LAND-USE PROBLEM REPORT

With Special Reference to Cut-Over Douglas-fir Areas in Benton County, Oregon

Submitted to

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November 24, 1954

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INTRODUCTION

The purpose of this report is to present the area under consideration as a land-use problem area. The problem confronting owners and managers of similar lands is whether to let nature take its course and to derive very meager returns from poor-quality timber, if any; whether to put the lands on an improved grazing program; or whether to attempt to re-establish a timber crop and exert all effort towards improved forestry.

This report will cover the location and site factors of the tract examined, the present use, and the potential uses of the tract under present economic and silvicultural considerations.

The scope of this report will be confined to an area in the Douglas-fir type forest of Benton County, Oregon. This particular area has been clear-cut and then burned. All conclusions and recommendations will be derived from this one tract, and they are not necessarily applicable to all such lands.

LOCATION

The area under consideration is in section 4, township 10 south, range 5 west, Willamette Meridian. The tract is owned by Starker and Son, Inc. of Corvallis, Oregon, but it lies within the boundaries of the McDonald Forest--

the Oregon State College School of Forestry outdoor laboratory. It is located along Soap Creek, a tributary of the Willamette River, and is relatively well-drained.

HISTORY

The Starker Tract, as it shall be referred to in this report, was first logged in 1939 and 1940. Then, during the war years, it was salvage logged and burned.[1] The timber crop harvested from the area was of average quality and size for the Douglas-fir site upon which it was located. Snowbreak had, however, considerably reduced the merchantable volume. Since logging, there has been no attempt at artificially regenerating reproduction.

PHYSICAL FEATURES

The Starker Tract is typical of many logged-off areas in Benton County. The area has a western to northwestern exposure and receives an average of 40 inches of rainfall per year. Most of this occurs during the late fall, winter, and spring with very little precipitation taking the form of snow. The summers are characterized by their lack of moisture. The growing season averages from 150 to 200 days

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1 Personal interview with R. A. Yoder, School of Forestry, Oregon State College.

during normal years (1). The average elevation for the area is 600 feet above sea-level.

Topography

The slope of the tract averages 15 percent and varies from nearly flat to approximately 30 percent. The entire tract slopes to the west and northwest, but several small streams break up the ground so that small areas have north and east aspects.

The topography is considered very favorable for timber growth in this region, and grazing could also be handled satisfactorily on most of the ground (3). There are no high, windswept ridges on the tract; and neither are there any poorly drained frost pockets.

Soils

Benton County lies in the Pacific Coast soil region. Soil survey maps indicate this particular area as rough and mountainous. Close inspection substantiates this. The soil is of the Akien clay-loam series and is moderately deep (4 to 5 feet). The drainage is generally good with the only exceptions being in areas where a claypan was found between 12 and 36 inches below the surface. The pH is 5.8 to 6.0 or moderately acid. This is a favorable condition for Douglas-fir growth. Generally, these soils

can be classified as acceptable for either timber or forage production.[1]

GROUND COVER

At the present time, the Starker Tract, like so many other cut-over areas in Benton County, supports a ground cover of brush, some grasses and herbs, a few scattered cull trees, and some isolated groups of reproduction.

Brush

Brush is the major ground cover on the tract. Salal (Gaultheria shallon), evergreen huckleberry (Vaccinium ovatum), and Oregon grape (Mahonia spp.) make up the minor species. There is a great abundance of wild blackberry (Rubus spp.). The taller, denser cover is made up of vine maple (Acer circinatum), rhododendron (Rhododendron spp.), Oregon white oak (Quercus garryana), ocean spray (Holodiscus discolor), and Indian plum (Osmaronia cerasiformis).

This brush is quite thick and, along with the great number of stumps and downed logs on the area, will prove to be the major obstacle in the establishment of some harvestable crop.

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[1] Soil data compiled by the author from two sample plots established on the tract.

Grasses and Herbs

The grasses and herbs present on the tract are of minor importance and are only present in limited amounts and densities.

Douglas-fir

The tract contains some residual D3 Douglas-fir saw-timber. It is of an extremely poor quality and is scattered too widely for another salvage show. Net growth of this stand is nil, and its seed-tree functioning is very poor. Some reproduction is also present, but practically a 100 percent planting show will be necessary to maintain a fair degree of stocking.

ALTERNATIVE USES

Recreation

This tract is in no way suited to recreational purposes. It is too small to support enough game animals for hunting, and there are no streams large enough to support fish.

Grazing

Grazing, or forage production, would be not only possible, but highly profitable for this area. The initial cost would be great; however, the long range returns would warrant such an investment.

According to local authorities, clearing cost for the tract will average $100.00 per acre.[1] The costs of fencing, fertilizing, and planting forage crops will run $23.40 per acre (2). Annual costs (taxes and administration) will average $2.70 per acre (2). By using a time-preference rate of 4% and assuming the returns per acre are $9.20 (2), we arrive--through discount formulae--at a land value or "expectation value" of $43.61 under improved grazing use. (See Appendix ii.) This is quite high and indicates that the area is well suited to this use.

Timber

A 120-year rotation of Douglas-fir was selected to represent timber production on this area. This rotation is technical in nature, being based upon the culmination of mean annual growth. Some authorities feel that this rotation puts timber at a great disadvantage financially speaking and that an 80 or 90-year economic rotation would give a clearer picture of the future situation. The author feels, however, that the maximum dollar return for Douglas-fir will continue to be from trees of sawtimber size and quality. That is why the rotation selected is one in which maximum growth is obtained.

Fire seems to be the most economical method of clearing this area for planting. This will cost approximately

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[1] Paul Goodmanson, Extension Forester, Oregon State College.

$12.00 per acre.[1] If a base of 1000 trees per acre is used, planting costs should average $29.50 per acre.[2] The annual costs have been assumed to be the same as under a grazing plan.

The crop should sustain thinnings at 40 and 80 years. These would net $31.60 per acre and $246.40 per acre respectively. At rotation age, 120 years, the net returns should average $1190.00 per acre.[3]

By employing the same time-preference rate as before (4%), we come out with an expectation value of only $2.59 per acre. (See Appendix iii.) This is considerably smaller than the value of land under a grazing program.

SUMMARY AND RECOMMENDATIONS

The Starker Tract has remained unproductive for the past 10 years. Brush has completely captured the area and made production of any crop nearly impossible. Only by expending a large initial capital outlay can any program of management be undertaken.

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[1] Personal interview with D. D. Robinson, School of Forestry, Oregon State College.

[2] Personal interview with W. P. Wheeler, School of Forestry, Oregon State College.

[3] These values were arrived at by taking $\frac{1}{2}$ of the product of the current market value times the expected volumes. This allows $\frac{1}{2}$ of the market value to cover the costs of logging and transportation.

If present values remain relatively stable in future years, grazing appears to be the only alternative worthy of consideration; therefore, it is the only use that I would recommend for this area at this time.

APPENDIX

BIBLIOGRAPHY

1. Hill, W. W. and Powers, W. L., Land Capability for Soil and Water Conversation in Oregon, Station Bulletin 530, Oregon Agricultural Experiment Station and the Soil Conservation Service, U. S. Department of Agriculture, January, 1953.

2. Hyer, E. A. and Becker, M. H., An Economic Study of Improved Pastures, Experiment Station Bulletin 520, Agricultural Experiment Station, Oregon State College, Corvallis, Oregon, August, 1952.

3. Sampson, Arthur W., Range Management, John Wiley and Sons, Inc., New York, 1952.

METHODS USED IN FINDING EXPECTATION VALUES

A. Grazing

1. Initial costs
   a. Clearing $100.00/A
   b. Planting & fencing 23.40/A

   $123.40

2. Annual costs
   a. Taxes 2.20/A
   b. Administration and protection .50/A

   $ 2.70

3. Returns--$9.20/A

4. Time-preference rate is 4%.

$$E.V. = -(\text{initial costs}) + \left(\frac{\text{returns}}{p}\right)(1+p)^{1} - \left(\frac{\text{annual costs}}{p}\right)(1+p)^{1}$$

$$= -\$123.40 + \left(\frac{\$9.20}{0.04}\right)(1.04) - \left(\frac{\$2.70}{0.04}\right)(1.04)$$

$$= -\$123.40 + \$239.20 - \$72.19$$

$$= \$239.20 - \$195.59$$

$$= \underline{\$43.61}$$

METHODS USED IN FINDING EXPECTATION VALUES (Cont.)

B. Timber--120-year rotation of Douglas-fir with thinnings at 40 and 80 years.

1. Initial costs

a. Clearing	$ 12.00/A	
b. Planting	29.50/A	
		$41.50

2. Annual costs

a. Taxes	2.20/A	
b. Administration and protection	.50/A	
		$ 2.70

3. Returns

a. 40-yr. thinning	31.60/A
b. 80-yr. thinning	246.40/A
c. 120-yr. harvest cut	1190.00/A

4. Time-preference rate is 4%.

$$E.V. = -(\text{initial costs}) + \left[\frac{1^{ST}\text{ thinning returns}}{(1+p)^n - 1}\right](1+p)^{n-80}$$

$$+\left[\frac{2^{ND}\text{ thinning returns}}{(1+p)^n - 1}\right](1+p)^{n-40} + \left[\frac{\text{Harvest returns}}{(1+p)^n - 1}\right]$$

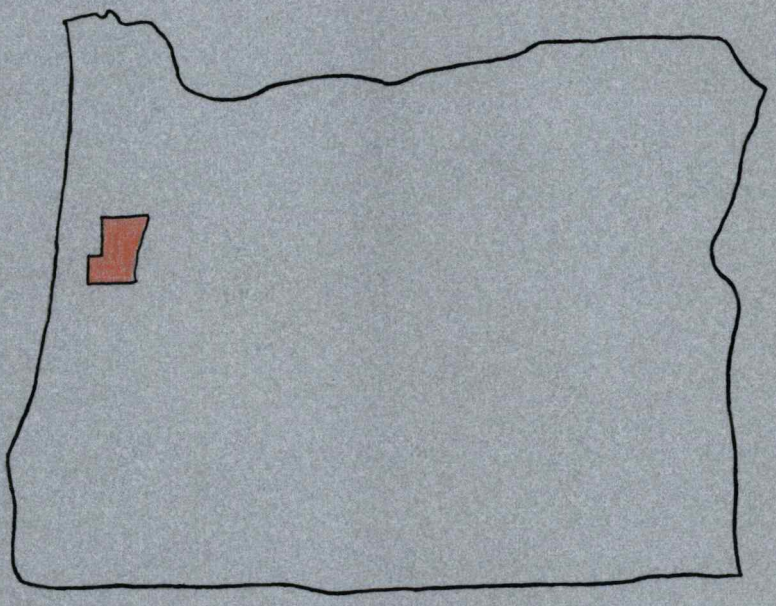
$$-\left(\frac{\text{annual costs}}{p}\right)(1+p)^n$$

$$= -\$41.50 + \left(\frac{\$31.60}{123.2705}\right)(23.0498) + \left(\frac{\$246.40}{123.2705}\right)(4.8010)$$

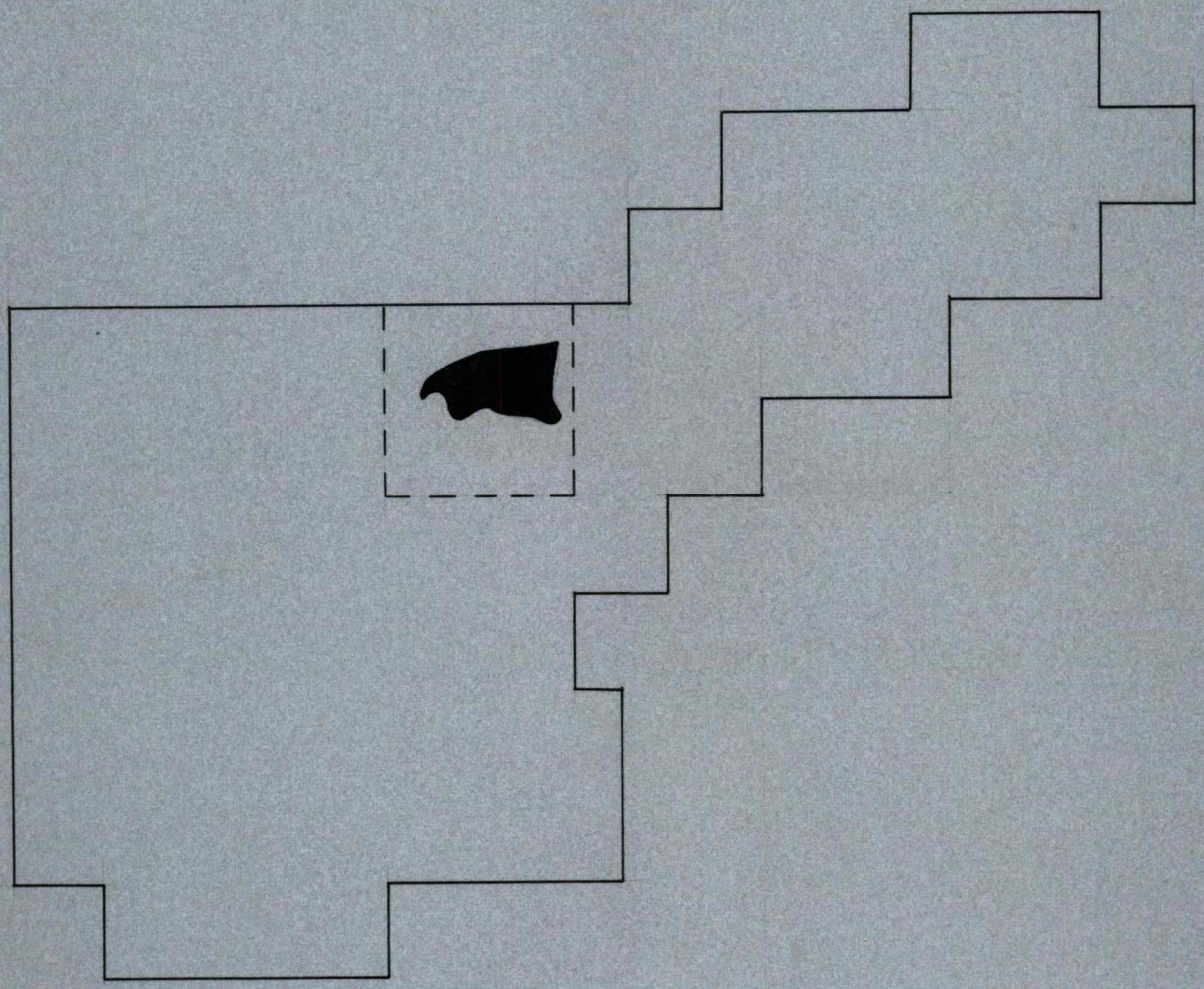
$$+\left(\frac{\$1190.00 - \$29.50}{123.2705}\right) - \left(\frac{\$2.70}{0.04}\right)(1.04)$$

$$= -\$41.50 + \$5.91 + \$14.84 + \$94.14 - \$70.80$$

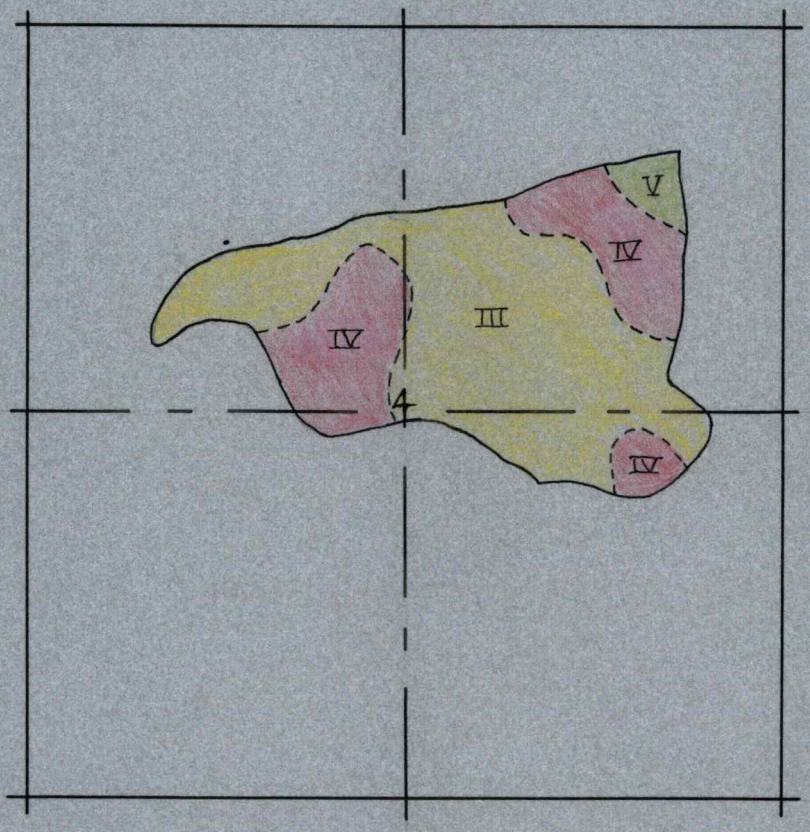
$$= \underline{\underline{\$2.59}}$$



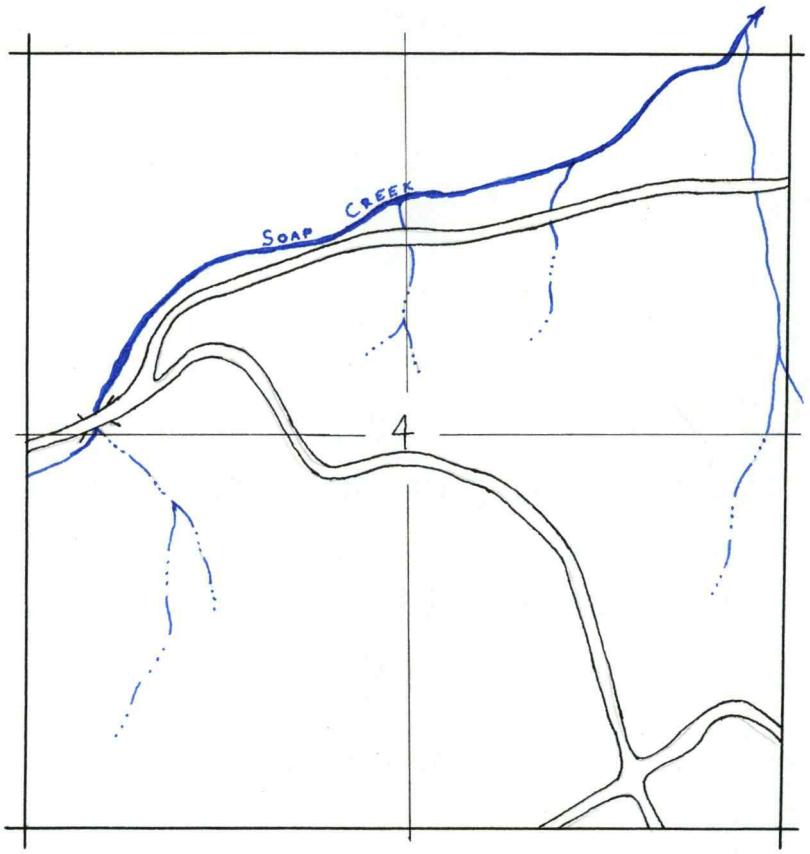
Sketch Map of Oregon Showing Benton County



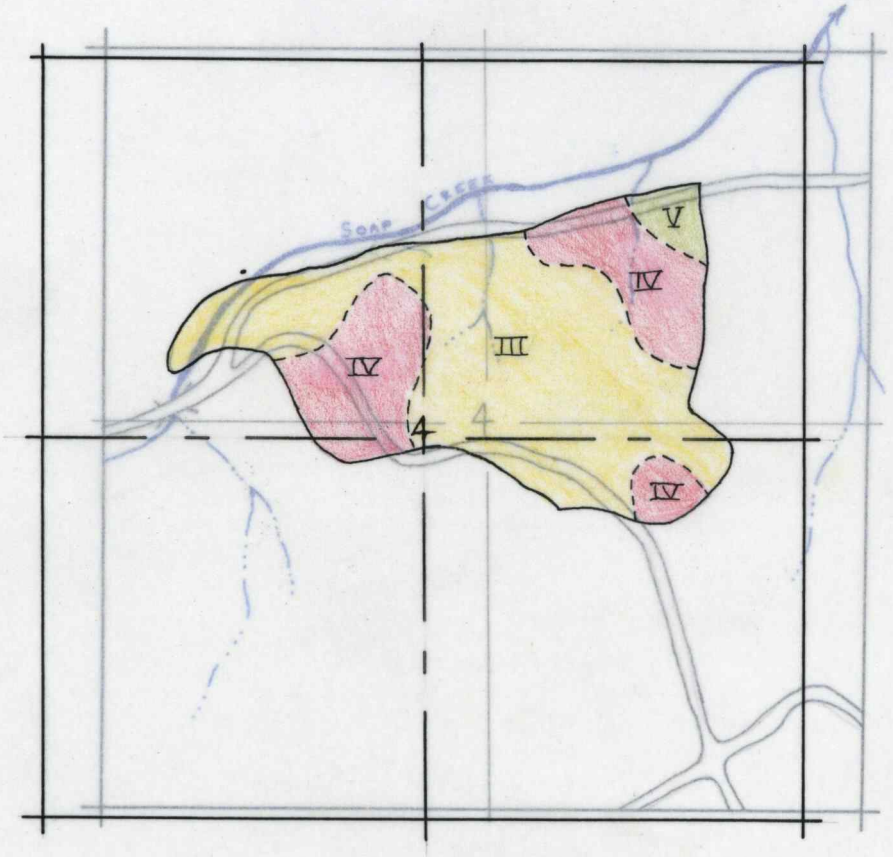
Sketch Map of the McDonald Forest Showing
S4, T10S, R5W, W.M. and the Starker Tract



Site Quality Overlay of Portions of
S4, T10S, R5W, W.M. (Starker Tract)



Planimetric Map of S4, T10S, R5W, W.M.



vi overlayed on vii

Planimetric Map of S4, T10S, R5W, W.M.

Site Quality Overlay of Portions of
S4, T10S, R5W, W.M. (Starker Tract)