# PRELIMINARY FOREST MANAGEMENT PLAN

# FOR THE

# ADAIR TRACT FOREST

By

EDWIN W. PIERSON

JULY 1953

## SUMMARY

The Adair Tract Forest is located about ten miles north of Corvallis, Oregon, in the Douglas-fir region of Western Oregon. The total land area is 6,240 acres of which 2,725 acres contain commercial species. The total timber volume of Douglas-fir is 31,092.0 M board feet Scribner.

The rotation has been set at 100 years with an allowable annual cut of 995 M board feet gross for the forest as a whole.

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# PRELIMINARY FOREST MANAGEMENT PLAN FOR THE ADAIR TRACT FOREST

## INTRODUCTION

The Adair Tract Forest is located approximately ten miles north of the town of Corvallis, in Benton and Polk Counties, Oregon. The total area is 6,240 acres. The land which now comprises the Adair Tract Forest was acquired in 1947 from the federal government when the Camp Adair Military Reservation was terminated.

## PHYSIOGRAPHIC FEATURES

### Topography

The topography of the area ranges from gentle slopes suitable for tractor logging to steep slopes adaptable to high lead logging methods. Exposures are generally northeast and southeast. There are only a few sharp, bare ridge tops or outcrops of rock, which make the area suitable for timber production throughout. Elevations vary from 500 to 1900 feet above sea level. There are two important stream drainages, Soap Creek flowing northeast, and North Fork Berry Creek flowing northeast. Berry Creek has its origin in the Adair Tract Forest and Soap Creek in the

McDonald Forest. This makes the area an important watershed on which agricultural land in the lower area is dependent.

Soil

The main soil types on the area are Olympic clay and silty-clay in the higher elevations, Aiken silty-clay loam on the middle elevations, and Wapato clay near the stream bottoms. The northeast slopes are of a heavier soil type.

Climate

The typical moderate climate of western Oregon and the Willamette Valley prevails throughout the area. Annual rainfall averages around forty inches. Summers are hot and dry with the winter months wet and often cold at the higher elevations. Prevailing winds are from the southwest with occasional dry winds from the east in the summer months. Fire season generally ranges from late May to early October in normal years.

## FOREST DESCRIPTION

Types

The predominant species is Douglas-fir, *Pseudotsuga* taxifolia, with individual trees and patches of

white fir, Abies grandis, scattered throughout the area. Major hardwood species are Oregon white oak, Quercus garryana and bigleaf maple, Acer macrophyllum, on the open hillsides. Oregon ash, Fraxinus oregona, and red alder, Alnus rubra are found along the stream banks and low areas that have an abundance of moisture.

Brush species are Ceanothus spp.; vine maple, Acer circinatum; blue elderberry, Sambucus glauca; cascara, Rhamnus purshiana, and other minor species. Numerous non-stocked grass areas are found on the southwest slopes. There are four main vegetative types on the forest: Douglas-fir, oak, grass, and brush.

TABLE I

SUMMARY OF AREA AND VOLUME

Area and Volume by Types

| Type | Area Acres | Volume |
|---|---|---|
| Timber (5-150 - years) | 2,725 acres | 31,092.0 M.B.M. |
| Recent Cutover | 205 " | |
| Old Non-stocked Cutover | 864 " | |
| Total Timber Land | 3,794 acres | 31,092.0 M.B.M. |
| Hardwood | 213 acres | |
| Oak | 204 " | |
| Agriculture | 1,401 " | |
| Grass | 628 " | |
| Total Non-Timber Types | 2,446 acres | |
| Total All Types | 6,240 acres | 31,092.0 M.B.M. |

## Fire

The fire occurrence record on the forest is below normal because the area is closed to the public. The forest has been free of any fires since the tract was acquired by the School of Forestry. Protection is provided by the Polk-Benton Fire District which has a twenty-man emergency fire crew stationed at the Oregon State Nursery located three miles west of the Adair Tract Forest. No portion of the Adair tract forest is over thirty minutes travel time from the Polk-Benton Fire District headquarters.

# ECONOMIC SITUATION

## Towns and Markets

Sawtimber markets are available in Albany, Philomath, and Corvallis. The outlet for poles is good in the Eugene and Corvallis areas. There is a small demand for minor forest products in the Portland market. If developed, a fuelwood market would allow for removal of non-commercial species which are prevalent throughout the forest.

## Transportation

County roads adjacent to the forest property provide easy access to public highways. The improved roads

connect with the county roads. The improved roads are all-weather stone reinforced for year around heavy traffic use. The summer fire roads are graded dirt roads designed for summer traffic only.

Timber access roads should be developed as funds become available and the harvesting program proceeds. In locating new roads the fire protection phase should be considered as well as the opening of timber stands.

Public roads are adequate for transporting the products to local mills in Benton and Polk Counties, while the Willamette River and the Southern Pacific Railroad offer opportunities for supplying more distant markets.

Labor

An adequate labor supply is maintained within the surrounding area, for Oregon State College students can be employed on a part-time basis during school months. Summer crews could be hired from the Forestry School at the College. Experienced local labor is available in Corvallis and surrounding communities.

Ownership

The policy of blocking up the holdings will require purchase of certain areas adjacent to the forest. These

areas are in private ownership or are Oregon and California lands administered by the Bureau of Land Management. Outright purchase should be carried out whenever possible or trading arranged if necessary.

## MANAGEMENT PLAN

### Introduction

Since the Adair Tract was acquired in 1947, operation has been maintained on a temporary basis pending completion of a management plan.

This is a preliminary management plan and will serve as an over-all guide for the next seven years.

The major product to be derived from the land will be sawtimber. All material should be directed toward its highest use: peeler logs for plywood, sawlogs for lumber, and low quality logs for pulp or minor products.

### Objective

The primary objective is to manage the forest resource on a sustained yield basis producing the maximum volume of forest products.

The secondary objectives are:

1. To develop the economic potentialities of the present forest resource.

2. To harvest such portions of the stand as have reached maturity and to assure reproduction.

3. To improve the quality and composition of the forest.

4. To preserve and protect the forest from fire, disease and insect damage.

5. To conduct research projects in the management of second-growth timber.

6. To utilize the forest for instructional purposes in conjunction with the School of Forestry and other departments of Oregon State College.

7. To direct all development of the forest based on the best economic and scientific knowledge.

## SILVICULTURE

### Cutting Practices and Considerations

Sound silvicultural practices should be followed in management planning. Clear-cut staggered settings should be the primary method of harvesting timber. Staggered settings should be logged with tractor or high-lead depending on the adaptability of the area to these methods. Seed sources should be retained in the form of seed blocks around the cutting areas and should not be removed until adequate reproduction has become established in the cutover areas. In selection of cutting areas, windthrow, fire hazards and cone-opening winds should be considered in marking boundaries.

## Intermediate Harvests

Intermediate harvests should be carried out in stands needing improvement and accessible for profitable operation. Removal of residual stands should be carried out after reproduction has been established, in areas which will not create hazards or cause severe damage to surrounding stands.

## Slash Disposal and Hazard Reduction

Slash should be broadcast burned throughout the area except in cases where slash accumulation after logging is below normal; where advanced reproduction is present on the area; or when the site will be damaged excessively by burning. All snags should be felled as part of the harvest operation. Cost of falling could be met by adjusting the stumpage price.

## Regeneration and Planting

Because of the large amount of non-stocked cutover area, particular attention should be directed toward restoration of reproduction on these areas. Natural regeneration should be the chief means of placing the non-stocked areas back into production. Rodent control by poisoning should be an established practice preceding the time of seed fall during good seed years. On areas

of low site III and site IV planting or direct seeding immediately following cutting should be investigated. Planting or direct seeding should be resorted to in event of failure of natural methods. There are several large areas, such as Sections 8, 14, 15 and 23 that should be planted or direct seeded at an early date.

## REGULATION

### Yield

The average total mean annual increment of the area is 500 board feet Scribner (6) per acre per year at rotation age (100 years) or 1,362 M board feet for the entire area that is stocked. Allowing for breakage and defect of 10 per cent, the total net yield will be 1,226 M board feet.

### Rotation

A rotation of 100 years is recommended for the Adair Tract Forest. The selection of a 100 year rotation is based on the fact that the average site quality of the tract is low site III and that culmination of the mean annual increment is around 120 years. During the twenty years between rotation and culmination the amount of increase in growth per acre per year is slight. Because of this lack of increase the economic feasibility of

holding the timber for another twenty years is not profitable.

## Allowable Cut

The allowable cut was determined by Barnes' method based on average cutting age (3) and was checked by the area-volume check. The calculated value for the indicated annual cut was 995 M.B.M. The area-volume check was within plus or minus five per cent (calculations in the appendix).

## Overcutting and Undercutting

Overcutting and undercutting should not exceed 30 per cent in any year. Over a period of ten years the allowable cut should balance within five per cent.

## Cutting Budget

TABLE 2

PLAN FOR SEVEN YEARS CUTTING

(Annual Cut = 995 M board feet)

| Year | Acres | Location | Volume M board feet |
|---|---|---|---|
| 1953 | 107 | A 1 | 984.4 |
| 1954-55 | 75 | A 2 | 2,380.0 |
| 1956 | 10 | A 4 | 112.0 |
| | 16 | A 3 | 853.8 |
| 1957 | 16 | A 3 | 853.8 |
| 1958-59 | 52 | A 5 | 1,846.0 |
| | 276 | | 7,030.0 |

The cutting budget has been computed for the next seven years. At the end of that time a recalculation for the next ten-year period should be made and revised each ten years hence -- 1960, 1970, and so forth. The budget should be revised to meet any catastrophic loss or large land acquisition. Location of cutting areas may be found on the cutting area map in the appendix.

## ADMINISTRATION

### Sales Policy

Being a state institution, sales must be auctioned by oral or sealed bids based on provisions of a harvesting contract. Only small salvage sales or thinning may be negotiated. The most desirable policy would be to have all harvesting operations handled by contract with operators in the immediate area, and to market all material within a fifty-mile radius of the forest.

Permits for harvest of minor products, sword fern, cascara, and fuelwood should be handled by the forest manager at his discretion.

### Grazing

Use of grass land in timbered areas is not advised at present. Cost of building and maintaining fence would

be prohibitive in comparison to income from grazing permits.

Research

Research should be handled by the staff of the Oregon State College School of Forestry. Student laboratories and student research projects could be held throughout the forest area.

Connected with the school is a small sawmill which is operated by students. Timber for the mill should be provided from salvage of windthrown and residual trees which could be logged by a student-manned operation. Timber harvested by the students should be charged against the allowable annual cut if it is of merchantable size and has been included on previous inventories.

Inventory see appendix

The inventory data used in determining the indicated annual cut and volume of the present growing stock were derived from Weyerhaeuser "Empirical Yield Tables" (7) and U.S.D.A. Technical Bulletin 201 "The Yield of Douglas-fir in the Pacific Northwest" (6).

Photo interpretation was used to compile a forest type map of the Adair Tract Forest. All photo interpretation work was checked by extensive type of field survey. Site classification and age were obtained from

survey notes previously compiled.

Because of the necessity of using inventory data derived solely from yield tables and the extensive nature of the inventory data, immediate plans to inventory the entire forest area intensively should be contemplated. A ten per cent, two-strip per forty type of cruise would be adequate.

## Revision of Plan

Revision of the plan is contemplated at the end of each ten-year period.

## Summary of Present Management Problems

The major management problems that exist on the Adair Tract Forest are:

1. There are large areas of cutover land that have not been restocked. Planting or direct seeding projects are needed to restore the 864 acres of such cutover land to productivity.

2. There are large areas of scattered trees and residual stands of merchantable material that could be removed in a salvage program.

3. On areas of low site III and site IV satisfactory regeneration after harvesting is questionable. Special attention should be directed toward the early restocking. Time of harvesting, size of cutting area, location of seed source as to

topography and cone-opening winds, and the possible use of planting stock or direct seeding immediately after cutting, might be considered for faster and better restocking.

4. Some of the small sawlog stands (D-3) are growing slowly or are stagnated. Investigation should be made as to possible utilization or methods of increasing growth rates of those stands.

5. Large areas of Douglas-fir and oak are growing together. The oak is taking up valuable growing space which might be better used by the Douglas-fir.

6. A condition of all planning should be an ever-increasing utilization standard. As markets develop for new forest products, immediate steps should be taken to meet the changing conditions. This might include a program for the utilization of thinnings.

# A P P E N D I X

## LEGAL DESCRIPTION

The Adair Tract Forest of the School of Forestry, Oregon State College, contains a total of 6,240 acres. The legal description of the property is as follows:

Township 10 South, Range 5 West, Willamette Meridian. All of Sections 32, 22, 21, 16 and 8. That portion north of Soap Creek Road, Section 26. That portion west of the Portland Umpqua Valley Road, including Sections 14, 15 and 9; the Northeast 1/4 of Section 17; South 1/2 of the Northeast 1/4 of Section 7; South 1/2 of Section 5, and that portion, included in an irregular boundary, of Section 4.

# WOOD PROCESSING PLANTS IN THE CORVALLIS-PHILOMATH AREA

| Corvallis | Daily Capacity M.B.F. | Species Cut |
|---|---|---|
| Corvallis Lumber Co. | 130 | Douglas-fir<br>White fir |
| Western Milling Co. (Dog Face Lumber Co.) | | |
| Sawmill | 40 | Douglas-fir |
| Planing Mill | 60 | Douglas-fir |
| Digger Mountain Planing Mill | 90 | Douglas-fir |
| **Philomath** | | |
| Central Willamette Lumber Co. | 55 | Douglas-fir |
| Clemens Forest Products Co. | 125 | Douglas-fir |
| Ellis Planing Mill | 100 | Douglas-fir |
| Bayless Lumber Co. | 30 | Douglas-fir |
| Red Fir Lumber Co. | 30 | Douglas-fir |
| Rose Brothers Lumber Co. | 30 | Douglas-fir |

## CALCULATIONS OF ALLOWABLE ANNUAL CUT

The indicated allowable annual cut was determined by Barnes' formula as follows:

(Indicated Annual Cut) $$IAC = \frac{Yn \times S \times D \times A}{R}$$

when Yn = Normal yield of average acre at average cutting age

S = Per cent of stocking as a decimal multiplier

D = Breakage and defect allowance as a decimal multiplier

A = Total area

R = Rotation age

substituting the values applying to the Adair Tract Forest property:

Yn = 72.2 M bd.ft. Scribner (at average cutting age of 115 yrs. on average site III land)

S = 0.506

D = As all volume figures given in this report are gross volumes, this correction was deleted

A = 2725 acres (land now stocked with Douglas-fir)

R = 100 years

$$IAC = \frac{72.2 \times 0.506 \times 2725}{100}$$

$$= 995 \text{ M bd.ft. Scribner}$$

When the area-volume check was applied, this figure proved to be within ± 5% of rotation age.

AREA-VOLUME CHECK
Indicated Annual Cut = 995 MBM
Rotation = 100 years

| Age | Site | Stock-ing | Acres | Average Cutting Age | Gross Vol.IA at Cutting Age (MBM) | Total Gross Volume (MBM) | Years to Cut Periodic | Years to Cut Cum. |
|---|---|---|---|---|---|---|---|---|
| 150 | III | 3 | 32 | 150 | 75.3 | 2409.6 | 2.5 | 2.5 |
| 150 | " | 2 | 52 | 155 | 49.9 | 2594.8 | 2.5 | 5.0 |
| 150 | " | 1 | 15 | 155 | 22.6 | 339.0 | .3 | 5.3 |
| 150 | " | 12½% | 10 | 155 | 11.2 | 112.0 | .1 | 5.4 |
| 120 | " | 2 | 75 | 125 | 42.7 | 3202.5 | 3.2 | 8.6 |
| 110 | " | 2 | 99 | 120 | 41.5 | 4108.5 | 4.2 | 12.8 |
| 110 | " | 1 | 10 | 125 | 19.6 | 196.0 | .2 | 13.0 |
| 100 | " | 2 | 126 | 120 | 42.0 | 5292.0 | 5.3 | 18.3 |
| 100 | " | 1 | 10 | 120 | 19.2 | 192.0 | .2 | 18.5 |
| 100 | " | 12½% | 123 | 120 | 9.2 | 1131.0 | .1 | 18.6 |
| 90 | " | 2 | 289 | 115 | 41.0 | 11849.0 | 11.9 | 30.5 |
| 90 | " | 1 | 18 | 120 | 19.5 | 351.0 | .3 | 30.8 |
| 80 | " | 3 | 18 | 110 | 57.8 | 1040.4 | .1 | 30.9 |
| 70 | " | 3 | 130 | 105 | 55.4 | 7202.0 | 7.2 | 38.1 |
| 70 | " | 2 | 174 | 115 | 43.3 | 7534.2 | 7.5 | 45.6 |
| 70 | " | 1 | 70 | 115 | 19.6 | 1372.0 | .1 | 45.7 |
| 60 | " | 3 | 221 | 115 | 60.4 | 13348.4 | 13.4 | 59.1 |
| 60 | IV | 2 | 84 | 120 | 46.7 | 3922.8 | 3.8 | 62.9 |
| 60 | III | 12½% | 101 | 125 | 9.7 | 979.7 | 1.0 | 63.9 |
| 60 | " | 1 | 70 | 125 | 21.9 | 1506.0 | 1.5 | 65.4 |
| 50 | " | 3 | 180 | 125 | 65 | 11700.0 | 11.7 | 77.1 |
| 50 | " | 2 | 72 | 130 | 51.8 | 3729.6 | 3.7 | 80.8 |
| 50 | " | 1 | 84 | 130 | 23.5 | 1974.0 | 1.9 | 82.7 |
| 30 | IV | 3 | 120 | 115 | 35.1 | 4212.0 | 4.2 | 86.9 |
| 30 | III | 3 | 30 | 115 | 65.9 | 1977.0 | 1.9 | 88.8 |
| 30 | " | 2 | 33 | 120 | 54.8 | 1804.4 | 1.8 | 90.6 |
| 30 | " | 1 | 43 | 120 | 25.1 | 1079.3 | 1.0 | 91.6 |
| 20 | " | 2 | 82 | 110 | 56.6 | 4641.2 | 4.6 | 96.2 |
| 20 | " | 1 | 354 | 125 | 27.7 | 9805.8 | 9.1 | 105.3 |
| | | | 2725 | | | | | |

TABLE 3

AREA - TYPE

| Type | Well Stocked | Medium Stocked | Poor Stocked | Total Area Of Type |
|---|---|---|---|---|
| D 1 | 120 acres | 82 acres | 354 acres | 556 acres |
| D 2 | 21 | 33 | 42 | 95 |
| D 3 | 541 | 330 | 224 | 1095 |
| D 4 | 18 | 589 | 38 | 645 |
| D 5 | 32 | 52 | 15 | 99 |
| RD 3 | - | - | - | 101 |
| RD 4 | - | - | - | 123 |
| RD 5 | - | - | - | 10 |
| A | - | - | - | 1401 |
| G | - | - | - | 628 |
| X | - | - | - | 205 |
| XO | - | - | - | 864 |
| HDW | - | - | - | 213 |
| Oak | - | - | - | 204 |
| | | | TOTAL | 6240 acres |

TABLE 4

GROWING STOCK VOLUME AND AREA

| Age | Area Acres | Volume MBM |
|---|---|---|
| 0- 5 | 1069 | - |
| 5- 15 | 0 | - |
| 15- 25 | 436 | 111.8 |
| 25- 35 | 216 | 55.9 |
| 35- 45 | 0 | - |
| 45- 55 | 336 | 1028.4 |
| 55- 65 | 375 | 3146.5 |
| 65- 75 | 374 | 5628.4 |
| 75- 85 | 18 | 504.0 |
| 85- 95 | 307 | 6568.7 |
| 95-105 | 259 | 4511.4 |
| 105-115 | 109 | 3022.8 |
| 115-125 | 75 | 2380.0 |
| 125-135 | 0 | - |
| 135-145 | 0 | - |
| 145-155 | 109 | 4134.1 |
| | 3794 | 31092.0 |
| | 1047 | |
| | 2725 | |

Volume computed from Weyerhaeuser "Empirical Yield Tables" (7) by interpolating between values of Site III and Site IV to arrive at a low site III value.

Pgs. 22-26 not supplied



## REFERENCES


1. Anonymous, Recommended Forest Practices and Techniques, Western Forestry and Conservation Association, Portland, Oregon, 1950.

2. Barnes, G. H., Timber Management, O.S.C. Cooperative Association, Corvallis, Oregon, 1950.

3. Barnes, G. H., "A New Method of Volume Regulation," Journal of Forestry, Vol. 49, No. 4, April 1951, page 272.

4. Dilworth, J. R., Log Scaling and Timber Cruising, O.S.C. Cooperative Association, Corvallis, Oregon, 1951.

5. Hicks, V. E. and H. J. Hixon, A Plan of Management for Timber Resources of Mt. Hood National Forest, U.S.D.A. Forest Service, Portland, Oregon, 1951.

6. McArdle, R. E., The Yield of Douglas Fir in the Pacific Northwest, U.S.D.A., Washington, D.C., 1930 revised 1949.

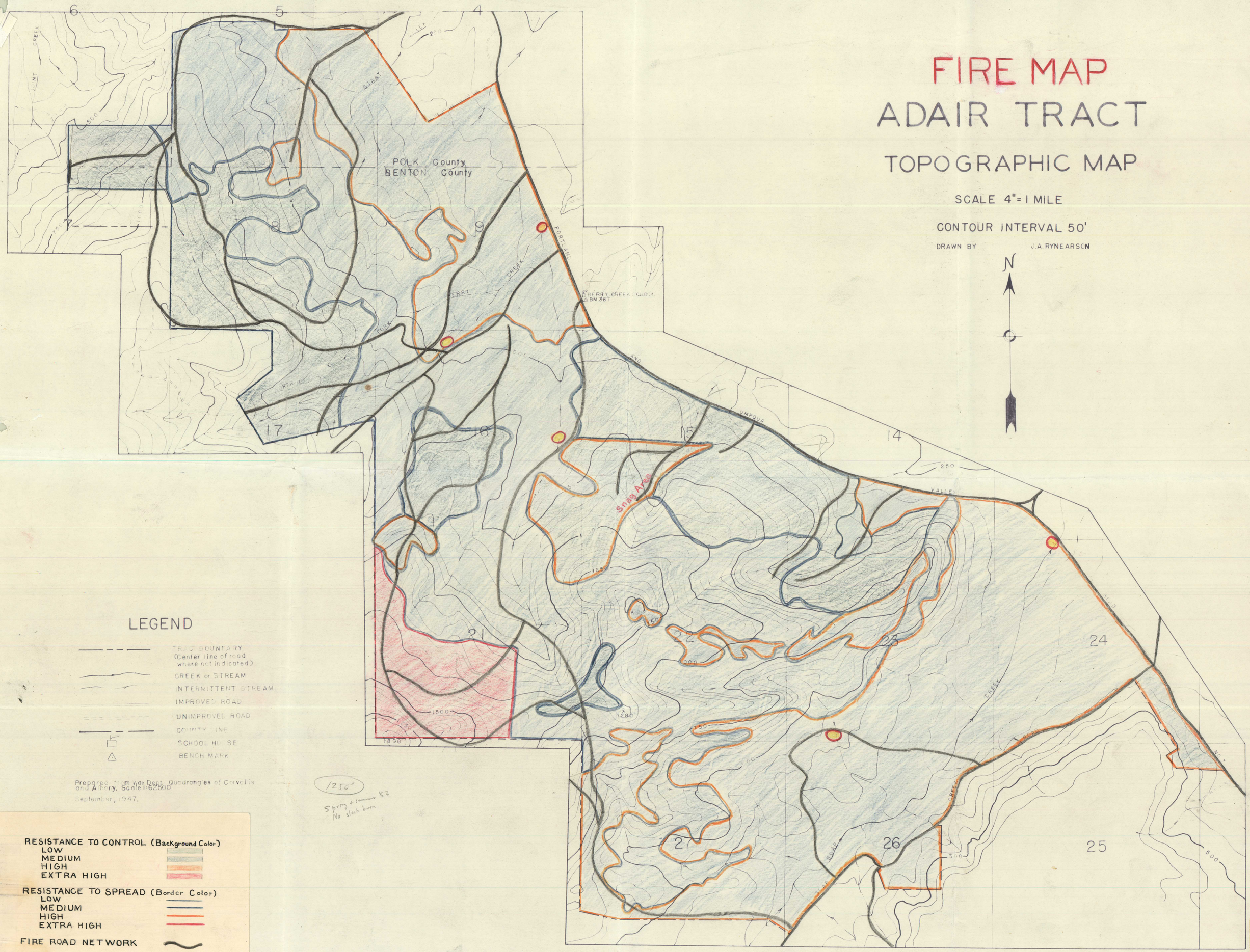
7. McKeever, D. G., Empirical Yield Tables for Douglas Fir, Weyerhaeuser Timber Company, Tacoma, Washington, 1947.

# FIRE MAP
# ADAIR TRACT
## TOPOGRAPHIC MAP

SCALE 4" = 1 MILE

CONTOUR INTERVAL 50'

DRAWN BY J.A. RYNEARSON




## LEGEND

- TRACT BOUNDARY (Center line of road where not indicated)
- CREEK or STREAM
- INTERMITTENT STREAM
- IMPROVED ROAD
- UNIMPROVED ROAD
- COUNTY LINE
- SCHOOL HOUSE
- BENCH MARK

Prepared from War Dept. Quadrangles of Corvallis and Albany, Scale 1:62500
September, 1947.

1250'
Spring & summer '52
No slash burn

**RESISTANCE TO CONTROL (Background Color)**
- LOW
- MEDIUM
- HIGH
- EXTRA HIGH

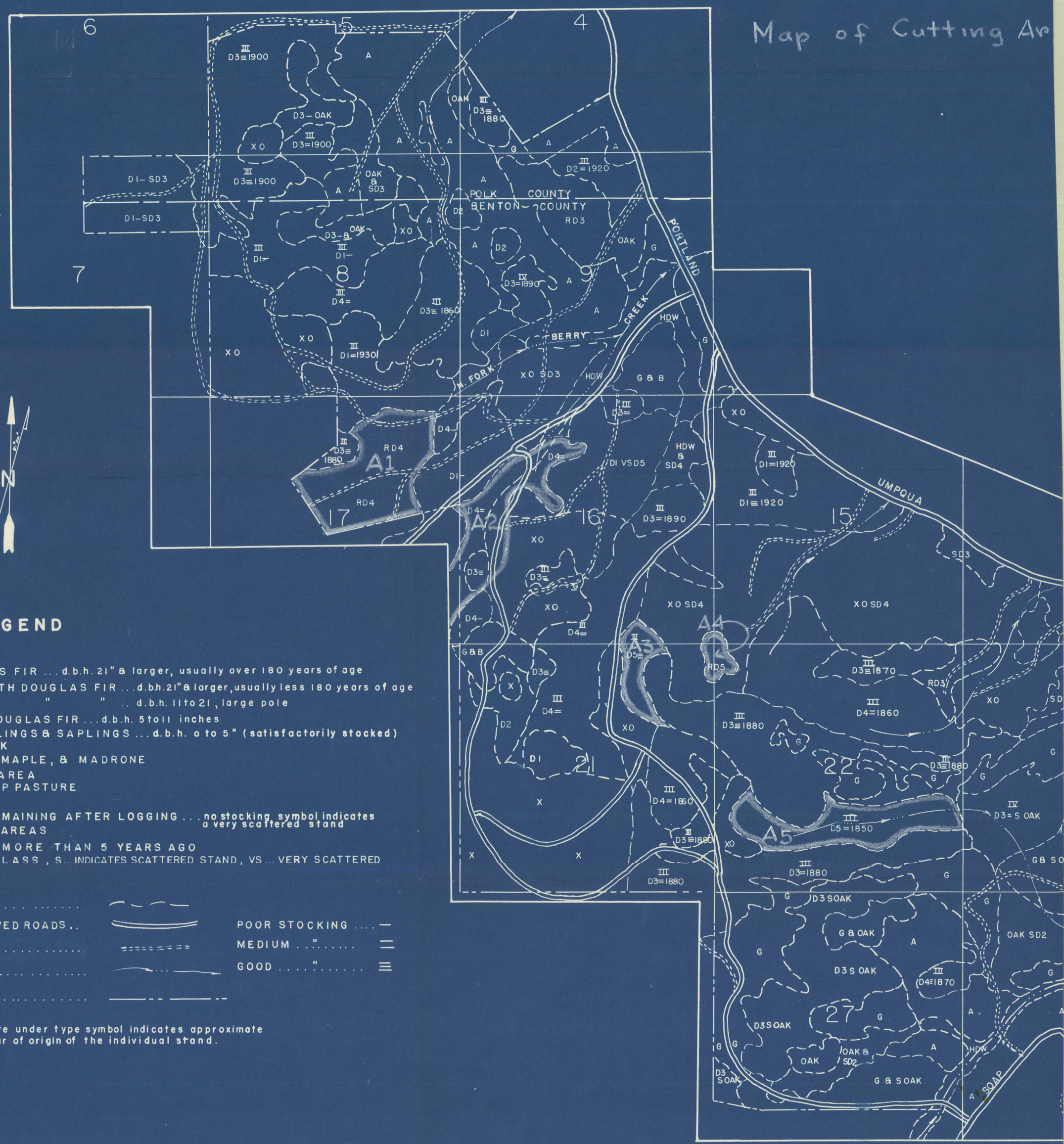
**RESISTANCE TO SPREAD (Border Color)**
- LOW
- MEDIUM
- HIGH
- EXTRA HIGH

FIRE ROAD NETWORK

PROPOSED WATER HOLES

2-1

Map of Cutting Ar




## LEGEND

D5 .. OLD GROWTH DOUGLAS FIR ... d.b.h. 21" & larger, usually over 180 years of age
D4 .. LARGE YOUNG GROWTH DOUGLAS FIR ... d.b.h. 21" & larger, usually less 180 years of age
D3 .. SMALL " " " " .. d.b.h. 11 to 21, large pole
D2 .. SMALL POLE SIZE DOUGLAS FIR ... d.b.h. 5 to 11 inches
D1 .. DOUGLAS FIR SEEDLINGS & SAPLINGS ... d.b.h. 0 to 5" (satisfactorily stocked)
OAK .. OREGON WHITE OAK
HDW .. MIXTURE OF OAK, MAPLE, & MADRONE
G & B .. GRASS & BRUSH AREA
G .. GRASS AREA OR STUMP PASTURE
A .. CULTIVATED LAND
R .. RESIDUAL STAND REMAINING AFTER LOGGING ... no stocking symbol indicates a very scattered stand
X .. RECENT CLEAR CUT AREAS
XO .. AREAS CLEAR CUT MORE THAN 5 YEARS AGO
III & IV REFERS TO SITE CLASS, S ... INDICATES SCATTERED STAND, VS ... VERY SCATTERED

TYPE BOUNDARY .....
ALL WEATHER, IMPROVED ROADS ..
SUMMER FIRE ROADS .....
STREAMS .....
FOREST BOUNDARY .....

POOR STOCKING .... —
MEDIUM .. " ..... =
GOOD .... " ..... ≡

NOTE: Date under type symbol indicates approximate year of origin of the individual stand.

# TYPE MAP

## OF

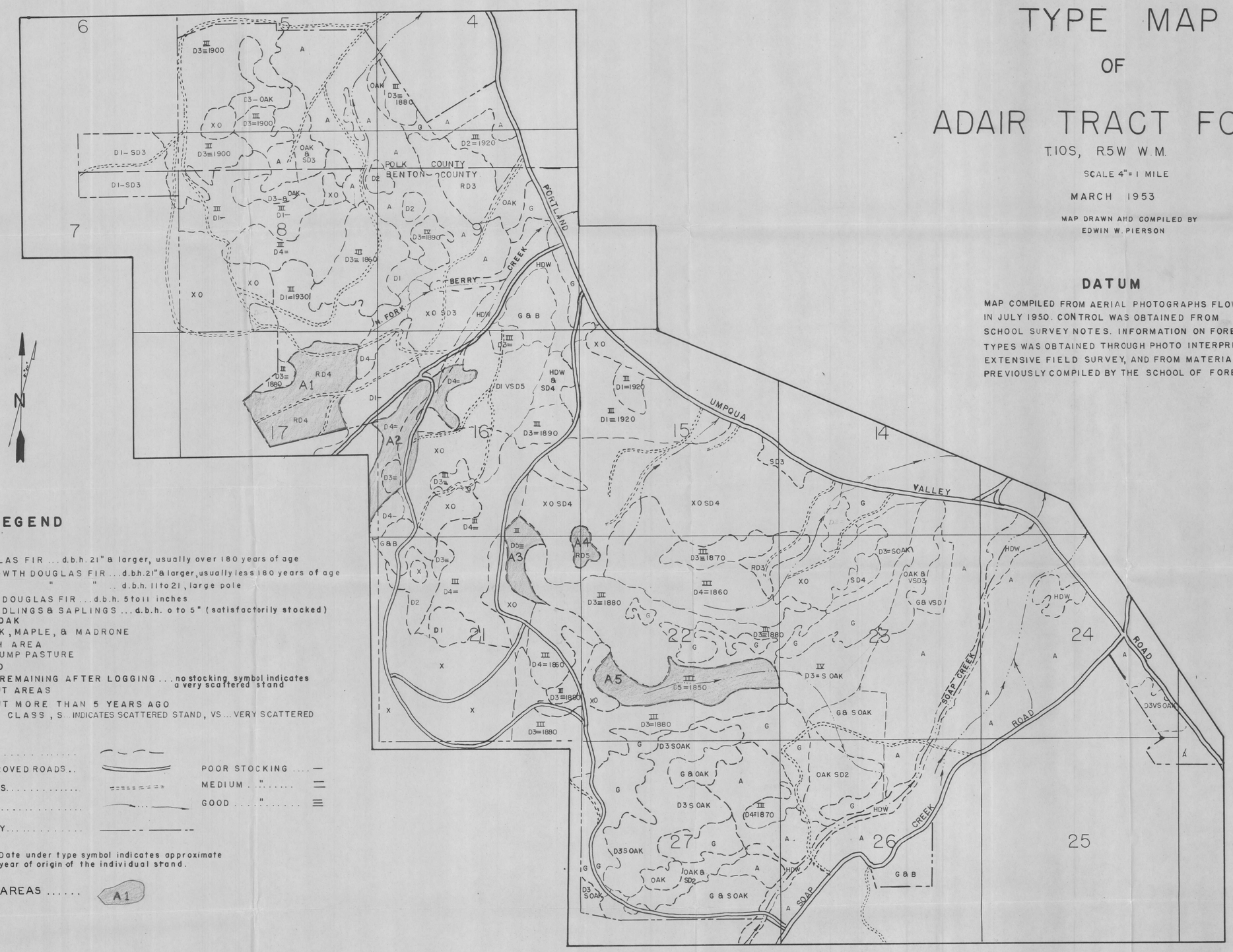
# ADAIR TRACT FOREST

T.10S, R.5W W.M.

SCALE 4" = 1 MILE

MARCH 1953

MAP DRAWN AND COMPILED BY
EDWIN W. PIERSON




## DATUM

MAP COMPILED FROM AERIAL PHOTOGRAPHS FLOWN IN JULY 1950. CONTROL WAS OBTAINED FROM SCHOOL SURVEY NOTES. INFORMATION ON FOREST TYPES WAS OBTAINED THROUGH PHOTO INTERPRETATION, EXTENSIVE FIELD SURVEY, AND FROM MATERIAL PREVIOUSLY COMPILED BY THE SCHOOL OF FORESTRY.

## LEGEND

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STREAMS .....
FOREST BOUNDARY .....

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MEDIUM .. " ..... =
GOOD .... " ..... ≡

NOTE: Date under type symbol indicates approximate year of origin of the individual stand.

PROPOSED SALE AREAS ..... A1