SOME SOCIAL AND ECONOMIC EFFECTS OF TIMBER UTILIZATION AND MANAGEMENT IN MODOC COUNTY, CALIFORNIA

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SUMMARY

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Description of county

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Modoc County, located in extreme northeastern California, includes 2.6 million acres, 29 percent of which is commercial timberland, 6 percent cropland, 2 percent plowable pasture, and 63 percent rangeland, non-commercial forest, etc. See reference (2) for description of the county physiography.

1. Public Services are adequate and include two railroads, busses, several through highways, the utilities, such as electricity, telephone, telegreph, and county governmental services. Despite a 25 percent reduction in the past decade, the county still has 31 elementary and 5 high schools, two-thirds of the former being one-teacher one-room establishments. The total day enrollment is 1,600. Centralizing population would effect economies and make better school facilities available to more people.

2. Population in the county has risen from 2,800 in 1875 to an all-time high of 9,117 in 1941; that of Alturas from 148 in 1880 to 2,090 in 1940 which is 10 percent below the 1935 estimate of 2,400. Alturas doubled in size from 1925-30 due to railroad construction, general prosperity, and building of the Pickering Mill. Recently the population flow is away from Alturas to the Tule Lake Reclamation area. Of the 13 other communities, only Tionesta has an estimated population of over 500. About 45 percent of total county population were gainful workers in 1930, and about 10 percent of these were engaged in forestry and wood manufacture. In 1940, it is estimated one-fourth of the gainful workers are in the forest products group due to lumbering expansion and cessation of railroad construction. The greatest number, however, still work in agriculture.

3. Governmental Receipts and Expenditures for the county show that in 1940: (a) about 50 percent of total county receipts of $730,000 came from subventions and grants mainly for education, relief and aids; (b) the forest reserve apportionment was less than 2 percent of operating receipts; (c) total subventions have increased 3.7 times in the last decade; (d) the largest expenditure item was for education which equalled 42 percent of total expenditures; (e) in the last decade expenditures for roads are up 250 percent, charities and corrections up 600 percent, and education up 40 percent; and (f) expenditures exceeded receipts by $90,000 in 1940. For Alturas, 18 percent of city receipts were from subsidies in 1940, whereas as recently as 1934 there was no such item, and one-third of its expenditures were for bond interest and redemption. The Alturas' bonded debt is nearly twice its current operating receipts.

Resource utilization

1. Agriculture and Grazing are described in some detail in reference (2). The nearly 700 farms which occupy 583,000 acres have 25 percent of this area in cropland and 112,100 acres of irrigated land. Largest acreage crops are meadow hay, grain hay, and barley; highest value crops are potatoes ($486,000), barley, meadow hay, and oats. From being three times the value of all other agricultural produce in 1929, beef and veal have declined to two-thirds this value in 1940, but even so still exceed the combined value of the three highest value crops. Livestock numbers in animal units decreased 30 percent in 1935-40, and are at the lowest point since before 1900. Probably numbers on range have declined even more, whereas numbers on irrigated pasture may have increased.

2. Forest Lands and Industries. Of the 750,000 acres of commercial timberland, half is in public and half in private ownership; mature old growth timber covers three-fourths the area; there is little second growth and also more public than private non-restocking land due to public acquisition of private cut-over areas. Although total timber stand is equally divided between the public and individuals, the latter control well over half the 7 billion feet of ponderosa pine and three-fourths of the 161 million feet of sugar pine. The public has major parts of the less valuable white fir, incense cedar, and juniper. On the 158,938 acres of mature commercial forest in the Alturas working circle are 1,335,874 M board feet of ponderosa pine, white fir, and incense cedar. An additional 70,000 acres of private land within gross boundaries of the circle support nearly a billion feet of timber.

The three largest mills in the county, Saw, Crane Creek, and Big Lakes were established 1928-35. Annual lumber cut of all 11 mills in the county, which jumped from 4 to 128 million board feet 1927-41, consists of over 90 percent ponderosa and Jeffrey pines. Four other operations, which log within the county but mill outside, took a nearly equal amount or another 116 million board feet in 1940. Whether this 50 percent leakage should be stopped by milling all timber in Modoc County, is a problem of balancing benefits of such action to the local area against detriments to areas now receiving the timber. With the exception of Edgerton Brothers, who are cutting sustained yield government timber, none of the existing major mills have a life expectancy over 10 years.

Utilization of timber is at or near its peak; 15 years ago lumbering was of small import; 15 years from now there will have been drastic curtailment from the present level.

Contribution of timber resources to county economy

1. Magnitude of Private and Public Forest Contributions. Since 1933 employment in wood manufacturing is up 3.5 times from 250 to 900 persons; payrolls are up 12 times from $77,000 to $938,000, and cost of materials up 6 times from $152,000 to $903,000. It is estimated that half these contributions leak out of the county due to residence and expenditures of workers in Klamath Falls and Lakeview, and outside purchase of heavy logging and milling equipment. This leakage combined with a 50 percent loss occasioned by milling outside the county of half the total log harvest, means that only 25 percent of potential benefits accrue to Modoc County. If future reductions in forest contributions are placed on outside areas, Modoc County itself may maintain fairly well the present level of benefits actually received.

Classifying as public contributions those benefits received from operations dependent on government timber as well as those from national forest administration, it is estimated that public contributions are 55, 60, 48, and 35 percent of private contributions in terms of employment, payrolls, cost of materials and taxes respectively. The principal tax contribution, which is $52,000 on standing timber, will decrease as private stumpage is logged with the consequent depletion of the tax base.

Varying from 45 to 160 persons monthly, Forest Service employment averages 93, whereas payrolls with a monthly range from $6,000 to $23,000 totalled $155,100 for 1941. Average annual activity expenditures of $184,500 are spent mainly in construction, protection, maintenance, and general administration and management. For the last 15 years, contribution in lieu of taxes has averaged about $12,535 or 2½ percent of county operating receipts. Of the two principal sources of Forest Service receipts — the sale of timber and forage — timber sales have yielded on the average $35,500 a year which is about $6,000 more than grazing permits.

2. Significance of Forest Contributions are that: (a) of all gainful workers, one fourth are employed in forest enterprises; (b) of those engaged in manufacturing, 94 percent are in the lumber industry; (c) value added by manufactures in forest industries is 86 percent of value added by all manufacturers; (d) primary forest income is 25-30 percent of all primary income in the county; and (e) taxes are 10 percent of total governmental receipts. From the present peak flow, forest contributions of all sorts will decrease as the virgin timber is harvested until ultimately they will come only from the Forest Service and from operations dependent on government stumpage for raw material.

Sustained yield vs. liquidation for Alturas working circle

1. Alternative Utilization Policies, both hypothetical, are: (a) an operation to mill 45 million board feet annually for 30 years, then cease abruptly and permanently; or (b) an operation to mill 15 million board feet for 30 years and 12 million feet annually thereafter. Purpose is to compare social and economic effects of the two alternatives. Necessary assumptions, which involve basic biologic and economic data and may or may not be true, are that raw material will be available from proposed Alturas working circle and logs will be milled at Alturas. Since the alternatives were selected at random from a universe of infinite choices, it is improbable either plan will maximize real income to the area. In order to aid in judging which alternative promises greater real income — which is defined as representing goods and services which satisfy wants — a number of tests or criteria are applied.

2. The Test of Resource Productivity, although duplicated in large measure by subsequent tests, is applicable under a philosophy of abundance. Accumulative sustained yield cut would not equal accumulative liquidation cut for 104 years. Thereafter sustained yield cut would draw steadily ahead unless another liquidation occurred in the second rotation, — a slim possibility. But granting this, liquidation would again get ahead for a few years to be caught once more in the 213th year and surpassed everafter. Total first rotation harvest would be 1.9 as against 1.3 billion board feet for sustained yield and liquidation respectively. Quality of product probably would be superior under sustained yield.

3. The Test of Population, computed from local county production factors, dependency and service ratios, indicates 155 and 488 primary workers required for sustained yield and liquidation respectively or a total primary and service dependent population of 524 and 1,653 respectively. Since both county dependency and service ratios are sub-normal, it is reasonable that in time the permanence of sustained yield will result in raising these ratios to at least normal, due to a greater percentage of workers having families, larger average families, and employment requirements of intensive cultural forestry. With normal ratios total computed dependency under sustained yield rises to about 1,872 persons. A similar but less pronounced increase would probably occur with the liquidating enterprise.

Age-class distribution and size of family in Modoc County are normal but 5 percent more of the total population is non-family than is customary, due in part to the number of single workers in logging camps. With a mill at Alturas, population will tend to centralize there, to the benefit of the local community, but to the detriment of Tionesta, Willow Ranch, Canby, and Big Lakes which will be nearly wiped out when existing mills shut down because of allocation of stumpage to Alturas. Poor quality of these communities belittles the significance of this possibility.

4. The Test of Incomes, computed from going county wage and salary scales, shows that annual wages and salaries would be $193,500 and $605,100 for sustained yield and liquidation respectively. Adding to these the operator's margin to get value added by manufacture and computing present net worth at 3 percent, liquidation has a greater present group income value by $7,000,000. For the short term, liquidation unquestionably will give greater group income. Not until the interest rate drops to between 1 and 2 percent does the present worth of group income become equal for the two operations.

Assuming identical relative profit margins in both plans or an actual three-fold difference, sustained yield has greater net worth to the entrepreneur only at interest rates below 2 percent due to low growth potentialities of the site. To make sustained yield equally attractive as liquidation to the entrepreneur, annual net growth of 158 board feet per acre is required at 3 percent interest, or 222 feet at 6 percent. Enlarging the working circle mainly through acquisition of over 100,000 acres of private timberland within its gross boundaries, would reduce the required growth per acre to 85 feet at 3 percent or 120 feet at 6 percent.

5. The Test of Community Quality, although defying definitive quantitative interpretation, is possibly the best criterion of real income. Allied to it is stability, not in the sense of a static economy, but as a stabilized trend toward a higher standard of living. The existing liquidation mill towns of Tionesta, Willow Ranch and Big Lakes are of poor quality compared to Alturas when judged on basis of quantity and character of housing, businesses, churches, clubs, amusements, schools, streets, and protective services. Although either alternative would stimulate the economy of Alturas, the liquidation plan would cause the greatest immediate boom, probably accompanied by a shacktown transient fringe, and followed by severe retrenchment and ghost-town maladies after 30 years. Sustained yield also would cause expansion but less pronounced and of potentially superior quality. Encouragement toward intelligent development would be needed through zoning restrictions, community pride, enterprising realtors, and company interest in employee welfare. Once established the enterprise should continue indefinitely.

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INTRODUCTION

The forested lands of Modoc County form the northeast portion of the "east-side pine type" in California. This east-side type, which occurs mainly east of the crest of the Sierra Nevada and Cascade Ranges, comprises some five million acres, and is characterized by open mature stands of ponderosa pine, relatively poor sites, dry climate, and irregular periodicity of reproduction. The type is an important source of raw material to the forest industries of California and to the population dependent thereon. It is, therefore, the subject of intensive research in silviculture, forest entomology and timber utilization, but relatively little specific information has been assembled regarding social and economic effects of forest management in this type.

This report supplements in a small way existing information on the east-side country by indicating for one segment of this region: (1) the extent to which public and private forest enterprises contribute to the area economy, and (2) probable effects of a large temporary forest enterprise contrasted to a small-scale continuous undertaking. Modoc County is the study area for phase one and the proposed Alturas working circle within the Modoc National Forest is the locale of study phase two. These specific study phases and study areas were chosen by national-forest administration in order not only to assist in decisions of management on the involved areas but also to strengthen general knowledge of the economic effects of applied forestry in the east-side pine type. This report specifically supplements, and should be considered in connection with the management plan for the Alturas working circle (7).[2]

As is true in the present analysis, appraisals in land economics often are predicated on basic physical and biological data not assembled by the appraiser. Considering the scope of this project it has been necessary to accept such data as sound; furthermore, to the extent that data are not available the appraisal becomes speculative. Should basic data subsequently be modified or

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1/ This analysis was undertaken at the request of the Regional Forester and Office of Timber Management, Region 5, and the Forest Supervisor, Modoc National Forest. Since it is intended primarily as an intra-bureau report, the reader is assumed to have reasonable knowledge of forestry, Forest Service procedures, the area under consideration, and the literature cited, particularly those reports dealing with land management in Modoc County. Grateful acknowledgment is made of the very considerable assistance rendered in the collection of data by Russell Bacon and James E. Sowder of the Modoc National Forest. Figures 4-8 are reproduced courtesy Modoc National Forest.

2/ Numbers in parentheses refer to literature cited.

supplemented, corresponding changes may or may not be indicated in the appraisal. For example, the sustained yield capacity of the Alturas working circle, which has been established at 12 to 15 million board feet annually, has been accepted as one of the basic facts of management; and coordinate with that is the assumed economic feasibility of milling at Alturas all timber logged within the working circle.[3/] These assumptions and others which are subsequently mentioned have been pointed out in order to emphasize awareness of them and the desirability in some instances of critically investigating their validity. In the present report, however, these assumptions have been accepted at face value.

DESCRIPTION OF MODOC COUNTY

For the purposes of this study the physiography of the county is adequately described in Fischer's land use report (2) which, except for omission of the western edge of the county, deals with an area nearly coextant with county boundaries. Table 1, which summarizes the acreage in major land uses, indicates that about 30 percent of the county is classed as commercial timberland, while about 60 percent is non-plowable grazing land and non-commercial forest land much of which is used for grazing.

Table 1.- Classification of Modoc County into major land usesby approximate areas.

Land use	Area	
	Acres	Percent
Commercial timberland (51 percent private; 49 percent public)	1/ 751,000	28.7
Cropland	2/ 151,000	5.8
Pasture land (plowable)	2/ 51,000	1.9
Other lands (non-plowable grazing land, non-commercial forest land, towns, roads, etc.)	1,667,000	63.6
Total land area[3/]	2,620,000	100.0

1/ From table 12 and reference 8.
2/ From Modoc County Agricultural Commissioner.
3/ Includes dry land and land temporarily or partially covered by water such as marshland, swamps and river flood plains. Lakes, reservoirs and ponds having less than 40 acres in area are classed as dry land.

3/ The latter assumption is the subject of a separate study by the Regional Office.

Public Services

The county is serviced by two railroads, bus transportation, several through highways, power from both the Rural Electrification Administration and a private company, telephone and telegraph, and the usual governmental services including a county hospital and library at Alturas, which is the county seat.

Before the advent of year-round transportation facilities, an excessive number of elementary schools were established throughout the county. In the last 10 years, with the trend toward consolidation becoming stronger, the number has been cut about 25 percent until, in 1940, 31 elementary schools remained as shown in table 2. Since two-thirds of these were one-teacher, one-room schools, it is felt by educational authorities that further consolidation into fewer and larger schools is desirable in order to effect economies and provide more pupils with the advantages of better teachers, better equipment, wider acquaintanceship, and extra-curricular activities. Centralizing the utilization of timber from the Alturas working circle at Alturas instead of dispersing it among small, shifting, outlying communities would automatically hasten this consolidation.

The large attendance of 640 persons in evening classes at the Alturas high school as indicated in table 2 was due to CCC classes for enrollees and enthusiastic interest in aviation training. Since 1940 night school enrollment has dropped off very materially.

Table 2.- Location and number of schools and size of enrollment, Modoc County, 1940 1/

	Number of schools	Enrollment: Regular day classes	Enrollment: Special evening classes	Average number of day pupils per school	Number of teachers
High schools					
At Adin	1	79	0	79	6
At Alturas	1	239	640	239	12½
Branch at New Pine Creek	1	27	0	27	2
At Cedarville	1	126	0	126	6½
Branch at Ft. Bidwell	1	22	0	22	2
Total	5	493	640	99	29
Elementary schools					
One-teacher; one-room	21	320	-	15	21
Two-teacher, two-room	7	320	-	46	14
Three-teacher, three-room	2	158	-	79	6
Eleven teacher (Alturas)	1	309	-	309	11
Total	31	1,107	-	36	52
Grand total	36	1,600	640	44	81

1/ Elementary school data were supplied by Leonard Grindstaff, General Supervisor of Modoc County schools, and data on high schools were obtained from records in the county office of public schools.

Population

Trends and Distribution

In 1874, Modoc County was set aside from Siskiyou County. The first census records of both Modoc County and the city of Alturas in 1880 gave populations of 4,399 and 148 respectively. An earlier 1875 estimate set the county population at 2,800. As shown in table 3, county population rose steadily until 1910, then declined somewhat but rose to a new peak in 1930, followed by another decline and subsequent rise to an estimated all-time high of about 9,000 in 1941, due probably to an influx to the Tule Lake reclamation area. Alturas increased steadily in size until 1935, with the population doubling between 1925-30 due probably to railroad construction and building of the Pickering Mill. While population throughout the State was increasing 20 percent and that of the county nearly 9 percent during the 1930-40 decade, population of Alturas declined about 15 percent to a 1940 figure of about 2,000 persons. An average county intensity of only 2.1 persons per square mile in 1940 indicates a sparse population contrasted to the California average of 44.1 persons.

Over the years from 1880 to 1935 population tended to concentrate more and more in Alturas, reaching a maximum of 35 percent of the county total in 1935. Five years later, however, a reverse trend toward dispersion had reduced this percentage to 24. Concentration of milling activities in Alturas would tend to once again resume the flow of people from outlying communities to the county seat. Of the 13 other community centers none except Tionesta had an estimated population over 500, according to table 4, and their combined total comprised only 34 percent of the county total which when added to Alturas leaves 3,600 persons or 42 percent scattered on ranches and farms.

Table 3.- Population of Modoc County and Alturas, 1875-1941

Year	Modoc County	Alturas	
	Number of persons	Number of persons	Percent of county total
1875	1/ 2,800	-	-
1880	4,399	148	3.4
1890	4,986	-	-
1900	5,076	-	-
1910	6,191	916	14.8
1920	2/ 5,425	3/ 979	18.0
1925	2/ 5,720	3/ 1,145	20.0
1930	8,038	2,338	29.1
1935	2/ 6,770	3/ 2,400	35.5
1940	8,713	2,090	24.0
1941	4/ 9,117	-	-

Source: Census data except as otherwise indicated.
1/ From reference (2).
2/ Estimated by California Taxpayers' Association.
3/ Estimated by city clerk and published in Financial Transactions of Municipalities and Counties.
4/ Estimated by California Department of Motor Vehicles.

Table 4.- Population of Modoc County by community centers, 1940

Community	Population	
	Number of persons	
City of Alturas (incorporated)		2,090
Adin	225	
Big Lakes	250	
Canby	150	
Cedarville	350	
Davis Creek	50	
Eagleville	75	
Ft. Bidwell	300	
Lake City	50	
Likely	75	
Lookout	60	
Pine Creek	500	
Tionesta	700	
Willow Ranch	200	
Total unincorporated communities		2,985
Total rural population not in communities		3,638
Total Modoc County		8,713

Source: 1940 Census and estimates by Leonard Grindstaff, General Superintendent, Modoc County schools.

Occupational Pursuits

In 1930, of the slightly less than half the total county population which was gainfully employed, those engaged in forestry and wood manufacture ranked third behind agriculture and railroads; but despite the high group ranking, only 10 percent of the total workers in the county found employment in forestry and wood manufacture due to the large number in agriculture and grazing (table 5). Comparable data for 1940 which were not available when this report was prepared may show appreciable reallocations in gainful pursuits. It is expected that fewer people will be employed by railroads because the 1930 census enumeration occurred shortly after the period of active road construction. Those engaged in the building industry may be less also because the large Pickering Mill was built shortly before 1930. On the other hand, a considerably greater percentage may be classified in the lumber group, because (1) two large mills, Shaw Lumber Company and Crane Creek, were just getting started in 1930, (2) a third mill, that of the Big Lakes Box Company, did not operate until 1935, and (3) the total lumber cut in the county in 1940 was four times the cut in 1929, and eight times the cut in 1931.

Governmental Receipts and Expenditures

Table 6 presents the receipts and expenditures of Modoc County for alternate fiscal years 1930 to 1940 inclusive.4/

4/ Fiscal years are from July 1 to June 30, the calendar year of the closing date being that given in the table.

Table 5.- Number of persons over 10 years of age gainfully employed in various industry groups, Modoc County, 1930 1/

(Total population 1930 - 8038; 1940 - 8713)

Industry group	Gainful workers
	Number
Total all industries	3,704
Agriculture	1,320
Railroads	513
Forestry and wood manufacture	393
Wholesale and retail trade, excluding automotive	256
Building industry	224
Other professional and semiprofessional service	192
Manufacturing and repairing, excluding wood working	118
Other domestic and personal service	114
Hotels, restaurants, boarding houses, etc.	108
All other industries including mineral extraction, clothing and food production, automotive and financial pursuits and others	476

1/ 1940 data not released by Census Bureau up until April 1942 when this report was completed.

Of the total receipts for government operations for the fiscal year 1940, amounting to a little over $731,500, approximately 50 percent came from subventions and grants, the bulk of which was for education, and relief and aids. The forest reserve apportionment amounted to 3.3 percent of total subventions and grants and only about 1.7 percent of total operating receipts of the county. Offsetting contributions by the county to the State for the maintenance of reform schools, homes for feebleminded, and other State institutions were only $2,212, or 0.6 percent of the subventions and grants received by the county. Apportionments to the county from the State for education, relief and aids, and from the liquor, gasoline, and motor vehicle funds have multiplied four and a quarter times over the 10-year period. Taxes paid on forest land and timber and on logging and milling equipment are included in general county property taxes.

Table 6.- Modoc County receipts and payments fiscal years 1930-1940. [1]

	1930		1932		1934		1936		1938		1940	
Receipts [2]	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
General county property tax		271,020		237,591		163,467		200,493		299,781		230,229
District taxes and assessments												
Schools and junior colleges	59,501		77,150		41,039		35,963		71,537		75,927	
Fire, lighting, cemetery, roads	-		-		6,800		4,398		7,925		6,695	
Others	7,890	67,392	5,012	82,162	-	47,839	200	40,561	-	79,462	-	82,623
Subventions and grants												
Educational moneys	53,395		63,756		147,377		152,239		158,337		162,277	
Forest reserve apportionment	[3] 16,845		[4] 13,014		[5] 7,832		13,049		18,020		12,185	
Liquor, gasoline, motor vehicles	24,884		30,335		36,082		44,413		55,202		63,624	
Relief and aids	3,727		2,355		2,932		27,248		100,546		124,109	
Others	-	98,852	4,086	113,546	[5] 6,332	200,555	1,586	238,536	1,967	334,071	4,723	366,918
Other operating income		[6] 84,241		24,778		28,345		48,035		31,783		51,749
Total receipts for Government operation		[6] 521,505		458,078		440,207		527,624		745,098		731,519
Payments [9]												
General government [7]		59,250		58,555		37,691		48,463		53,001		52,244
Protection to persons and property												
Law enforcement	19,252		17,230		12,270		16,822		20,146		24,618	
Agricultural aids	4,269		7,408		5,175		13,241		18,339		19,503	
Other protection	7,763	31,284	6,456	31,095	2,538	19,984	3,109	33,173	3,965	42,451	2,938	47,059
Health and sanitation		673		1,045		1,836		1,918		3,264		2,019
Roads and highways		56,561		53,503		53,412		62,203		90,875		134,245
Recreation		2,700		3,797		2,415		1,840		2,386		2,566
Charities and corrections												
Hospital and county physician	4,799		2,782		10,120		24,791		28,891		27,877	
Relief and miscellaneous welfare	25,055	29,855	28,411	31,193	25,819	35,939	42,322	67,113	129,832	158,723	149,098	176,976
Education												
School administration & maintenance	183,770		199,242		178,572		183,283		212,688		336,648	
Libraries	6,394		[8] 5,957		4,585		5,485		7,083		7,650	
School outlays	57,791	247,955	5,701	210,900	-	183,158	-	188,768	13,092	232,864	-	344,298
Interest on school and county bonds		17,810		19,037		14,089		13,147		10,428		13,763
Redemption payment on bonds		23,800		32,750		30,250		35,250		32,800		36,500
Miscellaneous		8,068		2,700		1,453		9,743		8,336		10,456
Total cost of government		477,957		444,575		380,227		461,617		635,127		820,126

1/ Condensed from Annual Reports of Financial Transactions of Municipalities and Counties in California. All figures rounded off to nearest dollar, consequently totals are not in all cases the exact sum of the sub-items. 2/ Classified according to source. 3/ From Forest Service records. 4/ Estimated from Forest Service records. 5/ Breakdown from Biennial Report of the State Controller for 1933 and 1934. 6/ Includes $67,000 sale of bonds. 7/ Includes legislative, finance, and law offices and accounts, elections, governmental buildings, etc. 8/ Includes teachers' institute and others. 9/ Classified according to government funtion performed.

Of the 1940 costs of county government, the largest item was for education, which amounted to 42 percent of the total. The relatively heavy educational charge may be due to the high per capita cost of operating schools in rural areas where with scattered populations enrollments are small per teacher, and also to the fact that other governmental functions are limited in number and run on a fairly modest scale. However, the 40 percent increase in educational costs in the last decade has not been as pronounced relatively as charities or corrections which have multiplied sixfold, nor as roads and highways which show a 250 percent gain. In 1940, total county expenditures exceeded receipts by about 12 percent.

Comparable data for Alturas (table 7) show that expenditures have exceeded receipts for 2 of the 6 years given and that in 1940, about 18 percent of total city receipts were from subventions and grants whereas there was no such item prior to 1934. Table 8 gives the bonded indebtedness of Modoc County and the city of Alturas for the period 1930 to 1940. The county was reducing its debt steadily until additional obligations were assumed in 1936 and 1939 for school buildings. Alturas was decreasing its debt load until 1938 when a new sewer and paving issue of almost $120,000 established a level far above that of any of the previous 10 years.

The heavy bonded indebtedness of the city of Alturas explains why one-third of its expenditures in 1940 were spent for interest and redemption of bonds. Whereas the bonded debt was only about 30 percent of government operating receipts for Modoc County in 1940, it was almost twice the amount of the operating receipts of the city of Alturas for the same year.

The overall financial picture of both the county and Alturas is heavy dependence on subventions and grants, recent increases in bonded indebtedness and little importance attaching to the national forest apportionment in lieu of land and timber taxes. The significance of forest taxes which are included in general property tax receipts is subsequently indicated.

Table 7.- City of Alturas receipts and payments fiscal years 1930-1940[1]

	1930	1932	1934	1936	1938	1940
Receipts[2]	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
General property tax	20,677	22,351	15,811	17,237	21,224	22,803
Licenses and permits	5,701	3,278	3,312	3,592	3,942	3,909
Fees, charges, fines, penalties, etc.	7,299	1,015	182	591	2,102	1,285
Property receipts, (rent, sale, interest)	-	248	145	203	108	142
Subventions and grants	-	-	24	2,670	5,477	11,552
Miscellaneous	1,771	87	288	138	138	382
Public service enterprises	17,523	12,148	12,542	14,537	16,438	18,168
Special assessments	-	21,774	13,747	16,281	19,304	6,481
Total government receipts	52,970	60,900	46,051	55,249	68,734	64,721
Payments[3]						
General government	12,297	5,548	3,837	6,579	4,054	4,464
Protection to persons and property	7,635	5,941	5,133	4,997	9,876	11,758
Health, sanitation, and cleanliness	1,315	3,190	2,054	1,000	1,132	1,832
Streets	10,748	10,210	6,298	7,946	13,703	12,444
Recreation and education	718[4]	662[4]	-	-	5[5]	852[6]
Charities and corrections	-	-	-	2,452	-	109
Interest and redemption of bonds	3,625	7,475	21,436[7]	965	6,584	17,900
Miscellaneous	11	69	293	1,123	16,908	214
Public service enterprises	17,099	8,090	5,770	6,006	7,696	5,941
Special assessments	-	-	-	7,227	23,033	-
Total government payments	53,448	41,186	44,821	38,295	82,991	55,514

1/ From same source as table 6. All figures rounded off to nearest dollar, consequently totals are not in all cases the exact sum of the sub-items.
2/ Classified according to source.
3/ Classified according to government functions performed.
4/ Includes $600 for education.
5/ Recreation only.
6/ Recreation only. Includes $850 for outlays.
7/ Includes $13,811 as interest and redemption of special assessment debt.

Table 8.- Bonded indebtedness of Modoc County and City of Alturas. 1930 - 1940.[1/]

Year	Modoc County: General county bonds outstanding June 30	Modoc County: School district bonds outstanding June 30	Modoc County: Total bonds outstanding June 30	City of Alturas: Total bonds outstanding June 30
1930	$280,000	$193,900	$473,900	$ 72,000
1931	260,000	137,450	397,450	70,000
1932	240,000	111,200	351,200	67,000
1933	220,000	97,950	317,950	65,000
1934	200,000	87,700	287,700	61,000
1935	180,000	78,200	258,200	55,000
1936	160,000	93,700	253,700	55,000
1937	140,000	79,500	219,500	54,000
1938	120,000	67,700	187,700	109,500
1939	100,000	152,700	252,700	128,250
1940	80,000	136,200	216,200	115,750

1/ Compiled from Financial Transactions of Municipalities and Counties.

Resource Utilization

The three principal forms of land use in Modoc County are agriculture, grazing, and lumbering but these are supplemented in a small way by mining and a peat moss industry.

Agriculture and Grazing

The agricultural and grazing situations in the county are well described by Fischer (2).

Briefly there were in 1940 about 690 farms occupying over 583,000 acres or about 22 percent of the land area in Modoc County. Of the total farm area, 151,000 acres, or about 25 percent was crop land, of which 110,000 acres were harvested in 1939. Modoc County farms also contained well over 300,000 acres of pasture lands[5/], of which 51,340 acres were plowable. Five hundred and thirty-two of the 686 farms had a total of over 112,100 acres of irrigated lands on them, 515 having irrigated cropland totaling over 81,200 acres, and 256 having irrigated pasture totaling over 30,900 acres. The average size of farm was 850 acres.

The acreage, production and value of crop and dairy farm products are given in table 9 for 1940. The greatest crop acreage is devoted to meadow hay, with grain hay, barley, alfalfa for seed, and wheat next in order of importance. Alfalfa hay, oats, rye, and potatoes comprise the remaining crops with over 1,000 acres each. Potatoes which were worth $486,000 lead in total value of crop. Next in order of importance are barley, meadow hay, oats, butter, alfalfa hay, grain hay, and wheat, each having a value of over $100,000 in 1940.

5/ Estimated from previous census figures: 1924 - 336,957 acres; 1929 - 316,990 acres; 1934 - 376,822 acres.

Table 9.- Acreage, production, and value of crops and other farm products in Modoc County 1940[1/]

Crop or product	Acreage	Production	Unit	Value
Meadow hay	57,000	57,000	tons	$ 256,500
Grain hay	14,000	21,000	tons	120,750
Alfalfa hay	8,000	18,000	tons	144,000
Barley (malt and feed)	13,326	746,256	bushels	358,200
Wheat	11,444	187,000	bushels	112,200
Oats	7,587	578,139	bushels	242,820
Rye	6,861	82,330	bushels	37,050
Alfalfa seed	12,600	300,000	pounds	36,000
Sugar beets for seed[2/]	366	-	-	-
Certified seed potatoes	30	3,700	sacks	5,480
Sugar beets for sugar	399	5,688	tons	35,420
Potatoes	4,087	1,080,000	sacks	486,000
Peas	110	200	sacks	700
Apples	55	8,000	boxes	8,000
Alsike clover	686	162,000	pounds	17,820
Turkeys sold		15,000	head	43,500
Chickens sold		28,200	head	18,360
Eggs sold		205,000	dozen	36,900
Butter		601,420	pounds	186,440
Milk retail		110,544	gallons	37,580
Cream retail		3,424	gallons	5,640
Cream shipped out of county		507,479	pounds	51,760
Ice cream		1,425	gallons	1,420
Cottage cheese		7,444	pounds	740
Strained honey		110,000	pounds	5,220
Comb honey		350	cases	1,220
			Total	$2,249,720

1/ Data compiled by Thomas Briles, Modoc County Agricultural Commissioner.
2/ To be harvested in 1941.

Beef and veal are also a large source of income to Modoc County ranchers and farmers, being more than double the value of any one crop, and even exceeding the combined value of the three largest-value crops, namely, potatoes, barley, and meadow hay (table 10). However, in 1940 the total value of livestock and livestock products was only two-thirds the value of all other farm products; this is in contrast to 1929 when livestock were worth three times more than other agricultural produce combined. Thus the trend in the last decade has indicated decreasing relative importance of range livestock and increasing importance of crop agriculture in the economy of the county.

Table 10.- Quantity and value of livestock and livestock products produced in Modoc County. 1940. 1/

Livestock or livestock product	Quantity	Unit	Value
Fat steers, cows, and calves	24,903	head	$1,131,920
Weaner calves	3,000	head	102,000
Lambs	16,500	head	99,000
Hogs	2,550	head	29,000
Wool	149,000	pounds	41,720
Total			$1,403,640

1/ Compiled by Thomas Briles, Modoc County Agricultural Commissioner.

Although there were fewer animal units in the county in 1940 than in 1900, a reduction of 30 percent having occurred in the 5-year period 1935-40 (table 11), total numbers of livestock are not necessarily significant. It is expected that if data were available to make the desired segregation, the trend would be definitely downward in dependency of livestock on range feed and upward in dependency on irrigated pasture and supplements.

Forest Lands and Industries

In order to obtain a comprehensive understanding of the forest land and timber situation in Modoc County, reference should be made to management plans for the Alturas and Big Valley working circles (6) (7), the timber policy statement for the Modoc National Forest (1), and two progress reports on the forest insect hazard inventory (3) (4). The following descriptive data which are not intended to present a complete picture, supplement these references only to the extent deemed necessary.

Timber Stand, Area, and Ownership. Pertinent statistics on forest land and timber are summarized for both Modoc County and the Alturas wrking circle in tables 12 - 15. In some instances current data are not available, and the information presented is doubtless somewhat in error due to changes wrought by logging, fire, reproduction, title transfers, and other phenomena. Also it was necessary occasionally to compromise between divergent estimates of the same item. 6/

It is estimated (table 12) that the 750,000 acres of commercial forest land in the county are about equally divided between public and private ownership, that mature old-growth timber covers over three-fourths this area, that there is relatively little second growth, and that there is more publicly than privately owned forest land classed as non-restocking.

6/ About 84 percent of the area of Modoc National Forest lies within Modoc County. Although county data have been used when possible, national-forest information is not always segregated on a county basis so it has been necessary occasionally to use data from the national forest as though the entire area were within the county. It is believed the errors thus introduced do not affect any results of this report.

Table 11. - Trend in livestock numbers in Modoc County 1900 - 1940[1/]

Animal	1900	1910	1920	1925	1930	1935	1940[2/]
	Number	Number	Number	Number	Number	Number	Number
Cattle	55,652	46,916	47,828	63,593	53,193	79,906	63,779
Sheep	59,293	76,562	108,062	80,565	110,099	77,397	52,258
Goats	1,280	549	448	137	387	342	342
Swine	9,134	8,488	4,858	4,555	5,342	3,480	6,168
Horses	17,081	15,636	9,889	8,681	6,449	6,079	6,653
Mules	1,811	1,132	709	896	485	307	397
All livestock in animal units[3/]	88,486	80,804	81,100	90,221	83,292	102,535	73,583

1/ Based on U. S. Census Reports.

2/ The 1940 figures given are adjustments upward by the 1930 ratio of total animals to animals of specified ages given in the census for 1940; the same number of goats were assumed to be on hand in 1940 as in 1935.

3/ Calculated from above data at the rate of one animal unit is equivalent to 1 cow, 1 horse, 1 mule, 5 sheep, 5 goats or 5 swine.

Table 12.- Commercial forest land area by character of growth and by ownership. Modoc County. 1934 1/

Character of growth	Privately owned	Publicly owned	Total
	Acres	Acres	Acres
Mature timber	288,222	295,650	583,872
Second growth	18,642	16,331	34,973
Restocking	74,566	38,107	112,673
Non-restocking	3,590	15,940	19,530
Total	385,020	366,028	751,048

1/ From reference (8).

Table 13.- Timber stand by ownership and species. Modoc County. 1936. 1/
(M feet board measure)

Species	Publicly owned (Modoc National Forest)	Privately owned: Within Modoc National Forest	Privately owned: Outside Modoc National Forest	Total public and private
Ponderosa and Jeffrey pine	3,012,326	3,099,730	1,000,000	7,112,056
Sugar pine	42,017	69,000	50,000	161,017
White fir	801,691	224,383	150,000	1,176,074
Incense cedar	52,233	55,692	25,000	132,925
Juniper	276,526	50,000	7,000	333,526
Other	65,142	5,008	-	70,150
Total	4,249,935	3,503,813	1,232,000	8,985,748

1/ Adapted from Timber Policy Statement, reference (1).

Table 14.- Land areas by ownership and type. Alturas working circle, Modoc National Forest. 1942.[1/]

Forest type	Privately owned	Publicly owned	Total
	Acres	Acres	Acres
Mature commercial	69,380	158,938	228,318
Mature non-commercial	660	20,980	21,640
Second growth and restocking	36,359	45,714	82,073
Non-timbered	19,161	154,694	173,855
Total	125,560	380,326	505,886

1/ Adapted from reference (7).

Table 15.- Timber stand by species and by ownership on mature commercial forest type, Alturas working circle, Modoc National Forest. 1942.[1/]

(M feet board measure)

Species	Unit area	Privately owned	Publicly owned	Total or average
Ponderosa and Jeffrey pines	(Total stand	931,187	1,231,733	2,162,920
	(Stand per acre	13.4	7.7	9.5
White fir	Total stand	11,886	90,496	102,382
Incense cedar	Total stand	546	13,645	14,191
All species	(Total stand	943,619	1,335,874	2,279,493
	(Stand per acre	13.6	8.4	10.0

1/ Adapted from reference (7).

The latter is probably due to the Federal policy of acquiring private lands as they are cut over in order to hasten their rehabilitation. In recent years operators have cut over mature Government timber at the rate of 7,000 acres in 1939 and 17,150 acres in 1940, thus materially altering the character of growth classification as of 1934 as given in table 12.

Not only was the acreage of timberland equally divided between public and private agencies, but also the total stand of timber of all species was evenly distributed in 1936. However, private owners controlled over half the 7 billion feet of ponderosa pine in 1936, and three-fourths the 161 million feet of sugar pine (table 13). On the other hand title to most of the white fir and juniper was vested in the public. The picture in 1936, however, is a

static excerpt whereas the true concept is dynamic with a trend toward heavier proportions of Government timber due to rapid liquidation of the stumpage owned in fee. For example, it is estimated that at the start of the period of rapid cutting in 1929, total timber on and adjacent to the Modoc National Forest was approximately 11½ billion board feet of which 7 billion, or 61 percent, was private. In 1941 the stand is estimated at about 5 billion board feet, 3 billion (60 percent) of which is Government owned.

In the Alturas working circle (table 14) which comprises some 505,886 acres, about 380,326 acres, or roughly 75 percent is publicly owned. Of these public lands, the 158,938 acres, which support mainly mature commercial ponderosa and Jeffrey pines, are designated as the area which has a sustained yield capacity of 12 to 15 million board feet annually and upon which the management plan is based.

If the timber stands occurring on private lands within gross boundaries of the working circle were also made available to a mill at Alturas, the sustained yield capacity would be materially increased (table 15). As is characteristic elsewhere in California and the United States, private lands carry the heavier stands per acre.

Lumbering. Up to 1928, the forests of Modoc County were practically virgin. Only some very small mills had been whittling at the timber from the late 1880's to this time. In 1928, the Southern Pacific Railroad broadgaged the spur from Alturas to Lakeview, Oregon, following which the Crane Creek Lumber Company began operations on a large scale in the North Warner Mountains. In 1930 after the Klamath Falls-Alturas railroad had been broadgaged, and the Great Northern extended through the county to Klamath Falls, the Shaw Lumber Company started large scale operations at Tionesta, with spur-line connections with the Great Northern Railroad. Subsequently in 1935 the Big Lakes Box Company started up its large mill at Canby with spur-line connections with the Southern Pacific to Klamath Falls. Thus, the threesome of large mills now operating in the county was formed during a period of but seven years. Meanwhile, however, the small mills that first began operations in the North Warners had ceased to exist, but other small and medium sized mills took their places, some of which have subsequently gone out of business.

From 8 active mills in 1927, the number rose gradually to a high of 14 in 1939, followed by a drop to 10 and 11 mills in 1940 and 1941 respectively (table 16). The first large production from Crane Creek Lumber Company in 1929 coupled with economic prosperity which affected small operators, resulted in an increase in lumber cut from 4 to 29 million board feet in the 2-year period 1927-29. Sharp curtailment explained by the general depression reduced the cut to 10½ million feet in 1933, but since then there has been a twelvefold increase to an all-time high of 128 million feet in 1941 with an estimated value of $2,509,400. Ponderosa and Jeffrey pines consistently comprise over 90 percent of the cut, the remainder of which is almost exclusively white fir and incense cedar (table 17).

Table 16.- Number of active mills and quantity and value of lumber cut in Modoc County. 1925 - 1941.

Year	Active mills	Lumber cut	
		Quantity	Values
	Number	M ft. b.m.	Dollars
1925	10	6,513	-
1927	8	4,315	106,108
1929	10	28,572	684,150
1931	11	12,941	248,975
1933	11	10,500	138,258
1935	12	34,761	673,403
1937	12	56,049	1,303,806
1939	14	94,719	1/ 1,849,800
1940	10	107,580	2/ 2,101,000
1941	11	128,494	2/ 2,509,400

1/ Adjusted upward by proportion due to incomplete value data.

2/ Computed from 1939 data by proportion. Conservative because assumes no price rise.

Table 17.- Lumber cut by species, 1936 - 1941. Modoc County.

(M feet, board measure)

Species	Year			
	1936	1939	1940	1941
Ponderosa and Jeffrey pines	56,527	92,702	101,440	123,734
Sugar pine	-	-	-	-
White fir	2,587	1,387	2,189	4,096
Incense cedar	20	630	3,951	664
Spruce	55	-	-	-
Total	59,189	94,719	107,580	128,494

However, lumber milled in Modoc County represents less than half the total drain of wood products from the county because several large operations in adjacent counties, both in California and Oregon, have been drawing logs from Modoc County forests. The result is that except for taxes and national forest apportionment on this timber, Modoc County receives no benefit from the utilization of these resources in terms of manufacturing establishments and their accompanying employment, taxes, and purchases. From the standpoint of Modoc County this is most undesirable; but whether from a broader regional outlook, the mal-effects on counties now benefiting from these resources would be overshadowed by favorable effects on Modoc County if all timber logged in Modoc County were also milled within it can only be determined by a separate economic analysis.

The extent of this dispersion of timber is demonstrated in table 18. In 1928, the McCloud Lumber Company established a logging camp in the extreme western part of the county and has been logging Modoc County timber in this region from 1929 to the present. In the spring of 1929 the Long-Bell Lumber Company also began large-scale logging operations in the same general area and has been cutting there every year since, except for 1932 and 1933. The Big Lakes Box Company has been logging south of Canby not only for its mill at Canby, but also for part of the requirements of its mill at Klamath Falls, and the Shaw Lumber Company has been selling small amounts of logs in Oregon. Because more than 35 percent of that cut and shipped out originated on Government lands, it is evident that if the Government could specify milling localities for its stumpage[7], it would be in a position in this instance to materially aid the economy of Modoc County, — provided it felt the benefits of so doing would outweigh detriment to adjoining areas.

Table 18.- Timber drain in Modoc County and its dispersion between local and out-of-county mills. 1940.

Company	Destination of timber cut in Modoc County	Cut from private lands in Modoc County	Cut from Government lands in Modoc County	Total cut all lands in Modoc County[2]
		M b.m. Log scale	M b.m. Log scale	M b.m. Log scale
McCloud Lumber Company	Siskiyou County, Calif.	26,260	[1] 5,740	32,000
Long-Bell Lumber Company	"	2,370	[1] 36,630	39,000
Big Lakes Box Company	Klamath County, Ore.	40,000	-	40,000
Shaw Lumber Company	"	5,000	-	5,000
Total for four mills shipping out		73,630	42,370	[3] 116,000
Total for 10 mills operating in Modoc County	Modoc County	65,260	[1] 46,800	[4] 112,060
Total cut in county		138,890	89,170	228,060

1/ From timber sale records, Modoc National Forest.
2/ Breakdown by companies and source of timber supplied by Russell Bacon, Modoc National Forest.
3/ Total figure determined by Modoc National Forest and given in the Crop Report for 1940 by Thomas Briles, Agricultural Commissioner for Modoc County.
4/ Mill underrun in western Modoc County 1938-1940, inclusive, averaged 4.0 percent for 147,059 M board feet for four mills reporting to the Forest Supervisor, Modoc National Forest. Estimate of log scale production made by applying this underrun percentage to mill tally production in 1940 of 107,580 M board feet (table 17)

7/ See footnote 13, page 29.

Table 19 has been prepared from the best available data in order to summarize for the lumber industry the number of wage earners, wages paid, length of operation, average salary, yearly wage, value of various wood products, and value added by manufacture. Averages may be reasonably accurate but totals on number of employees, and value of product may be too low by 20 to 25 percent. Even so, the value of all wood products manufactured in the county is double the value of livestock and livestock products, and 12 percent greater than the value of all other farm products and agricultural crops.

Table 19.- Wage earners, wages, value of manufactures and other items for Modoc County sawmills. 1939.

Number of mills operating	14
Number of salaried employees and wage earners	640
Average number of months work per wage earner	9.7
Average length of logging operation, days	160
Average length of milling operation, days	150
Salaries and wages	$ 720,300
Average annual salary	$ 2,180
Average yearly wage	$ 1,100
Value of lumber produced	$1,849,800
Value of planing mill products	$ 437,700
Value of box mill products	$ 336,300
Value of other wood products	$ 89,300
Total value of manufactures	$2,713,100
Value added by manufacture	$1,810,100

In 1939, of the 14 active sawmills in the county, only 6 cut over 250 M board feet of lumber. The largest of these, the Shaw Lumber Company at Tionesta, cut approximately 34,280 M feet in 1939, and 41,206 M feet in 1940. A box factory, operated adjacent to the mill, utilized 17,415 M feet in 1939 and 17,735 M feet in 1940 for the manufacture of box shook. Next in size is the Crane Creek Lumber Company at Willow Ranch which cut 23,203 M and 24,690 M feet of lumber in 1939-40 respectively. A box factory operated in connection with the mill produced 8,771 M feet of shook in 1939, and an estimated 9,524 M feet in 1940. This mill burned in 1941 but is being rebuilt with an enlarged capacity estimated at about 36,000 M feet.

The third largest mill, that of the Big Lakes Box Company at Canby, cut approximately 14,000 M feet of lumber in 1939, and an estimated 16,000 M feet in 1940 but does not operate a box factory. The Ralph L. Smith mill, newly constructed at Canby in 1941 and operating only part of the year, has an estimated annual capacity of about 15 to 20 million feet. Next in order of cut are Edgerton Bros. Lumber Company at Adin, cutting 7,500 M feet in 1939 and Davis Creek Lumber Company at Lookout, cutting 7,065 M feet. Several other mills each cutting over 1,000 M feet in recent years include two at Day, one of which burned down recently, and one between Adin and Canby.[8/] All of the major mills with the exception of Crane Creek and Edgerton Bros. are cutting mainly private timber, and the total cut of private timber is 1½ times the cut of Government stumpage.

8/ Data on cut of individual operations supplied by Modoc National Forest.

Based on the rate of cut in 1940 and timber available now or prospectively, life expectancies of the major mills are: Shaw, 4-6 years; Big Lakes, 6-8 years; Davis Creek, 4 years; Smith, 1/2 year unless Government timber can be obtained; Conklin-Harris, 2 years; and Edgerton Bros., on sustained yield. Crane Creek Lumber Company, Willow Ranch, has exhausted timber accessible to the mill from the east side of Goose Lake. A channel was dredged across Goose Lake in 1941 and during part of the year, logs were brought to the mill across the lake from timber owned by the company in Oregon. If this operation is continued as planned, life expectancy of the mill is seven years. Beyond that period, the company will be dependent on the Government timber interspersed with Weyerhaeuser stumpage in the Crowder Flat block of the Alturas working circle. With the exception of Edgerton Bros., no existing mill has an anticipated life of even one decade.

CONTRIBUTIONS OF TIMBER RESOURCES TO COUNTY ECONOMY

Industrial contributions to areal support take the form mainly of employment, payrolls, taxes, and operating expenditures. Moreover, in an economy dedicated to the welfare of society as a whole as distinguished from one dedicated to entrepreneurial gain, certain intangibles or social assets, which defy definitive evaluation, are nevertheless recognized as positive contributions. In this brief resumé of forest contributions, those which flow from public and private enterprise are compared, and the significance of all forest contributions in the county economy is indicated.

Magnitude of Private and Public Forest Contributions

In table 20, which summarizes the bare statistics of contributions, it is plain that (1) there has been great increase in the support rendered the county by wood-using industries from 1933 to 1940, and (2) the intangible contributions from the Modoc National Forest are inadequately represented by statistics. Two other points are: (1) if all the timber harvested within the county were also milled within it, forest contributions would be doubled; and (2) because many workers reside and spend their money outside the county, and because certain manufacturing supplies and equipment are purchased outside the county, only about 50 percent of the total contributions listed in table 20 actually accrue to the benefit of Modoc County.

From 1933 to 1939 employment in wood manufacturing increased 3.5 times from 250 to 900; payrolls were up 12 times from $77,000 to $938,000; operating costs up 6 times from $152,000 to $903,000; and taxes paid by timberland holders and sawmill operators decreased more than 10 percent from $69,600 to $60,700. The history of timber utilization shows that contributions are at or near their peak and that material declines are foreshadowed in the near future by the short life expectancy of existing mills. Fifteen years ago, taxes on timber holdings and Forest Service business were the principal sources of revenue to the county from forest lands. Fifteen years from now, it will be Forest Service business plus moderate operations on sustained-yield Federal lands that will furnish support to the county.

Table 20.- Contributions from private and public forest enterprises, Modoc County.

Kind of contribution	Manufacturing enterprises				Modoc National Forest
		1939			
	1933	From cutting private timber	From cutting Government timber	Total	
Employees and wage earners, number	250	632	268	1/ 900	2/ 93
Wages and salaries, dollars	77,223	684,253	253,773	1/ 938,026	3/ 155,112
Cost of materials, dollars	4/ 152,453	4/ 733,990	4/ 168,988	902,978	5/ 184,472
Taxes paid					6/ 16,691
Timberland holders, dollars	61,508	-	-	51,929	
Sawmill operators, dollars	8,134	5,145	3,618	8,763	
Total, dollars	69,642	5,145	3,618	7/ 60,692	

1/ Adjusted upward from incomplete data of table 19.
2/ Average for period July 1938 - May 1941.
3/ Fiscal year 1941.
4/ Slightly less than half these costs used for supplies, fuel and electric energy; remainder for stumpage, logs, lumber and contract work.
5/ Average for fiscal years 1933-41.
6/ Contribution in lieu of taxes. Gross forest receipts 1940 were $79,266.
7/ Taxes paid are for 1940 instead of 1939.

As the cut-over acreage increases, smaller and smaller tax payments can be expected on the diminishing tax base of standing timber. In table 21 are summarized the taxes paid by timberland owners and sawmill operators from 1910 to 1940. These payments increased from $31,000 in 1910 to $136,000 in 1930, after which a decrease to $61,000 in 1940 took place. In every year taxes paid on stumpage by timberland owners not operating in the county were greater than those paid by sawmill operators. The long-time trend in tax receipts from forest resources will be downward, although there may be short-term rises resulting from reassessments and higher tax rates.

If leakages to outside the county can be stopped by having all harvested timber milled within the county and by inducing workers to live within the area by strategic location of plants and offering attractive residential facilities and shops, the net reduction in forest contributions to the county should be slight. In other words, the gain in stopping leakages should just about offset ultimate total losses in forest revenue. Another way of expressing it is that the county by skillful manuevering may be able to place the loss in contributions on outside areas rather than shouldering them itself. Regardless of whether this would be to the maximum economic advantage of the Klamath Basin it definitely would benefit Modoc County.

Without more detailed exploration than has been permitted it is impossible to estimate accurately the extent of present leakage outside the county. Of the three major mills, Shaw, Crane Creek, and Big Lakes, which together comprise 85 percent of total employment capacity, no less than one-third and probably nearer one-half the workers have their permanent residence in Oregon according to a license plate tabulation. Probably most of these workers reside either in Klamath Falls or Lakeview during the winter months, but during the summer operating season live at the various logging camps and mill towns. In addition, many of the California residents doubtless spend a considerable portion of their income at Klamath Falls which is a city of 16,000 as against Modoc County's largest urban center of 2,000. By the same token, many items of logging and milling supply and equipment cannot be purchased within the county and must be obtained elsewhere. In view of all these factors and others which suggest that only between 30 and 40 percent of total primary personal incomes in the county is spent in local establishments, it is estimated in round numbers that half the county total of forest contributions is lost directly through milling outside the county and at least half the remainder is lost through residence and expenditure outside Modoc County. Altogether this means that the county is getting only about 25 percent of its total forest contributions.

In 1939 two operations in the county, one of which was on sustained yield and the other cutting salvage timber, were dependent on Government stumpage; so if these operations may be classed indirectly as public contributions, it is evident from table 20 that total public contributions were about 55 percent of private in terms of employment, 60 percent of private in payrolls, 48 percent of private in operating cost and expenditures, and 35 percent of private in taxes.

As far as the Modoc National Forest is concerned, its contributions appear relatively small. Existing before the rise of the lumber industry in the county, they will continue to exist and perhaps gradually increase long after the industry has cut itself out and settled down to the growing capacity of the timberlands. Other national forest contributions from which private enterprise indirectly benefits are not evident in the statistics such as fire prevention and suppression and insect control.

Forest Service employment and payrolls, which are subject normally to considerable seasonal fluctuation due to heavy demands of the fire season reach a maximum usually in August and a minimum in February and March at about one-third the maximum. Monthly employment varies from about 45 to 160 persons while payrolls range similarly from $6,000 to $23,000. In tables 22 - 24 are given the breakdown of payrolls by employment classes; expenditures by activities; and receipts by sources of income for the Modoc National Forest. One-third of the payroll goes to regular Civil Service personnel, one-third to emergency fire crews and the balance is distributed mainly to CCC and ERA appointees. The four principal expenditure activities are construction, protection, general administration and management, and maintenance in that order. Together these four groups comprise about 85 percent of total expenditures and in themselves equal total monies spent for payrolls.

For the last 15 years the average annual fund going to the county from national-forest operation in lieu of taxes is $12,535 which is equal to only about 2½ percent of total county governmental receipts. Even with this relatively small amount there is considerable annual fluctuation from a low of $7,000 to a high of $25,500. Of the two principal sources of Forest Service receipts (the sale of timber and forage) timber sales have yielded on the average $6,000 a year more than have grazing permits. Besides the 25 percent fund an additional 10 percent of gross receipts is spent on national-forest roads and trails which of course benefit the county. Assuming this expenditure is proportional to the national-forest area in the county, an average annual sum of $5,014 is spent directly for county benefit in addition to the $12,535 already mentioned. This 10 percent fund is included in the activity expenditures in table 22.

Significance of Forest Contributions

In relation to the entire economy of Modoc County, forest contributions play a very significant role as demonstrated in table 25. The most important contribution factors are employment and income to workers. Thus of all gainful workers in the county, which is about half the total population, 25 percent find employment in forest enterprises; whereas of those engaged in manufacturing, 94 percent are in the lumber industry. The value of all manufactured wood products is double the value of livestock and livestock products and 12 percent greater than the value of all other farm products and agricultural crops. Primary forest income, which is comprised of value added by manufacture plus payrolls in non-manufacturing forest pursuits, is not only 86 percent of the value added by all manufactures but also roughly 25 to 30 percent of all primary incomes in the county. These incomes are estimated very crudely to total between 6½ and 7 million dollars, of which one-half derives from agriculture, one-fourth from the forests and one-fourth from other sources.

Table 21.- Taxes paid by forest industry.
Modoc County. 1910-1940.

Year	Non-operating timberland owners	Sawmill or logging operators 1/	Total
	Dollars	Dollars	Dollars
1910	25,824	5,347	31,171
1920	49,678	2/ 234	49,912
1925	72,752	1,356	74,108
1930	92,558	3/ 43,740	136,298
1933	61,508	8,134	69,642
1940	51,929	8,763	60,692

1/ Operators may or may not own timber. If so, their timberland tax is included in this column.
2/ Decrease from 1910 payment due mainly to one operator going into the non-operating group.
3/ Due to heavy taxes paid by McCloud and Long Bell Lumber Cos.

Table 22.- Payroll breakdown into employment classes, Modoc National Forest, fiscal year 1941. 1/

Group	Employment class	Amount of payroll
		Dollars
1.	Permanent formal and probational Civil Service appointments (regular personnel)	56,251
2.	Informal temporary (not to exceed 10 months), non-Civil Service appointments (forest workers)	12,919
3.	Informal emergency (not to exceed 120 days), non-Civil Service appointments (fire guards)	2,497
4.	Informal emergency (1 to 3 months) appointment, principally office personnel)	1,066
5.	CCC and ERA appointments (machine operators, foremen, clerks, trades, junior professional)	21,092
6.	ERA workers hired by the hour or day (labor, trades)	6,704
7.	Emergency fire crews hired by the hour or day (labor, trades)	54,583
	Total all classes	155,112

1/ Data from payroll records and vouchers, Fiscal Control, U. S. Forest Service, San Francisco.

Table 23.- Average annual expenditures by activities, Modoc National Forest, fiscal years 1932-1940.1/

Group	Activity group	Average expenditure per fiscal year
		Dollars
1.	General administration and management, surveys, plans, etc.; timber and timber sales, grazing, recreation, wildlife, water.	30,940
2.	Maintenance: roads and truck trails, horse and foot trails, improvements.	23,021
3.	Construction: roads and truck trails, horse and foot trails, forest highways, improvements.	58,054
4.	Lands: acquisition, exchange, gift, purchase, land adjustments.	1,906
5.	Reforestation and timber stand improvement.	5,369
6.	Equipment: roads and trails, fire, general.	8,462
7.	Stores: roads and trails, general.	735
8.	Protection: fire prevention, presuppression, suppression; timber disease, insect and rodent control.	43,482
9.	Cooperation and research: forestry extension, fire, reforestation, timber disposal, range, silvicultural.	10,369
10.	Emergency employment relief: Forest Service contribution and other.	2,134
	Total	184,472

1/ Data from Reports of Expenditures, Fiscal Control, U. S. Forest Service, San Francisco.

Table 24. - Gross receipts by sources, total 25 percent fund, that part of the 25 percent fund going to Modoc County, and its proportion of total receipts for county government operation, 1927 to 1941.1/

Fiscal year	Gross receipts: Timber	Grazing	Special use	Miscellaneous	Total	Total 25 percent fund	Part of 25 percent fund going to Modoc County	Fiscal year in which received by Modoc County	Proportion of total receipts for Government operation. Modoc County.2/
									Percent
1927	$11,234	$36,441	$1,167	$ 30	$ 48,872	$12,218	$10,253	1928	2.83
1928	13,969	32,954	1,358	30	48,311	12,078	10,125	1929	2.77
1929	39,558	39,504	1,269	54	80,385	20,096	16,845	1930	3.23
1930	81,523	38,767	1,320	30	121,639	30,410	25,494	1931	5.99
1931	25,250	35,408	1,307	136	62,102	15,526	3/13,014	1932	2.84
1932	13,440	14,726	4,895	79	33,139	8,285	3/ 6,944	1933	1.96
1933	8,230	27,078	2,220	4/-143	37,385	9,346	7,832	1934	1.78
1934	12,340	18,770	1,589	10,075	42,774	10,694	8,962	1935	2.17
1935	39,112	21,504	1,667	-	62,284	15,571	13,049	1936	2.47
1936	16,441	23,309	1,359	-	41,109	10,277	8,613	1937	1.67
1937	60,254	24,502	1,195	57	86,008	21,502	18,020	1938	2.42
1938	11,844	19,629	1,570	-	33,043	8,261	6,923	1939	0.97
1939	37,755	18,916	1,470	-	58,141	14,535	12,185	1940	1.67
1940	59,961	17,628	1,677	-	79,266	19,817	16,691	1941	5/ -
1941	41,893	18,212	2,058	-	62,163	15,541	3/13,100	1942	5/ -
Average	31,520	25,823	1,741	690	59,775	14,944	12,535		6/2.48

1/ Data from Office of Fiscal Control, U. S. Forest Service, San Francisco.
2/ Calculated from table 6 and its source material.
3/ Estimated. Correct amount, released after report was prepared, is $13,097.
4/ Due to an adjustment in accounts.
5/ Data for total county governmental receipts not yet released by the State Controller.
6/ On basis of 13 years for which data are available.

Table 25.- Significance of forest enterprise in economy of Modoc County by factors of contribution. 1939-1940.

		Percent
1.	Gainful workers in forest enterprise as a percent of total gainful workers in county.[1/]	25
2.	Gainful workers in forest industries as percent of total employees engaged in manufacturing.	94
3.	Wages paid forest-industry employees as percent of total wages paid in manufactures.	73
4.	Cost of materials in forest industry as percent of total cost of materials in manufactures.	65
5.	Value of product in forest industry as percent of total value of product of all manufactures.	78
6.	Value added by manufacture in forest industry as percent of value added in all manufactures.	86
7.	Taxes and contributions in lieu of taxes from forest enterprise as percent of total county receipts.	10
8.	Taxes and contributions in lieu of taxes from forest enterprise as percent of total county receipts excluding subventions and grants.	19
9.	Primary income from forest enterprise as percent of total primary income in county.	25-30

1/ 1940 data on gainful workers not yet released by Census. Assuming same proportion of gainful workers to total population in 1940 as in 1930, total number is 4,015 or 46 percent of total population.

As already pointed out, forest taxes and tax contributions are a small part of the county tax base, so small that they constituted only 10 percent of total governmental receipts in 1940. However, if subventions and grants are eliminated, forest taxes comprise 19 percent of county receipts.

This analysis covers a period during which forest contributions are approximately at their peak. Not only will employment and payrolls fall off within a decade upon the closing of large mills, but taxes on timberland will decrease as the tax base of virgin timber is destroyed and replaced by cut-over lands subject to low assessments. Ultimately unless private timber is harvested so the growing stock and tax base are not destroyed, the only important source of forest contributions to the county will be from the Modoc National Forest and from sawmills dependent on Government stumpage for raw material.

SUSTAINED YIELD VS. LIQUIDATION FOR ALTURAS WORKING CIRCLE

Having shown the material importance of forest resources in the economy of Modoc County and the expected increased significance of public forest enterprise, the inquiry is now narrowed to one segment of the county, - the Alturas working circle, - an area comprising 5 blocks of timber surrounding and scattered at considerable distances from Alturas, which is in the approximate geographical center of the area.[9] The following discussion of the relative merits of sustained yield and liquidation is based entirely on publicly owned national-forest timber. It should be remembered that there is a nearly equal amount of privately owned timber within the gross boundaries of the working circle which may not be included by the Forest Service in planning an Alturas operation. If this were made available to a mill at Alturas through a cooperative sustained yield unit or some other method, the proposed operation could be nearly doubled in scope.

Alternative Utilization Policies

The social and economic effects of an operation milling 45 million feet annually for 30 years and then ceasing abruptly are to be compared with an operation milling about 15 million feet annually for 30 years and 12 million feet annually thereafter, presumably forever.[10] In these alternatives two assumptions which pass over many difficult problems are made, - namely that, (1) the raw material will be available to support the larger operation for about 30 years or the smaller one ad infinitum, and (2) the logs will be milled at Alturas. These assumptions are of major importance but it is beyond the province of this report to test their validity.[11]

Simple budgeting of the present total merchantable stand, including white fir and incense cedar as well as ponderosa pine, at the rate of 45 million feet a year makes it last about 30 years. For the large operation therefore growth is assumed to offset mortality. For the sustained-yield enterprise there are the problems of possible heavy insect attack, irregular

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9/ For detailed description of the working circle, see reference (7).
10/ Cutting cycle 30 years; rotation 150 years.
11/ From a practical standpoint the assignment had to be: Assuming the alternative operations are possible what will be their economic and social effects?

and infrequent reproduction, and unregulated growing stock with an excess of mature timber and a shortage of pole stands. Budgeting the existing merchantable pine timber and allowing for estimated growth and mortality gives an annual yield of 14.4 million feet for the first cycle of 30 years, and 12 million feet annually for the next two cycles. However, data on immature growing stock, growth, and mortality are insufficient to support more than a general estimate that yield will be at the same rate of 12 million feet for the last two cycles of the first rotation and for subsequent rotations. Due to inadequate data for the younger age classes there has necessarily been mainly volume regulation of the mature timber instead of integrated volume-area regulation of the entire growing stock.12/

The economic question of whether logs from the scattered blocks of the working circle can be milled at Alturas is the subject of a separate report. It is assumed here either that: (1) Alturas is the most desirable locality from an entrepreneurial standpoint; or (2) Alturas is specified as the milling locality in the timber sale contract.13/

It should not be thought that either of the two utilization plans will necessarily maximize real income from the working circle. From a universe of infinite choices the two plans for comparison were selected at random; so it would be pure chance if either plan were the particular one, from the multitude of possible procedures, that will yield the maximum real income. The probability of such an occurrence is very small. In other words, it is quite possible that some other plan, quite apart from the two compared, may yield greater benefits than either of the two which are considered.

Economic and Social Tests for Comparing Alternative Policies

The utilization plan which returns the larger group net real income is recognized as the more desirable. According to Weeks and Josephson (11), "Net real income represents goods and services which satisfy wants," and thus includes not only monetary income but also intangibles and goods produced and utilized but not sold. "Real income is a fairly simple concept from the standpoint of the individual, but application to a social group requires not only a broader basis of calculation, but also a further definition of goals. In the calculation of net real incomes of a social group, elements of cost and of income require consideration which may not be involved in the analysis of individual income." Net real income defies definitive evaluation but the

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12/ The above is not said in reflection on the management plan but only to indicate awareness that the basic assumptions on which the economic analysis is founded may be subject to change.

13/ This may not be done under present regulations, but it may be possible should bill S. 1093, 77th Cong., 1st session, become law. The pertinent Sec. 3 reads: "Whenever in the judgment of the Secretary of Agriculture the maintenance of a stable community or communities is primarily dependent upon the sale of national forest timber and such maintenance cannot effectively be secured by following the usual Forest Service procedure in selling such timber, he may, in his discretion, establish by formal declaration a sustained-yield unit for the maintenance of a stable community or communities, determine and define the boundaries of the community or communities for whose benefit the unit is created, and, subject to such conditions and requirements as he believes necessary, sell national forest timber and other forest products from such unit without competitive bidding at prices not less than their appraised values, to responsible purchases within such community or communities."

goals are to increase per capita income, reduce income dispersion, and increase income permanence.

A number of tests are proposed which in the aggregate should allow reasonably sound judgment as to which plan promises greater real income. The tests complement each other; no test in itself is an adequate criterion; and some are more relevant than others. They are the tests of resource productivity, population, incomes, and community quality.

The Test of Resource Productivity

Economically this test has little significance because anything it may show is also shown and with greater effectiveness by the more fundamental tests which follow. Under a philosophy of abundance which prescribes the growing of all saw-timber possible, the test becomes important; and yet there is obviously a limitation to reasonable expenditures to promote timber growing even under this philosophy. The entire financial resources of the United States cannot be poured into timber growing due to counter-demands from other sectors of the national economy. Consequently the question must be faced whether funds required to grow a certain amount of timber on a specific area might result in growing more timber if expended elsewhere. Unfortunately for Modoc County, this is undoubtedly true and because of low site quality, a large expenditure for forest production would not be economically justified.

Under the proposed 45 million annual cut, the resource would produce three times as much wood as the alternative plan for the first 30 years, namely, 1,310 million as against 430 million board feet (table 26). Thereafter the smaller annual cut would begin to close the gap until during the 104th year the two plans would have yielded equal quantities of wood. By the end of the first rotation at 150 years, the smaller scale operation would have exceeded the larger in total timber harvested by 1,870 million to 1,310 million feet or by over 40 percent. Giving the liquidation plan the benefit of the doubt by assuming restocking after cutting, another similar harvest could be initiated in the 151st year which by the 180th year would have raised the total liquidation harvest to 2,620 million feet. This again would have overtaken and passed the sustained yield harvest which in the 180th year would have reached only 2,230 million feet. However, by the 213th year, total accumulative harvests under the two plans would again be equal, and thereafter the sustained yield plan would draw away, never again to be headed as table 26 shows.

Projecting theoretical yields so far in the future is pure speculation and in the liquidation plan there would be gaps of 120 years between cuts during which there would be no operations whatsoever. Moreover it is extremely unlikely that under liquidation the forest would regenerate sufficiently to yield subsequent harvests even remotely resembling the cut of the first 30 years. However, even giving the liquidation or intermittent type of cutting all possible consideration, the smaller steady annual harvest ultimately results in greater total resource productivity.

Table 26.- Comparison of total accumulative cuts under alternative utilization plans at different periods in the future.

Year of operation	Total accumulative cut: Sustained yield management	Total accumulative cut: Liquidation
	Million board feet	Million board feet
30th	430	1,310
90th	1,150	1,310
104th	1,310 (accumulative cuts are equal)	1,310
150th	1,870	1,310
180th	2,230	2,620
213th	2,620 (accumulative cuts are equal)	2,620
300th	3,670	2,620
330th	4,030	3,930

With regard to quality of product from the two plans, the continuous operation would yield superior lumber because only the larger trees would be cut. In the liquidating operation, if the ground is covered only once in the 30-year operating period, all merchantable timber down to an 18-inch diameter would have to be cut in order to maintain an annual production of 45 million feet for the full period.[14] This would mean cutting trees of both poor quality and nearly marginal value with a resulting low average net return per M but a maximum return per acre. Even if the liquidating operation covered the entire working circle three times on a 10-year cycle, thus taking advantage of some growth, smaller trees of poorer quality would have to be cut than under the plan of continuous operation.

The Test of Population

In speculating upon prospective dependent populations under the alternative operations, guides may be sought from regional production factors as prepared by Rapraeger (5), from county averages, or from records of specific existing mills in the county which most nearly resemble the proposed operations. The latter course is the one followed, but results have been checked against both regional and county factors.

14/ The 1938 Blacks Mountain Fruit Growers mill study in eastside pine showed the marginal tree to have a diameter between 16 and 18 inches. Assuming this margin applies, stock table analysis, block by block, shows that 98 percent of total merchantable volume is in trees 18 inches D.B.H. and up. A 45 million annual cut of trees 18 inches and up would theoretically last 29.1 years; a similar cut of all merchantable timber (12 inches and up) would last 29.7 years. The difference is so small it may be disregarded.

Dependent Population

It is assumed that: (1) both operations will have, in addition to the sawmill, a planing mill, box factory, and perhaps a wood-working plant as has the Shaw Mill at Tionesta; (2) the companies will do their own logging as well as milling; and (3) both woods and mill operations will run for about 230 days per year. Under these conditions records indicate that the annual productive capacity per wage earner in Modoc County is 95 M board feet for mills cutting as high as 35 million or as low as 13 million feet per year. Apparently within this size range, there is no significant difference in operating efficiency between mills. Since additional data are lacking, it is assumed that this productive rate applies also to mills cutting as high as 45 million feet annually.

Applying this unit of production to the alternative plans, it is evident that the continuous operation would need 150 wage earners during the first cycle and 125 thereafter as against 475 for the large operation as demonstrated in table 27. By similar methods the salaried employees are estimated at 5 and 13 respectively.

Since 46 percent of the county population are gainful workers according to table 5, the ratio of workers to dependents is about 1:1 which is quite unusual, for ordinarily the average worker supports more than one additional person besides himself. However, applying the exact county ratio of 46:54, total primary population, including both workers and their direct dependents, becomes 335 and 285 for the small operation and 1060 for the large operation.

Table 5 likewise shows that for every 100 primary workers in the county there are only 56 service workers. This is explained partly because many primary workers are agriculturists and therefore more self-sufficient than the average, and partly because primary workers now patronize service establishments outside the county. But applying this low ratio and also the worker-dependency ratio, total service population is estimated at 189 and 593 respectively which brings the total dependent population, primary and service, worker and dependent, to 524 for the small mill and 1653 for the large mill (table 27).

If under a continuous enterprise, it is reasonable to believe that in time transients and floaters will diminish with more families and larger average families resulting, and that service establishments to meet growing needs of a permanent primary population will be located within the area instead of outside, a recalculation after the first cutting cycle for the small continuous industry indicates a primary population of 468, service population of 1,404, or a total of 1,872 dependent persons.[15/] A similar but less pronounced recalculation might be warranted for the temporary operation to account for some increase in dependents and service population that would develop in the 30-year period.

15/ The recalculations used (1) an estimate of 3.60 persons per average size family of both woods and non-woods workers (from reference 8) and (2) a ratio of 1 to 3 between primary and service populations for manufacturing enterprises (from reference 9).

Table 27.- Number of primary and service workers and their dependents under alternative enterprises.

Population	Small continuous operation (15 million b.f. for 30 years and 12 million thereafter)		Large temporary operation (45 million b.f. annually for 30 years)
	First 30 years	After first 30 years	
	Number	Number	Number
Salaried employees	5	5	13
Wage earners	150	125	475
Total primary workers	155	130	488
Primary dependents	1/ 180	1/ 155	1/ 572
Total primary population	335	285	1060
Service workers	2/ 87	2/ 73	2/ 273
Service dependents	1/ 102	1/ 86	1/ 320
Total service population	189	159	593
Grand total primary and service population	524	444	1653

1/ Calculated from table 5 which shows 54 percent of total population are dependents.
2/ Calculated from table 5 which shows that for every 100 primary workers there are 56 service workers.

Another reason why existing dependency ratios indicate too small a total population for the continuous enterprise is that no account is taken of those engaged in the cultural practices of intensive land management which are necessary to maintain or increase production. According to the Forest Service (8), 9,570 persons (including workers and their dependents) may have major dependence on intensively managed forest lands in Modoc County under recommended land management. Prorating this estimate on an area basis and subtracting industrial population, leaves about 1,500 additional persons who might be dependent on the land and who have not been included in table 27. On the other hand a liquidating operation would not need this intensive land management.

Population Distribution

In addition to magnitude of population, its geographical distribution, age-class distribution, size of family, and permanence are all factors of importance.

Geographically, the potential populations under either management alternative may be a net gain locally to Alturas, but they will not be a net gain either to the working circle or to the whole county, at least not until the distant future. Allocation of Government stumpage from this working circle to Alturas will mean the closing of the three largest mills in the county within a decade, or the transfer of one of them to Alturas. When this occurs, employees of the Alturas mill will face stern competition for their jobs from the men who will be out of work; eventually large numbers of unemployed will be forced out of the county to seek work elsewhere. Under the liquidation plan about 70 percent of the number now employed at the three large mills can be carried for 30 years after which there will be a complete bust; under sustained yield about 20 percent of those now employed can be carried indefinitely. The decline in population which cannot be avoided under either plan will practically wipe out the communities of Willow Ranch, Tionesta, Canby, and Big Lakes; likewise there will be serious adverse effects on Lakeview and Klamath Falls in Oregon, but Alturas itself probably will benefit by these changes.

Age-class distribution in Modoc County shows 34 percent of the inhabitants to be under 20 years, 43 percent between 20 and 45, and 23 percent over 45 years. In comparison with California these figures indicate a relatively high proportion in the young and prime age classes; comparable State data are 28, 41 and 31 percent, respectively. Under a continuous industry this healthy condition may be expected to continue; under a temporary operation, as the end approaches, a heavy outgo of people in their prime will result in excess proportions of the very young and the old. Moreover, the in-betweens that do stay will be the poorest, not the best.

Modoc County in 1930 had a slightly greater proportion of 4 to 6 person families than the State-wide average (32 against 29 percent), and a slightly smaller proportion of 3-person families or less (63 against 66 percent). Apparently farm and ranch families of considerable size partly offset the small families of woods floaters; besides many of the woods workers are not tabulated as residents of Modoc County. Sixteen percent of the total county

population does not fall into the family group at all.[16] Since this figure is greater by 5 percent than the comparable State-wide percentage, due probably to logging and milling camps, it is believed that both a permanent enterprise and one of 30 years duration would materially increase the proportion of total population in family groups with consequent increased dependency ratios as previously indicated.

The Test of Incomes

Group Income

In industrial enterprises one measure of income is the value added by manufacture which is simply the difference between the value of product and total cost of materials and includes therefore wages, salaries, other operating costs, and a margin for profit and risk.

In table 28 which is a continuation of table 27 in monetary terms, the factors of income are segregated for the alternative operations. Assuming an average annual salary of $2,700 and an annual wage of $1,200,[17] salaries and wages would come to $163,500 annually for the smaller enterprise after the first cutting cycle and $605,100 for the larger undertaking. For a number of operations in the county fairly similar in degree of remanufacturing to that proposed, it was computed that value of product less wages, salaries, and cost of materials equals $2.56 per M. Applying this to the annual expected harvest and calling it "enterprise income," annual amounts of $38,400 and $115,200 are obtained for small and large mills respectively to cover profit, risk and operational costs other than cost of materials and payrolls.[18] Annual value added by manufacture thus becomes the total of enterprise income, salaries and wages.

Table 28.- Estimated annual salaries, wages and present worth of group income under alternative enterprises.

Item	Small continuous operation		Large temporary operation
	First 30 years	After first 30 years	
	Dollars	Dollars	Dollars
Salaries[1]	13,500	13,500	35,100
Wages[2]	180,000	150,000	570,000
Salaries and wages	193,500	163,500	605,100
"Enterprise income"[3]	38,400	30,720	115,200
Value added by manufacture[4]	231,100	194,220	720,300
Present worth of annual value added by manufacture at 3 percent	7,197,000		14,120,000

1/ Annual salary $2,700. 2/ Annual wage $1,200.
3/ Based on county data. Value of product less wages and cost of materials defined as "enterprise income" which equalled $2.56 per M.
4/ Total of Salaries, wages, and enterprise income.

16/ Single person families include those living alone, but exclude persons in institutions, hotels, or boarding house groups.
17/ These are higher than county averages which are $2,180 and $1,100 for salaries and wages respectively (table 19), but the higher rates are justified because larger mills in the county pay these rates or better.
18/ Cost of materials includes expenditure for stumpage, logs and lumber, supplies, fuel and electric energy, and contract work.

For comparison between operations, annual "value added", which is here considered a criterion of income produced by industry, may be reduced to present worth by calculating the present worth of a 30-year terminable series of equal annual amounts in the liquidation case. Likewise for the first 30 years of the continuous operation, the annual value added by manufacture is reduced to the present by calculating the present worth of a 30-year terminable series of equal annual amounts. For subsequent years, the annual value added is capitalized and the capital worth then discounted 30 years to the present. The total of these two present sums ($4,529,000 and $2,667,000) equals the present income worth of the sustained yield operation. If 3 percent is accepted as a reasonable interest rate, and the present price structure continues, the 30-year liquidating operation has considerably greater present value, — 14 as compared to 7 million dollars.

These comparisons of income are not altogether valid, two of the chief reasons for this being that neither the capitalized group income of the service population nor the degree of extra-area leakage can be estimated. Apparently the short-term operation has the greater value, and yields income sufficiently greater than does the sustained yield plan to more than offset the advantage of continuity which characterizes the latter undertaking. Not until the interest rate drops to between 1 and 2 percent does the present worth of the value added by manufacture become equal for the two operations. The dispersion of incomes will not be great and probably about the same for either operation.

Entrepreneurial Income

Owing to lack of future cost and return data, annual profit margin to the entrepreneur has not been calculated. However, the profit if any, is included in the "enterprise income" column of table 28, and it is reasonable to assume that stumpage rates and operational efficiency will be such that the relative return in relation to investment will be equalized between the two undertakings. In other words, the total actual annual profit margin or net income will be three times greater in the larger operation but the margin per M will be the same. If this is true, it is possible to evaluate the two undertakings by establishing the margin of the small mill as unity for the first cycle and .8 thereafter, and that of the large mill as three.[19]

Doing this and computing net worth for various discount rates, it is apparent (table 29) that only with interest rates below two percent does the sustained yield enterprise have greater net worth to the operator. As interest rates rise, the differential favoring the 30-year mill becomes progressively larger. If the analysis is sound and management is given the choice, it would obviously select the liquidating plan.

In order to increase attractiveness of a continuous operation to business management, the annual cut must be increased, and this can be done by either accelerating the growth, enlarging the working circle area, or both. The present working circle area of 158,938 acres (table 14) is increased in the third cutting cycle to 167,438 acres through the addition of 8500 acres now classed as cut-over. On this enlarged area, annual net growths of 72 and 90 board feet per acre are necessary to sustain annual cuts of 12 and 15 million feet, respectively. In table 30 are tabulated the annual sustained cuts

19/ Setting up a cut of 15 million as unity, then a cut of 12 million is .8 of unity, and a cut of 45 million is three times unity.

required at different interest rates to make continuous operation equally attractive at those rates as a 45 million 30-year plan. Likewise are shown the annual per acre growth required to attain these cuts, both from the potential acreage of 167,438 acres, and from a theoretically enlarged working circle of 310,391 acres which includes the potential working circle plus 105,739 privately owned acres of mature, commercial, second-growth and restocking types as well as 37,214 acres of publicly owned second-growth and restocking lands not included in the potential acreage, but all lying within the gross boundaries of the present working circle. For example, from table 30, at 3 percent interest an annual cut of 26,400 M feet is needed which amounts to 158 or 85 feet per acre net growth for the potential or theoretical acreages, respectively. What the ultimate annual growth potentialities are under intensive forestry is for the silviculturist to determine, but even if they are as high as 120 feet per acre, the sustained yield plan based on potential acreage is attractive only at less than a 2 percent discount rate. However, with the theoretical acreage, sustained yield is preferable even at rates nearly as high as 6 percent, provided the cost of acquiring the private stumpage is overlooked.

The Test of Community Quality

Of all the tests, this one is probably the best criterion of real income, but at the same time it is the most obscure and defies quantitative interpretation.

Closely allied to community quality is the feature of stability which in turn cuts across all previous tests. Stability per se in the sense of a static economy is not desired, be that economy good or bad. On the contrary the aim is a dynamic economy, stabilized to the extent of ironing out violent fluctuations, but with the steepest sustained trend possible toward a higher standard of living. The liquidating operation, with its "boom and bust" economy manifestly cannot meet this concept.

Community quality is measured in the quantity, character, and tone of housing, businesses, churches, clubs, theatres, and other establishments that, combined with a given population, make up the sum and substance of a community. The size and quality of schools and libraries, the condition of streets, the kind and efficiency of protective services, the number and condition of recreation facilities and parks all go to reflect the quality of living standard that is to be found in a community.

Precedent is available in the county regarding quality of temporary mill towns each with a total life of 10 to 20 years. Tionesta, for example, consists of 2 cottages, 44 three- and four-room shacks, and 150 one- and two-room shacks, 1 bathhouse, 1 grocery store, 2 temporary one-room school buildings, a small post office, and a branch of the county public library maintained in one of the shacks, in addition to the manufacturing plant and its office building.[20] None of the buildings except the two cottages and the office building were adequately finished or painted. Although there was a street-like arrangement of the shacks, there was no semblance of street grading. Although practically every dwelling was supplied with electricity and perhaps a fairly large number with piped water, few if any had modern sewage

20/ From a survey made by René Bollaert in June 1941.

Table 29.- Entrepreneurial present net worth in units of return for sustained yield and liquidating operations calculated at various interest rates. 1/

Interest rate	Small continuous operation (15 million for 30 years and 12 million thereafter)	Large temporary operation (45 million for 30 years)
Percent	Units	Units
1	85.1	77.5
2	44.5	67.2
3	30.5	58.7
4	23.5	51.9
5	19.1	46.2
6	16.0	41.3

1/ Capitalization calculations are similar to those for value added by manufacture in table 28.

Table 30.- Estimated annual cut and growth per acre required under sustained yield to make its present net worth equal that of liquidation at various interest rates.

Interest rate	Required annual cut	Required annual growth per acre: Under potential working circle of 167,438 acres	Required annual growth per acre: Under theoretically enlarged working circle of 310,391 acres
Percent	M bd. ft.	Bd. ft.	Bd. ft.
2	20,150	120	65
3	26,400	158	85
4	31,000	185	100
5	34,500	206	111
6	37,200	222	120

disposal. In fact several "streets" of one-room shacks that were apparently single men's quarters had only one community privy at the end of each street (figs. 1-4). Big Lakes was worse than Tionesta, for it did not even have electricity, telephone, or solid ground for streets in winter (fig. 5). At Willow Ranch, on the other hand, the dwellings were larger, sometimes finished and painted, and there was evidence of modern sewage disposal systems (fig. 6). Moreover the maintenance of adequate school facilities is made difficult by mills that go in and out of production and fluctuate in their annual output because every time a change is made in the operation of a mill it reflects in school enrollment.

Similar poor conditions exist in the outskirts of Lakeview, a few miles over the line in Oregon, where a larger community than Alturas is supported by several mills. Although all these towns depend on other communities such as Klamath Falls and Lakeview for the better things in life, Klamath Falls itself has a life expectancy of only about 20 years at the present cutting rate (10).

In contrast, 569 out of 654 dwellings tabulated in Alturas, which is the largest and best town in the county, but not a mill town, were estimated to have a value of less than $5,000, but only 32 of these fell under $1,000 (figs. 7, 8). None of the remaining 85 homes were considered to be worth more than $10,000. In addition Alturas has over 100 shops and service establishments, high and elementary schools, both new and modern, the main library of the county system, five churches or religious group meeting places, an Oddfellows Hall, Legion Post Building, cinema, bowling alley, park with tennis courts and baseball diamond, and the county hospital. The County Offices, State Highway Patrol Office, State Employment Office, Soil Conservation Service Office, U. S. Forest Service Office, and the county Agricultural Commissioner's Office are maintained here. Modern conveniences such as a public sewer system, municipal water system, paved streets, sidewalks, and street lighting, also are found in Alturas. Adin is another community of a quality superior to the county average due in part at least to the Edgerton Mill which is on sustained yield.

Establishment of either a temporary or permanent mill at Alturas would definitely stimulate the community. Accompanying construction of the larger mill would be rapid economic expansion similar to that which occurred during erection of the Pickering Mill in 1928.[21] Without preventive measures an expanded Alturas under the larger operation would much resemble the present town of Lakeview in quality, but would be about 50 percent larger. Thirty years comprise a major share of a man's productive life so it is reasonable to believe some permanent homes would be built at the beginning of the period, but probably these would be outnumbered by a shacktown transient fringe on the city's outskirts. New service establishments would be built, schools enlarged, and the whole town would show substantial growth in many respects. After 20 years lapse, however, youths newly grown to manhood would begin to drift outside the community and the county to seek work, because the impending collapse would be foreseen. When the mill closed a mass exodus would necessarily follow, shrinking Alturas to a ghost town of less than 2,000 persons who would again be dependent primarily on livestock and agriculture and probably unjustly burdened with a public debt hangover from the expansionist period.

21/ This project was abandoned due to the depression and for other reasons.

The probable effects of the smaller permanent mill would also be community expansion, but at first on only one-third as large a scale and with greater solidarity. This expansion would not be even proportionally evident for some would be absorbed by slack capacity of existing services and facilities.[22] Permanence in itself is not likely to prevent shack towns around lumber mills, but permanence plus intelligent local encouragement such as zoning restrictions, chamber of commerce activities, building initiative by realtors, and company interest in employee welfare, should in the aggregate stimulate desirable local development. Quite the reverse from a sudden collapse in 30 years, there should be a gradual population growth partly from labor demands of intensive cultural forestry, and partly because a prideful community is like a rolling snowball, enlarging itself as it goes along. The distribution of age classes in the population should remain normal with a proportionate number of young persons finding work and making homes in Alturas.

Extra-community effect of either plan would be to hasten elimination of Tionesta, Willow Ranch, Big Lakes, and Canby through allocation of timber to Alturas and consequent forced dismantling of mills at these other towns. Since these mill towns all offer a low standard of living, the ultimate economic desirability of this action seems unquestionable provided Alturas offers better conditions. This it will do. Nevertheless an adjustment of such magnitude is bound to cause some individuals duress, hardship, and privation.

All in all the choice seems to lie between: (1) marked economic expansion of mediocre quality followed by abrupt, drastic, and permanent retrenchment after 30 years; or (2) a less pronounced but nevertheless material expansion potentially of superior quality that will endure indefinitely.

22/ This slack capacity may be considerable with the result that the smaller mill would cause considerable less than one-third the expansion stimulated by the larger operation.

Figure 1.- Center of Tionesta, mill town of the Shaw Lumber Company. Two center buildings are the general store or commissary and the post office.

Figure 2.- Family dwellings at Tionesta. These are three- and four-room unpainted establishments with outside privies.

Figure 3.- A row of single men's quarters at Tionesta. Fuel blocks are piled in the center.

Figure 4.- One of the one-room unpainted shacks used by single men at Tionesta.

Figure 5.- Big Lakes, logging camp of the Big Lakes Box Company.

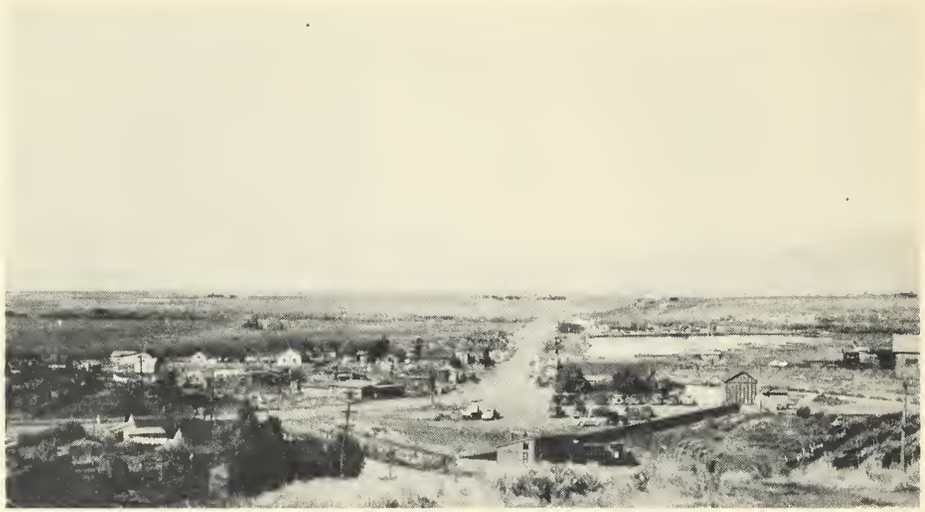

Figure 6.- Willow Ranch, site of the mill of the Crane Creek Lumber Company.

Figure 7.- Alturas, showing about half the residential district.

Figure 8.- Main street and business district of Alturas.

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