considered culls and the volumes of same were not compiled. The number of these defective trees has been compiled and carried into the final compilations under the heading "Diseased trees."

About 16 per cent of the total area of government lands mapped is in this type, nearly all of which is in the mature age class.

Sample acre compilations were prepared for the mature age class in this type and comprise Tables 8 and 9 following.-

TABLE NO. 8
SAMPLE ACRE IN MATURE FL TYPE (FL – 3)
MALHEUR RIVER AND COTTONWOOD CREEK BLOCKS

D.B.H. Inches	Y – Mat.		Y-Immat.		L. P.		D		WF		WL		ES		Total	
	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.
4-7			0.99		7.331		1.047		10.908		1.696		.305		21.386	
8-11	.007		.146		3.583		.875		8.044		1.730		.265		14.650	
12	.019	1	.087	4	.627	50	.464	45	4.233	296	1.360	122	.116	6	7.088	524
14	.019	2	.067	6	.106	16	.559	56	2.613	261	.753	98	.174	17	4.291	456
16	.029	4	.135	18	.019	3	.492	69	2.044	286	.530	106	.116	19	3.365	505
18	.048	9	.125	26	.19	4	.395	79	2.150	430	.434	121	.087	21	3.258	690
20	.019	7	.135	40	.010	3	.463	130	1.909	535	.386	154	.067	23	2.989	892
22	.096	43	.145	55			.492	177	1.581	569	.260	135	.029	13	2.603	992
24	.145	88	.116	67			.530	244	1.851	852	.3437	226	.077	48	3.066	1,525
26	.087	67	.048	37			.357	214	1.514	914	.202	164	.039	33	2.247	1,429
28	.125	123	.058	56			.260	195			.125	124	.029	33	.597	531
30	.135	163	.029	28			.222	200			.106	126	.039	54	.531	571
32	.164	242	.039	56			.202	223			.183	267	.010	16	.598	804
34	.116	202	.019	34			.193	251			.077	127			.405	614
36	.087	184	.019	43			.174	246			.067	128			.347	601
38	.067	168					.077	133			.048	103			.192	404
40	.039	105					.077	152			.019	47			.135	304
42	.077	239					.048	106			.048	129			.173	474
44	.048	170	.010	31			.010	25			.029	85			.097	311
46	.010	38					.010	29			.010	31			.030	98
48	.048	199					.019	69							.067	268
50	.010	48					.010	41							.020	89
52																
54							.010	54			.010	41			.020	95
Totals	1.388	2,102	1.032	501	.781	76	5.246	2,738	17.895	4,143	4.994	2,334	.783	283	32.119	12,177

TABLE NO. 9
SAMPLE ACRE IN MATURE FL TYPE (FL - 3)
NORTH FORK MALHEUR RIVER-LITTLE MALHEUR RIVER-FLAG CREEK BLOCKS, MALHEUR N. F.

D.B.H. Inches	Y - Mat.		Y-Immat.		L. P.		D		WF		WL		ES		Total	
	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.	No. of Trees	Vol. Ft. B.M.
4-7			.194		8.426		2.572		8.931		2.168		.155		22.446	
8-11			.189		5.405		2.424		11.975		2.237		.372		22.602	
12			.090	4	.530	42	.933	65	3.716	260	1.211	109	.187	9	6.667	489
14	.024	2	.090	3	.126	19	.717	71	2.849	285	.916	119	.078	8	4.800	507
16	.018	3	.066	11	.042	8	.578	81	2.475	347	.837	167	.120	19	4.136	636
18	.012	3	.120	28	.012	3	.657	131	2.102	420	.657	184	.054	13	3.614	782
20	.030	9	.084	25	.012	4	.500	140	1.729	484	.524	210	.036	12	2.915	884
22	.090	39	.048	21	.012	5	.152	184	1.614	581	.422	219	.036	17	2.734	1,066
24	.090	53	.060	38			.626	302	1.325	698	.410	266	.030	19	2.541	1,286
26	.120	103	.030	23			.404	242	1.253	752	.265	215	.030	26	2.102	1,361
28	.133	134	.018	18			.331	248			.211	209	.006	7	.699	616
30	.126	149	.024	29			.229	206			.241	287			.620	671
32	.072	102	.012	18			.102	113			.133	193	.006	10	.325	436
34	.066	117	.006	11			.145	188			.066	109			.283	425
36	.054	105	.006	12			.078	112			.030	57			.168	286
38	.054	122					.060	104			.066	142			.180	368
40	.036	98					.030	59			.036	87			.102	244
42	.042	137					.024	53			.006	16			.072	206
44	.036	117					.036	94			.012	35			.084	246
46	.030	114	.006	20							.006	19			.042	153
48							.006	22			.006	21			.012	43
50																
52	.006	26													.006	26
54											.006	26			.006	26
Totals	1.039	1,433	.660	261	.734	81	5.968	2,415	17.063	3,737	6.061	3,690	.583	140	32.108	10,757

Lodgepole pine types:

Two age classes of this type occur on the project. It is not of commercial importance at the present time because the trees found in it are not of large enough size to justify logging operations. Only a small number of trees of other species is permitted in this type, since the volume in feet B.M. of even a dense stand of lodgepole pine is comparatively small.

Juniper type:

This woodland type occurs on dry exposure where the soil is shallow and of a scab-land nature.

Occasionally a small pine of pole or sapling size, less than normal height is found in this type. The pine in such sites does not seem to thrive, the trees dying at about 4 to 6 inches in diameter apparently for lack of sufficient moisture. The juniper trees are usually very limby, are of short height and have very rapid taper. Mountain mahogany is usually found growing in mixture with the juniper.

Mountain mahogany type:

This woodland type was added to the list of types in this District during the course of the work in connection with this project. It is a type highly desirable from a grazing viewpoint and there being a considerable acreage of it near the lower limits of the yellow pine type, it was classified separately. It occupies the same kind of a site as does the juniper type, and its only forest cover is mountain mahogany. Mountain mahogany trees on this project rarely exceed six inches d.b.h. and are short, seldom being over 18 or 20 feet in height. The branches are very hard and stiff, making it difficult for one to pass through when in a dense stand. It is commonly found in long, narrow strips or small patches surrounded by open areas or a young age class of yellow pine type. It is doubtful if it become of commercial importance for its lumber value.

Grass and sagebrush types:

A considerable acreage of non-timbered types was classified as of these two types and they occupy about the same sites. In the sagebrush type, there is a good deal of grass and weed forage and it is found usually on drier sites than is the grass type. It also carries, usually, some bitter-brush or goat-brush, which is used as browse by sheep. Good examples of this type are found in the vicinity of Flag Prairie, Crane Prairie, and Antelope Mountain.

The grass type is found mostly on the flats, where there is usually a deep soil. In many places the chief covering in this type consists of weeds, as for instance in the upper part of the project along the North Fork Malheur River. Occasionally this type is found on the high ridges, as on the main divide between the John Day River and Malheur River watersheds and there it has a considerable amount of weeds in mixture.

A summary of the acreage of forest types is given at the back of this report, Tables 10 to 21 inclusive.

Site classification:

The site classification ranges from III to VI, with most of the acreage falling in Site IV. Site V is found at the lower limits of the pine bordering on the juniper and mountain mahogany types, and on the high ridges. Juniper and mountain mahogany types are classified as of Site VI.

The percentage of acreage in each site is indicated for each compartment in the summaries at the bottom of the township plats.

Description of timber:

Yellow pine:

The yellow pine logs will average five logs per M. The average volume of pine per tree is larger in the white fir-larch-Douglas fir type and in the forest of mixed composition than in the more pure Y stands. The trees there are taller and attain larger diameter growth. On the assumption that only the mature trees will be cut, it is believed the average log volume will be slightly more and that the average run will be 4 ½ logs per M.

The quality of the pine compares favorably with that found in other parts of the Blue Mountains, and it is estimated will yield about 22 per cent No. 2 logs and better.

Douglas fir:

This timber is smaller than the pine and will cut on an average of seven and one-half logs to the M feet B.M. Only a small amount of clear logs are found and never more than one log length to a tree. The trees are usually short with rapid taper, and are quite limby. The best trees are found in the W.F.-Larch-D.F. type and on the upper well-drained benchlands. There is, however, a goodly mixture of this timber throughout most of the yellow pine type, where it undoubtedly will add appreciably to the value of the stand, as it is comparable to the Douglas fir found in the Blue Mountain region where sales are now in progress.

White fir:

Individual trees of this species are larger than the Douglas fir, but they are worthless for lumber. Practically all the larger trees are rotten and this defect is so pronounced that the cull line was placed at 28 inches d.b.h., that is the volume of timber for this species was computed from the trees of 26 inches and less d.b.h. Trees 28 inches and more are carried in the summaries as diseased trees. The lumber from the smaller trees will contain very little clear, but should make excellent box lumber and common boards and dimension stuff.

Western larch:

This timber should run a little higher in quality than does the Douglas fir. It attains its largest growth along the stream beds but under such conditions it is usually quite shaky, making it necessary to cull out the larger, clear portion of the bole. The younger trees are tall and straight and free from defect. It will produce lumber of average quality for building purposes.

White pine:

The best example of this species is found on the John Day River slope to the west of the road. Trees 34 inches in diameter are commonly found and they are tall and straight. Some of the larger trees have stump rot, otherwise this timber is free from defect. It will average about six logs per M.

Engelmann spruce:

This timber is found growing along the stream bottoms where it sometimes attains a diameter of about 3 feet. It is usually quite limby and the trees have rapid taper. The timber is sound and there is a small amount of clear in the butt logs.

Reproduction:

Reproduction in the yellow pine type runs for the most part as two-thirds stocked. On some of the poorer sties it is scant, about one-third stocked, while in other sites it is dense. On the whole it

compares favorably with most of the eastern portion of the Blue Mountain region. Even in the yellow pine type the reproduction over most of the area is a mixture of all the species common to the region.

Silvicultural management:

Cutting in all the yellow pine type should be done under the selection method. Since it is most probable that horse logging will be done in the white fir-larch-Douglas fir type, this method should be followed there. There is a goodly sprinkling of immature timber throughout most of the area to be logged which will permit the leaving of a sufficient number of trees to insure a future crop.

There are no main highways or resort sites on the project, therefore it will not be necessary to make provisions for scenic strips or special thinnings.

Injurious factors:

Insects:

There is evidence throughout most of the project that bark-beetles did considerable damage a few years ago in the yellow pine timber. It is apparent that the damage done within the last year or two is not so serious and that their destruction has now dropped down to a normal basis.

The lodgepole beetle did considerable damage in the lodgepole pine stands in all the upper watersheds, and this insect is still busy at the north end of the project. Examples of its work are found on the ridge between the North Fork and Little Malheur Rivers, where it is active in some of the immature yellow pines, killing off entire groups of four to six trees, also occasional single trees. This beetle does not, however, do damage to the mature trees.

Growth and yield data:

All yellow pine trees over 12 inches d.b.h. were tallied in two age classes as mature or immature. All other species were tallied under one age class. Trees of pole size of each species were tallied in two diameter classes, namely 4"-7" and 8"-11" d.b.h. The compilation of these pole classes is shown in the tabulations at the back of this report, Tables 28 to 33 inclusive.

IV. Logging Data

The topography over most of the pine area is rolling and in some places quite steep. The best logging ground is found north and westerly from Antelope Mountain. There are, however, other areas such as are found north of Crane Prairie, the area adjacent to the road in Little Crane Creek drainage, and on the flat ridge summit between the North Fork and the Little Malheur River, which will offer excellent logging chances. The country is adaptable to tractor or horse logging and on some of the rougher portions skidders may be used to advantage.

The location of a tapline into this tract has been the subject of much concern for several years. Several different routes have been proposed and are briefly as follows.

1. Extension of the Sumpter Valley line from Prairie City over the John Day River divide into the Malheur River drainage.
2. Construction up the North Fork of Malheur River from Juntura, a distance of about 38 miles of main line, to the mouth of Crane Creek.
3. Construction along a route generally paralleling the North Fork but keeping to the higher country to the west of the river and tapping the project in the Cottonwood Creek block.
4. Extension of the logging railroad from Seneca through Bear Valley, tapping this project in the northeast portion of Logan Valley.

Of these routes, Nos. 1 and 3 are not considered feasible.

Logging Engineer Hoffman in 1925 made an examination of the railroad problem as it affects most of this project, and prepared an excellent report on the matter. His report points out clearly the advantages of operating by way of Seneca and Burns. As brought out in his report, the actual cost of transportation is a little lower by way of Juntura than by way of Seneca and Burns. In addition to this, it is the writer's opinion that there should also be an additional savings in logging costs in favor of the Juntura route, because of the railroad location being below the most of the timber, giving a down-hill haul. However, these advantages are apparently more than equalized by the advantages of a much lesser initial investment and will permit the beginning of operations in Bear Valley where the logging conditions are fairly easy with a short haul to Seneca. The, too, if the Malheur River Working Circle is taken out by way of Juntura, the operation would not permit of a sustained cut owing to the heavy investment requiring an annual cut which would exhaust the timber supply in the course of about 40 years' operation. If the timber is taken by way of Seneca it would tend to increase the stumpage value of the Silvies Working Circle and lessen the rate from Seneca to Burns.

Both routes are feasible and the final selection of the route will undoubtedly be determined by the pressure put upon the demand for pine timber. The large amount of timber controlled by the Eastern Oregon Land Company, being about one-third of the total volume, will necessarily have considerable influence in the situation. In case a good market develops within the next five or ten years, it is most probably that there will be applications for the purchase of this timber, with the proposal of moving it by way of Juntura.

No quality strips were run on the project. It is estimated that the yellow pine will cut about 22 per cent No. 2 logs and better, and in some cases it runs as high as 30 per cent. The other species have but very little clear timber and are suitable only for the rougher grades of lumber.

V. Statistical Summary

Acreage of forest types:

1. National forest lands:

The summary of acreages of forest types and age classes is indicated for the national forest lands in Tables 10 to 15 inclusive, each block being taken care of under a table number.

2. Eastern Oregon Land Company lands:

The tabulation of acreages of types on these lands is carried out on the same principle as for national forest lands and is shown under Tables 16 to 21 inclusive.

Timber:

The timber on only the national forest lands was cruised and tabulated. In addition to the timber, the number of snags and defective white fir trees is indicated under Tables 22 to 27 inclusive.

Poles:

The final tables in this report pertain to a summary of the poles by species and by 4"-7" and 8"-11" diameter classes. These summaries comprise Table 28 to 35 inclusive.

Conclusion:

1. Based on the acreage of the timberland types for the government lands, we obtain the following averages.
 - a. Per acre stand, all species, 12,720 feet B.M.
 - b. Number of snags per acres – 3.3
 - c. Number of diseased trees per acre – 0.9
 - d. Number of small poles, 4"-7" class, per acre – 12.2
 - e. Number of large poles, 8"-11" class, per acre – 9.7

2. In the mature yellow pine type, the following averages apply.
 - a. Stand per acre – 18,041 feet B.M.
 - b. Yellow pine forms 88.9% of the stand.
 - c. Of the YE timber, 17.4% is immature.
 - d. The average volume per tree, all species, is 674 feet B.M.
 - e. The average volume of a mature YP trees is 1,036 feet B.M.

3. In the white fir-larch-Douglas fir type (mature), the averages are as follows.
 - a. Average volume per tree, all species, 357 ft. B.M.
 - b. Average volume per tree, mature YP, 1500 ft. B.M.
 - c. Yellow pine forms 18.7% of the stand

A report pertaining to the cost of the work will be submitted under separate cover.

Fred A. Matz
Fred A. Matz,
Chief of Timber Surveys.

Approved June 9, 1928.
Walt Kulton (sp?)
Forest Supervisor

Approved June 16, 1928
Kavanagh
Acting District Forester

Supplement to Report of May 24, 1928.

At the conclusion of the field season in 1927, there had been covered 191,898.54 acres of both government and E.O.L.D. Co. ownerships. The data pertaining to this work were compiled before field work was resumed the following spring. On May 14, 1928, Junior Forester Jack B. Hogan, with Field Assistants N. R. Hawley, E. E. Rapp, and M. E. Guck resumed field work on the project and completed in on July 17, 1928.

As now completed, the project area is somewhat larger than originally outlined because of the fact that it was found desirable to include in the survey all the merchantable yellow pine areas in the Malheur River Working Circle. With the exception of the unmerchantable forest areas on the upper slopes, this working circle is now complete in this report.

The John Day River Block is also complete, but only a small portion of the Strawberry Block has been covered, so there is necessarily much to be done to complete the John Day River Working Circle.

Rather than make supplemental tables pertaining to the type acreages and timber stands, it was believed more desirable to change the originals, and as the tables now stand the information is complete for the entire project.

The acreages covered during each of the two field seasons are as follows:-

Season	Government land. Acres	Eastern Oregon Land Co. Acres	Total Acres
1927	113,239.34	78,659.20	191,898.54
1928	18,095.10	9,030.16	27,125.26
Totals	131,334.44	87,689.36	219,023.80

A report pertaining to the combined costs of both seasons' work is being prepared and will be available soon.

Fred A. Matz
Fred a. Matz
Chief of Timber Surveys.

Scan Map

United States Department of Agriculture
Forest Service
North Pacific District

S D-6
Timber Surveys, Malheur
Malheur River Project.

December 21, 1928.

The Forester,
Washington, D. C.

Dear Sir:

I am enclosing, herewith, for your information a copy of the cost report for this project.

Very truly yours,
C. M. GRANGER
C. M. Granger,
District Forester.

Enclosure.

(Additional tables, too large to transcribed, are available to view at the Umatilla NF Supervisor's Office)

United States Department of Agriculture
FOREST SERVICE

S D-6
Timber Surveys-Malheur
Malheur River Project

Portland, Oregon,
December 15, 1928.

COST REPORT
MALHEUR RIVER TIMBER SURVEY PROJECT
MALHEUR NATIONAL FOREST SERVICE
Seasons 1927 and 1928

Fred A. Matz,
Chief of Timber Surveys.

Cost Report
Malheur River Project
Malheur National Forest

I. Acreage and Mileage:

1. Total gross area mapped – 220,224 acres.

2. Net area cruised National Forest lands:

10% cruise -	81,734 acres
5% cruise -	74,790 acres.
Extensive cruise -	<u>1,810</u> acres
Total	131,334 acres.

3. Patented lands mapped:

Eastern Oregon Land Company (cooperative funds)	87,689 acres
Other ownerships -	<u>1,200</u> acres
Total -	88,889 acres.

4. Number of miles of vertical control (transit) – 122.

5. Number of miles of horizontal control, retracements with compass and chain – 251.

6. Number of miles of strip surveys:

(a) Cruising government	1,321
(b) Mapping E.O.L. Co. -	906

7. Total volume of all species cruised,

M. Ft. B.M. -	1,326,765
---------------	-----------

II. Field Expenses:

1. Cost of subsistence supplies	\$2,273.34
2. Cost of cook's wages	703.74
3. Cost of packing and hauling	300.11
4. Travel expense	92.57
5. Equipment and automobile supplies	189.72
6. Miscellaneous expense	<u>10.00</u>
7. Total all expense	\$3,569.48
8. Average daily expense per man -	\$1.475

III. Field Work:

1. Cost of salaries -		\$7,990.72	
2. Average size of crew -	11.5 men		
3. Average individual monthly salary -		\$99.06	
4. Transit control	Man days -	219	
	Salary -	\$769.16	
	Expense prorated -	<u>323.03</u>	\$1,092.19
5. Compass control	Man days -	386	
	Salary -	\$1,183.29	
	Expense prorated	<u>569.75</u>	1,753.04
6. Strip surveys	Man days -	1,032	
	Salary	\$2,961.68	
	Expense prorated	<u>1,521.78</u>	4,483.46
7. Camp computing and map compilation			
	Man days -	83	
	Salary	\$406.53	
	Expense prorated	<u>123.90</u>	530.43
8. Supervision	Man days - 103		
	Salary -	\$642.17	
	Expense prorated -	<u>151.92</u>	\$794.09
9. Travel, camp chores, establishing camp and moving			
	Man days -	224	
	Salary	\$803.46	
	Expense prorated	<u>330.40</u>	1,133.86
10. Sundays, holidays, leave and rain			
	Man days -	372	
	Salary	\$1,224.43	
	Expense prorated	<u>548.70</u>	1,773.13
11. Total cost of field work			
	Man days -	2,420	
	Salary	\$7,990.72	
	Expense	<u>3,569.48</u>	
	Total Cost	\$11,560.20	

IV. Headquarters Office Work:

1. Computation	Man days -	255	
	Salary	\$1,796.28	\$1,796.28
2. Type maps	Man days	106	
	Salary	\$766.67	
	Expense	<u>2.00</u>	768.67
3. Drafting, map making, and printing	Man days -	203	
	Salary	\$1,370.78	
	Expense	<u>124.70</u>	1,495.48
4. Written reports	Man days -	26	
	Salary	<u>237.33</u>	237.33
5. Total cost of headquarters office work	Man days -	590	
	Salary	\$4,171.06	
	Expense	<u>126.70</u>	4,297.76

V. Totals

1. Summarized cost of project	Man days -	3,010	
	Salary -	\$12,161.78	
	Expense	<u>3,696.18</u>	\$15,857.96
2. Cost per acre for gross area mapped -		\$0.072	
3. Cost per acre for net area cruised -		\$.1207	
4. Cost per M. feet B.M. cruised by all methods		\$0.119	

VI. Conclusion:

The above-mentioned \$15,857.96 represents the total expenditures on the project and is made up from the following appropriations, namely:

- | | |
|---|------------|
| 1. G. E. Reconnaissance (timber) - | \$9,973.51 |
| 2. G. E. Reconnaissance (grazing), contributed | \$1,500.00 |
| 3. Cooperative fund, based on a charge
of 5 cents per acre for the Eastern Oregon
Land Company lands within the project | \$4,384.45 |

Considering only the government money involved in these expenditures, we have a cost of \$11,473.51. This amount divided by the net acreage of National Forest lands involved and by the total volume of timber gives corresponding results, as follows:

- | | |
|---|----------|
| 1. Cost per acre for net N.F. area cruised - | \$0.087 |
| 2. Cost per M. feet B.M. cruised by all methods | \$0.0086 |

Fred A. Matz
Fred A. Matz
Chief of Timber Surveys