Economic significance of federal ownership of Bureau of Land Management administered lands on selected Montana county incomes

by Carlton A Infanger

A thesis submitted to the Graduate Faculty in partial fulfillment"of the requirements for the degree of DOCTOR OF PHILOSOPHY in Agricultural Economics

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Abstract:

In a nation where basic ideologies and institutions are rooted in private ownership, complaints are often voiced that the maintenance of large blocs of publicly owned land within local government boundaries has. a detrimental effect upon the magnitude and growth of incomes and production in these local areas. In order to attempt to answer the questions implied in these complaints, expository efforts were directed toward reviewing the background of when and how federal ownership, particularly of rangeland, developed; what effects the public ownership of this land has on firms utilizing it; how socio-economic progress is affected in counties with large amounts of their land in public ownership; what effects transferring these lands into private ownership might have; and how a change in utilization policy directed toward greater public recreation use of these multiple-use lands would affect the counties' output or income.

From the study of the background of federal range ownership it was determined that ranchers using the land have been successful in keeping the fees at or near administrative cost levels. Through the use of the theory of the capitalization of economic rent into fixed assets it was determined that most of the difference between the level of fee and the value productivity of the land had been capitalized into the ranchers private property. Hence, the inference was made that a minimal effect on the local economies had occurred because the return to the public land had accrued to the local ranchers. This inference was generally substantiated when comparisons of socio-economic phenomena for two groups of counties with different percentage amounts of their land publicly owned showed negligible differences in magnitude and change.

If a program to transfer ownership of the public rangeland at prices based on its capitalized value productivity should develop, severe damage to the ranch firms' capital structure could occur. The amount of damage would be sensitively related to the price paid for the capitalized value of the public land in the private holdings and the firm's debt position. Also, to the extent that the capitalized value of the public land had been included in assessments, shifting these lands into private ownership would not increase the local property tax base.

A framework within which physical and economic data could be used to determine the relative value of increased recreational use of the public land on local economies was developed. Its use will have to await the development of the data it suggests.

The analysis of the data and information used led to the general conclusions that the low fee leasing of the publicly owned rangeland has permitted the public to retain title to these multiple-use lands for the development of their full potential while allowing its value for domestic animal grazing to accrue to its private users.

ECONOMIC SIGNIFICANCE OF FEDERAL OWNERSHIP OF BUREAU OF LAND MANAGEMENT ADMINISTERED LANDS ON SELECTED MONTANA COUNTY INCOMES

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Approved:

Head, Major Department

Chairman, Examining Committee

Dean, Graduate Division

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Any errors of omission or commission are the responsibility of the author.

TABLE OF CONTENTS

TABLE OF CONTENTS (Cont.)

TABLE OF CONTENTS (Cont.)

TABLE OF CONTENTS (Cont.)

LIST OF TABLES

LIST OF TABLES (Cont.)

LIST OF FIGURES

ABSTRACT

In a nation where basic ideologies and institutions are rooted in private ownership, complaints are often voiced that the maintenance of large blocs of publicly owned land within local government boundaries has a detrimental effect upon the magnitude and growth of incomes and production in these local areas. In order to attempt to answer the questions implied in these complaints, expository efforts were directed toward reviewing the background of when and how federal ownership, particularly of rangeland, developed; what effects the public ownership of this land has on firms utilizing it; how socio-economic progress is affected in counties with large amounts of their land in public ownership; what effects transferring these lands into private ownership might have; and how a change in utilization policy directed toward greater public recreation use of these multiple-use lands would affect the counties' output or income.

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CHAPTER I

INTRODUCTION

Since its inception, the federal government has been the largest single landowner in the United States. This ownership, in a nation where the basic ideologies and institutions are oriented toward private ownership, is often hotly debated, particularly with respect to range and forest resources where the federal ownership is concentrated. 1/ Although institutions and values are at the roots of these debates, the inevitable questions of economic efficiency and results may be raised to support one's views or policies. Policy makers may turn to economic arguments when others fail.

Problem Setting

In addition to the opposition to federal ownership of large blocs of land on the basis of a supposed contradiction of the "traditional" institution of private ownership of property, the complaint is often voiced that the existence of this publicly administered land within the boundaries of local government units has a detrimental effect upon these local economies. The general opposition to any federal land ownership implies that such ownership is a newly developed policy for the nation. The complaint implies that: (1) this federal ownership is a causal

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1/ S. V. Ciriacy-Wantrup, "Criteria and Conditions for Public and Private Ownership of Range Resources," Giannini Foundation Paper No. 164, Proceedings of the 11th Annual Meeting of the American Society of Range Management, Great Falls, Montana, January 29 to February 1, 1957.

factor in keeping the incomes emanating from this land at a lower level than would be the case if it were in private ownership; (2) federal ownership is creating an undesirable distribution of the cost of operating these local governments; (3) capital returns from these lands are undesirably different from what they would be if they were in private ownership; and (4) changes in present public administration could improve income levels and distribution. Whether these ideas are valid or relationships of this nature exist should be testable within the frameworks of the history of federal land ownership and known economic theories.

Since federal land is devoted to a variety of uses under various administrative agencies, it should be understood clearly that this work will be concerned primarily with land under the administration of the Bureau of Land Management (BLM) devoted largely to the grazing of animals--either domestic or wild.

Problem Delineation

Ownership

The historical information which is traced in Chapter II illustrates that federal land ownership has been part of the national heritage of the United States since the nation's beginning. It also illustrates that policy toward this federally owned land has developed through a series of stages. One of these stages attempted to transfer much of the land into other than federal ownership. When the policies

and programs for making these transfers failed to achieve their purpose, or lands were determined to be in the best interests of "promoting the general welfare" of the nation if retained in federal ownership, they have been retained or reserved in public ownership. It shall generally be assumed that lands currently in federal ownership will remain there with some small deletions or additions.

Distribution

The development in Chapter II also shows that distribution of federal land ownership is concentrated in the 11 western states. BLM administered lands tend to be concentrated in range lands.

While the present distribution appears to concentrate the use of the BLM administered land in larger ranches, we shall assume that the productivity of the land is not seriously impaired in terms of output of product. This does not mean necessarily that it is being used by firms where the land has its highest marginal value productivity. For example, Gardner has argued that some of the explanation for the difference in the price permits on BLM lands were selling for and what they might be worth was due to restrictions on transfer which kept them from moving into use by ranches where they would have the "greater economic value." 1/ Although this distribution may have been detrimental

1/ B. Delworth Gardner, "Transfer Restrictions and Misallocation in Grazing Public Range," Journal of Farm Economics, XLIV (February, 1962)pp. 50-63.

to the original settlement pattern and development of local businesses (i.e., whether more or less service, retail, or other businesses would have developed under a wider distribution is unknown), it shall be assumed that such a distribution is not detrimental under present economic conditions.

Conservation Levels

While there are questions as to whether it is possible to determine some optimum allowable limit of grazing on a particular range area with the techniques available, it shall be assumed that this level of use is being approached. 1/ The level of use might be greatly improved for either type of ownership, but it is assumed to be comparable whether the land is in public or private ownership. Indeed, much of the controversy over the use of these lands has revolved around the attempts to readjust the destructively depleting levels of use which prevailed at the time of the passage of the Taylor Grazing Act. Concerning levels of conservation Wantrup says:

> Range conservation by itself has no clear meaning in terms of a certain level of range productivity that should be preserved indefinitely. Range productivity is increasingly man-made. This raises the question what productivity level should be aimed at and to what extent productivity variations over time should be tolerated--for example, in periods of drought or economic

1/ See N. K. Roberts, "Economic Foundations for Grazing Use Fees on Public Lands," Journal of Farm Economics, Vol. 45, No. 4, (November, 1963) pp. 721-731.

> depression. Furthermore, in an attempt to connect range conservation with public interest, the question arises which level of productivity is regarded as the social "optimum." 1/

Although the question as to what the level of conservation is will not be answered, the above assumption will be used.

Control

The historical information contained in Chapter II illustrates the effective manner in which ranchers using this public land were able to retain control of its administration, although title remained with the nation. This control resulted in the establishment of fees, for the use of this public land, below the land's value productivity. From the theory developed in Chapter III it is expected that the difference between the fee and the value productivity will be capitalized into the private holdings which utilize the low fee public land. The effectiveness of this control and its possibility for keeping the value of the public land in private users' hands leads to the hypotheses.

Problems and Hypotheses

Using the above background and assumptions and those developed in Chapters II and III--along with other specific assumptions developed in the analysis of empirical data--an attempt will be made to determine whether there are differences in the value of firms utilizing

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1/ S. V. Ciriacy-Wantrup, op. cit.

large as compared to those using smaller amounts of these public grazing lands. Since it is expected from economic theory and cited references that low factor costs tend to be capitalized into fixed assets, the hypothesis that there is a non-significant difference in their value is made.

As corollaries, it is hypothesized: (1) that the nearer the factor cost (grazing fees) approaches zero, the more nearly will the capital return to that factor stay with the ranch firm operator; (2) that in-lieu payments, under unit assessment, should approach zero as the factor costs approach zero and vice versa; and (3) that under Montana's current assessment practices a windfall in decreased taxes may accrue to the users of the land in accordance with the amount of the public lands used. In short, it is a test of the model which "can serve as a hypothesis to be tested by empirical procedures" proposed by Roberts. 1/

If the above hypothesis is verified, the further hypothesis is made that there are non-significant effects from federal land ownership on the counties' output (income), or where payments to capital go.

Procedures and Methodology

Given the frameworks referred to and the data they require, an attempt will be made: (1) to trace the role of federal land ownership in the land policies which the nation has pursued since its birth to

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1/ Roberts, op. cit., p. 721.

the present; (2) to determine and isolate the effect federal land ownership and its administration has on the magnitude and distribution of the income of firms utilizing such land; (3) to trace selected socio-economic changes which have occurred through time in a group of those Montana counties having larger amounts of BLM administered land as compared to a group with lesser amounts; (4) to make some prediction as to the changes in economic activity which might occur if these lands were to be transferred to private ownership; and (5) to illustrate the possible effects of a given change in public administrative policy. The analysis and interpretation of the above steps should provide information upon which valid conclusions as to the effects large amounts of federally owned land, under given administrative practices, has on the economies of local areas in which it is located.

In addition to the information previously cited as contained in Chapter II, it develops the historical framework of national land policies through which the present federal ownership and control of BLM administered land came to be.

In Chapter III the theoretical input-output framework is developed within which possible effects from federal ownership could be tested. In addition it includes the expected directions in which present federal ownership and administration might have changed the incomes of these local areas.

In Chapter IV the first hypothesis and its corollaries are tested by using data obtained from secondary sources and a survey of ranches with varying dependency upon the BLM administered lands. An attempt will be

made to determine whether there are differences in the amount of carrying capacity controlled from other than BLM sources in equal-sized firms utilizing greater or lesser percentages of BLM administered land. If there are differences, it can be expected that they will be in the form of a linear regression in the mathematical form of $Y=f(x)$, where Y is the non-BLM administered land carrying capacity and x is the percent dependency on BLM administered land. No attempt will be made to measure this regression in a formal sense, but an attempt will be made to measure whether there are differences between groups of ranches having varying amounts of dependency.

In Chapter V the hypothesis that there are non-significant differences in counties' outputs (or incomes) with and without large amounts of BLM administered lands is tested in a second manner. This is done by comparing selected economic and sociological data, from secondary sources, for the two groups of counties. The procedure will generally follow one used by Goldschmidt in his study of the cities of Arvin and Dinuba and their surrounding trade areas, the details of which are found in Chapter V. 1/

Chapter VI uses the analysis of Chapter IV and secondary data sources to develop the expectations from moving the lands under consideration into private ownership.

Chapter VII develops the background of and information which would be required to make a determination of what effects the suggested changes in use of this land would have on the local areas' incomes.

1/ Walter R. Goldschmidt, "Small Business and the Community," U.S. Congressional Record, 79th Congress, 2nd Session, 1946, Senate Committee Print, No. 13.

CHAPTER II

OUTLINE OF THE HISTORY AND DEVELOPMENT OF FEDERAL LAND OWNERSHIP AND ADMINISTRATION

An essential part of the framework necessary for understanding the effects of publicly owned lands is the history and background of how federal ownership of land developed. Equally important is a knowledge of the group interests that shaped the policies under which these lands are administered. This chapter is developed as an aid to reviewing the information available on policy development, and to illustrate the possible effects of these policies.

Historical Setting

Federal land ownership has gone through or is in one of four non-mutually exclusive phases or eras in terms of either time or purpose. These four major eras have been identified as: "acquisition," "disposal," "reservation," and "management." 1/ The "acquisition" period is concerned with how, when, and from whom the federal government acquired lands. the "disposal" era covers when, to whom, and how the federal government transferred title of its land to other public or private interests. The "reservation" phase was, or is, carried on in an effort to reserve certain lands in public ownership for a greater "social-benefit." The "management era includes the time in which programs for achieving the purposes for which the reserved lands were set aside are developed and

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1/ Marion Clawson and Burnell Held, The Federal Lands: Their Use and Management, Baltimore: The Johns Hopkins Press, 1957, p. 16.

carried out. The complete details of the first three of these eras are beyond the scope or need of this work. Only a brief summary of some of the major points of the "acquisition," "disposal," and "reservation" phases are covered herein to establish the historic-political setting of the "management" period.

"Acquisition"

The federal government of the United States literally became a landowner at its birth. Of the original 13 newly independent states in 1776, seven claimed lands west of the Applachian Mountains while six made no such claims. The six have-nots fearing unequal economic or political advantage placed national ownership of these western lands as a prerequisite to ratification of the Articles of Confederation. Yielding to their pressure, New York ceded its claim on March 1, 1781. 1/ On promises that the other six western land claimant states would also relinquish their claims--which they did between 1781 and 1802--Maryland signed the Articles of Confederation on the same day. 2/ Although these Articles of Confederation were to be replaced by the Constitution in 1789, they served as the basis of a federal government in a new nation. With this cession of lands by these seven states, the United States became a landowner. Also with the

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1/ Benjamin Horace Hibbard, A History of the Public Land Policies, New York: Peter Smith, 1939, p. 9.

2/ Ibid.

acceptance of these cessions, she began a long period of acquisition and disposal of land.

Following the completion of the cession of lands by the states in 1802, the federal government acquired 827,987 square miles from France by the Louisiana Purchase of 1803. 1/ Although this purchase was not primairily for land as such, but rather for control of shipping on the Mississippi River, it added a significant amount of land. The purchase of Florida in 1819 from Spain was next in the series of acquisitions. 2/ The annexation of Texas in 1845 was next; however, of the 389,166 square miles contained in the Republic of Texas less than one-third (123,270 square miles) came into federal ownership by purchase in 1850. 3/ A settlement with England on the Oregon Territory in 1846 added an additional 286,541 square miles. 4/ The Treaty of Guadalupe Hidalgo of 1848 added 529,189 square miles--most of the Southwestern area of the 48 contiguous United States. 5/ The Gadsden Purchase of 29,670 square miles along the United States-Mexico boundary in present day Southern Arizona and New Mexico completed acquisition of the territory currently within

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1/ Ibid., p. 4.

2/ Ibid, p. 17.

3/ Ibid., p. 19. Unoccupied lands within the boundaries of the State of Texas became state lands.

4/ Ibid.

5/ Ibid, p. 21.

the boundaries of continental United States. 1/ Other acquisitions of island possessions and Alaska, although important, were not additions to the contiguous continental land area.

"Disposal"

While the federal government was actively pursuing the acquisition of land, it was nearly as active in a program of distribution. The prevailing policy appeared to be one of moving it into private hands, at least initially. With the acquisition of the lands ceded by the states in the 1781-1802 period, the nation began with the Land Ordinances of 1785 and 1787 attempting to transfer this land ceded by the states in the 1781-1802 period to settlers or other interests. These ordinances laid the basis for the rectangular survey with its square townships, six miles on a side, and 36 sections each. 2/ They also served as a basis from which new states could be formed, later land laws could be developed, land prices established, and a democratic land distribution could be achieved. These two ordinances, which required minimum purchases of 640 acres at $1 an acre in cash, were followed by later laws which reduced minimum sizes of purchases, changed prices, and made land credit available. 3/

1/ Ibid., p. 22.

2/ Wayne D. Rasmussen, Readings in the History of American Agriculture, Urbana: University of Illinois Press, 1960, pp. 36-41.

3/ Harold Underwood Faulkner, American Economic History, New York: 8th Edition, Harper and Brothers, 1960, pp. 173-4.

Notable provisions were found in the laws of 1800, 1820, 1832, 1841, and 1862. 1/ The law of 1800 reduced the minimum tract to 320 acres, raised the price to $2 per acre, and established installment buying. The 1820 law further reduced the minimum tract to 80 acres and lowered the price to $1.25 per acre. The minimum tract was reduced to 40 acres at $1.25 per acre by the law of 1832. Settlement before survey was legalized by the Pre-emption Law of 1841 and payment was delayed until after survey. The frontiersmen had achieved, through these laws, many of their desires. Land was available in quantities they considered useful and the legalizing of pre-emption allowed them to settle where and when they wanted. While it would still be over 20 years until a free land law would be passed in 1862, settlement was now largely at their discretion.

Homestead Acts. The Homestead Act of 1862 allowed free land up to 160 acres, provided it was lived on and improved upon over a period of five years. This and the series of laws up to 1841 illustrate the steps in reshaping the nation's land policy from the carry-over idea of the large estates and feudalistic systems of Europe to the more democratic individual ownership demanded by those living on and developing the American frontier. Unfortunately, by the time the Homestead Act was passed, the humid lands east of the 98th Meridian to which it would have been most applicable were

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1/ Robert Dunbar, "Creation of Public Domain," unpublished lecture, Montana State College, October 1962. The provisions cited are adapted from notes on this lecture.

largely taken up. Of the lands west of the 98th Meridian, Kraenzel says, "The 160 acre acre homestead was totally inadequate for providing the income necessary to support a family and the institutions necessary on the land." 1/ While Kraenzel was writing nearly a century later and had access to considerable "hind-sight," there were those of the mid-18th century who were visionary or prophetic in the light of later developments. 2/

The Congresses elected after 1862 rapidly began to realize the inadequacies of the Homestead Act for transferring western land to private ownership. These Congresses made a number of changes in earlier land laws and passed new ones in an effort to move the remaining land into private hands. Only 11 years after the passage of the Homestead Act they passed the Timber Culture Act which permitted 160 acres in addition to the homesteaded 160 acres if 10 acres of trees were planted and raised for eight years. 3/ This they followed with the Desert Land Act of 1877 which allowed a settler in selected western states and territories to "purchase one section (640 acres) of land if he agreed to irrigate it within three years of filing." 4/ This was in addition to the 160 acre homestead, but

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1/ Carl Frederick Kraenzel, The Great Plains In Transition, Norman: University of Oklahoma Press, 1955, p. 179.

2/ See Chapter IV of Joseph Kinsey Howard's Montana High, Wide, and Handsome, New Haven: Yale University Press, 1943.

3/ Hibbard, op. cit., pp. 414-415.

4/ Roy E. Huffman, Irrigation Development and Public Water Policy, New York: Ronald Press Company, 1953, p. 19.

the wording of the act was so vague that numerous abuses developed which were only partially stopped by a modified law of 1891 which reduced the allowable acres to 320. (The Desert Land Act specifically recognized the close tie between land and water in western United States.)

Other modifications were to be made later in the Homestead Act, but by 1879 Congress had become sufficiently concerned to appoint a Public Lands Commission. 1/ In the employ of this Commission was one John Wesley Powell. He was chief among those able to see and voice the difficulties in transferring the land west of the 98th Meridian to private ownership by the then existing laws. 2/ Among the major points of his report are the recommendations that:

1. Homesteads in the arid area be 2560 acres.
2. Homesteads be 40 or 80 acres if they could be irrigated.
3. The rectangular survey be abandoned and surveys according to watersheds to allow as many homesteads along streams and water sources as possible.
4. Settlements be of a village type to prevent isolation that might otherwise occur.
5. Pasturage districts be set up to allow grazing in common by the homesteaders.
6. Water and land rights be inseparable.

That these recommendations were much beyond the thinking of the Congresses of that day is emphasized by the inadequate legislation passed even after

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1/ E. Louise Peffer, The Closing of the Public Domain, Stanford: Stanford University Press, 1951, p. 12.

2/ See his Report on the Lands of the Arid Region of the United States, Cambridge: Harvard University Press, Third Edition, 1962.

they were forcibly reminded of the need for a more suitable policy for this region by the report.

In 1909 Congress passed the enlarged Homestead Act which permitted 320 instead of 160 acres. It was followed in 1912 with a Three-year Homestead Act--of which Webb says, "This act seemed to grow out of the realization that on the remaining land the average family could not hold out for five years. The point of starvation was reached short of that; and, consequently, it would be humane to shorten the required time of residence to three years." 1/ In 1916 Congress passed the Grazing Homestead Act which permitted 640 acres, if the land was primarily suited only to grazing. This Act also created a size which was too small, and as the awareness grew that federal ownership of these lands might become permanent, it became the last of the inadequate acts designed to move the available western lands into the ownership of settlers. All were far short of recognizing the problems that existed in developing adequately sized ranch units; none approached the recommendations of Powell.

"Generally speaking, the Homestead Act of 1862 and its succeeding modifications came too late to fit the area remaining open to homesteading. The result was unnecessary human hardship and failure, deterioration of the range, and accelerated erosion. 'Too little and too late' best

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1/ Walter Prescott Webb, The Great Plains, New York: Grossett and Dunlap, 1931, p. 423.

summarizes the Homestead Acts." 1/ These acts, to get the land into the hands of settlers, were accompanied by others designed to move land into other than federal ownership by grant.

Land grants. The granting of lands to states began with the land laws of 1785 and 1787. In these and subsequent laws, lands amounting to from one to four sections per township were granted for the support of the common schools. 2/ To this basic type of grant were added grants for colleges, public development, irrigation projects, and transportation development. A summary of the magnitude of the above and other disposal plans is shown in Table I.

TABLE I. SUMMARY OF THE DISPOSAL OF PUBLIC DOMAIN LANDS TO 1950.*

Receivers	Million Acres
Patented to homesteaders	285
Granted to states	225
Granted to railroad corporations	91
Sales and other disposal including private claims	430
Total public land disposed of	1,043

*Source: Marion Clawson, Uncle Sam's Acres, New York: Dodd, Mead and Co., 1951, p. 1.

1/ Phillip O. Foss, Politics and Grass, Seattle: University of Washington Press, 1960, p. 37.

2/ Marion Clawson, Uncle Sam's Acres, New York: Dodd, Mead and Company, 1951, pp. 70-71.

Quantity of federal land over time. A running comparison of federally-owned land with the total area of the Continental United States is shown in Figure 1. A rough breakdown of ownership of land in the 48 contiguous United States in 1960 is shown in Table II. Obviously acres alone do not constitute a valid comparison as different acres are useful and valuable for different purposes. For example, the federal government owns little farm land, but much wilderness land. A brief discussion of the types of lands owned by the federal government and their locations is given in the section below.

TABLE II. RELATIVE DISTRIBUTION OF LAND OWNERSHIP IN THE CONTINENTAL UNITED STATES, 1960.*

Type of Land	Million Acres	Percent of Total
Owned by the federal government	408	21
Managed by federal government for Indians	57	3
Owned by states	80	4
Owned by counties and municipalities	17	1
Remainder presumably owned privately including corporations, co-operatives, units, etc.	1,342	71
Total	1,904	100

*Source: Marion Clawson, R. Burnell Held, and Charles H. Stoddard, Land for the Future, Baltimore: The John Hopkins Press, 1960, p. 43.

"Reservation"

As illustrated in Figure 1 and Table II, the federal government is, and has been, a landowner of some proportion. As already indicated, land

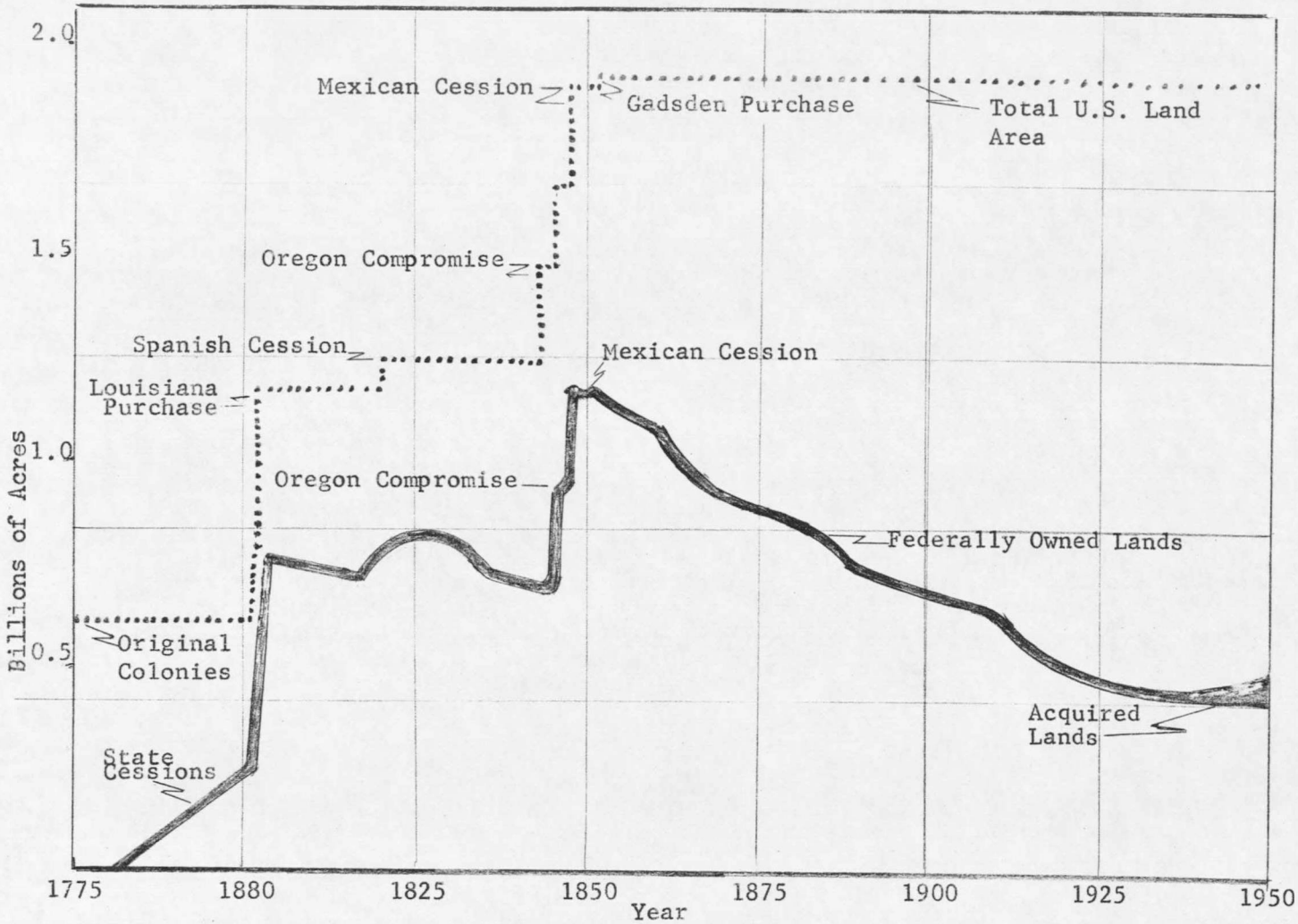

Figure 1: Approximate Area of Federal Lands in the Continental United States, 1781-1950.

Source. Adapted from Marion Clawson, Uncle Sam's Acre's, New York: Dodd, Mead and Co., 1951, p.3 and Marion Clawson, R. Burnell Held, and Charles H. Stoddard, Land for the Future, Baltimore: The John Hopkins Press, 1960, p. 43.

unsuitable for transfer into private hands by the laws prevailing in the late 19th and early 20th centuries resulted in "reservation by default." Other lands were set aside for specific purposes when "about the year 1900 a great number of men prominent in politics, educators, editors, and others of public spirited character became suddenly awakened to the patent fact that the national resources of the country could not be lavishly used and wantonly wasted indefinitely without greater danger of ultimate disaster."1/ The emphasis placed on reservation at this time was forcibly brought before the general public by the fast growing "conservation movement" whose leaders were dedicated to the preservation of our national land heritage.

While the federal government had been a large land holder, the amount intentionally held for perpetual ownership was probably limited to small tracts, for military or other specific purposes, until 1872. In that year the "first major reservation . . . had taken place when Yellowstone National Park was set aside . . . "; additional parks, monuments, and sites have been set aside in ensuing years, until by 1951 they numbered 174. 2/ Their total amounted to approximately 12 million acres, as shown in Table III.

The first comprehensive bill to create forest reserves was introduced in Congress in 1871. 3/ However, not until an amendment was attached to

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1/ Hibbard, op. cit., p. 472.

2/ Clawson, op. cit., p. 102.

3/ E. Louise Peffer, op. cit., p. 15.

TABLE III. FEDERALLY-OWNED LAND IN THE 48 CONTIGUOUS UNITED STATES BY PRINCIPAL MANAGING AGENCIES AND BY METHOD OF ACQUISITION, JUNE 30, 1961. *

Agency	Method of Acquisition		
	Public Domain	Acquired	Total
	(Million Acres)		
Department of Agriculture--Forest Service	139.2	26.1	165.4
Department of the Interior:			
Bureau of Land Management	175.2	2.4	177.6
National Park Service	11.1	4.2	15.3
Fish and Wildlife Service	5.3	2.9	8.2
Bureau of Reclamation	7.6	1.6	9.2
Department of Defense	14.2	17.3	31.5
All other agencies a/	2.0	2.1	4.0
Total	354.6	56.6	411.2

*Source: U.S. Dept. of Interior, Bureau of Land Management, Public Land Statistics, Washington, D. C., 1962, pp. 13-27.

a/ Including bureaus, other than those named in the Departments of Agriculture, Defense, Interior, and trust properties.

an 1891 act to repeal the Timber Culture Laws was authorization granted the Presidents to withdraw public forest lands. Under this authorization

17,500,000 acres were set aside for withdrawal. 1/ Under the Sundry Civil Appropriation Act of 1897, President Cleveland set aside an additional 21,379,840 acres. 2/ President Theodore Roosevelt added other reserves until they totalled 60,175,765 acres in 1902; 106,999,138 acres in 1906; and 167,677,749 acres in 1909. 3/ In addition to these major withdrawals others were added and some purchases were made so that the total land administered by the various federal agencies in 1961 were as shown in Table III. Each of these types of lands have some of their own distinct management problems.

"Management"

Clawson and Held divide the management era into two phases: custodial and intensive. 4/ For them, the era of custodial management began nearly simultaneously with, although somewhat later than, the reservation period. For them, one of the major features of the custodial phase was the opening of the reserved land to use under supervision as to fire, trespass, and utilization control--an extensive type of management in economic terms. They also included in this custodial era some of the measures developed or used to acquire, exchange, and prepare lands for more intensive management. It is in this custodial era that the policies and

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1/ Ibid., p. 17.

2/ Ibid.

3/ Ibid., p. 107.

4/ Clawson and Held, op. cit., pp. 29-35.

programs for the federal government to become a landlord in perpetuity were being developed.

The creation of the National Parks, Forest Reserves, Taylor Grazing Districts and other types of reserves was established amid much controversy. The details of this controversy over federally owned lands are covered in previous references cited. 1/ There were those who opposed federal ownership in any form. Others were opposed to unused reserves advocated by the most avid conservationists. Finally there were the compromisers and managers who saw that there could be reserves, use, and management in combination. It was the wisdom and thinking of this group which emerged out of the controversy.

The present discussion will largely be limited to those lands administered by the BLM; however, the general methods and principles utilized may have application for other public land ownership situations of a parallel nature. Here it is sufficient to record that when the laws and programs, under which the public grazing lands could be transferred to private ownership, failed to accomplish their objective and no regular enforcement or management was carried out on the public lands, they fell victim to widespread and severe abuse. Under these conditions the use of the public land literally went to those who got there first with the most livestock. The rights to these unappropriated lands were so ill-defined as to make them a "fugitive resource" subject to very depleting abuses where "every

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1/ See especially Peffers, The Closing of the Public Domain.

user tries to protect himself against others by acquiring ownership through capture in the fastest possible way." 1/

According to Foss, "The old lawless west of range wars and conflicts between homesteaders and stockmen, and between cattlemen and sheepmen, was lawless not because it was populated by a peculiar breed of hyperaggressive and unscrupulous people, but because of political acts which resulted in land policies that were not suited to the region and that had the effect of encouraging conflict, insecurity, and disrespect for law." 2/ Attempts to get management legislation was undertaken only after those who stood to gain from the use of the federal range could see that unless steps were taken there would be nothing left to contend over. Deterioration was evident; according to Foss the "percentage of range depletion varied from a low of 30 percent in national forests to a high of 67 percent on the public domain." 3/ Action became necessary if anything was to be preserved. The era of intensive management spoken of by Clawson and Held began for the public grazing land with the passage of the Taylor Grazing Act.

Taylor Grazing Act. The major management legislation for federally-owned rangelands ouside forest reserves is commonly known as the Taylor

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1/ S. V. Ciriacy-Wantrup, Resource Conservation Economics and Policies, Berkeley: University of California Press, 1952, p. 142.

2/ Foss, op. cit., p. 30.

3/ Ibid., pp. 33-34.

Grazing Act. This act was passed in 1934 after over one-third of a century of debates as to what level of government, if any, should own the public grazing land; which government bureau should administer it; and how users would pay for the services the land could provide. The provisions of the act, briefly stated below, are the result of over a quarter of a century of developing leasing principles for forest, mineral and other lands and applying them to grazing land when it "became increasingly apparent that the homestead acts were no longer practical" . . . and . . . "stockmen . . . began to realize that unrestricted competition for the free range was destroying the forage and was responsible for range wars and the instability of the western livestock industry dependent on the public lands. It became increasingly clear that some kind of regulations or control was imperative." 1/ The first bill introduced into Congress to lease public grazing lands was that by Senator Foster in 1899. 2/ Each succeeding Congress was presented a similar bill, but no regulatory measure was passed until the Taylor Grazing Act of 1934.

The three main objectives of this act were set forth in its preamble. They are: (1) "to stop injury to the public grazing lands by preventing over-grazing," (2) "to provide for their orderly use, improvement, and development," and (3) "to stabilize the livestock industry dependent

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1/ Ibid., p. 71.

2/ Ibid., p. 71.

upon the public range." 1/ In order to reach these objectives it gave authority to (1) establish grazing districts, (2) exclude lands previously reserved to forests, parks, etc., (3) establish a lease and fee basis, (4) classify remaining public domain as to capabilities, (5) set up rules and regulations for the operation of the districts, (6) make consolidations and simplifications of the land tenure patterns, and (7) make regulations "for co-operation with local associations of stockmen." 2/ (This last provision was changed by amendment in 1939 to give legal status to the "advisory board of local stockmen.")

This act was a major change in rangeland policy. Of it, Calef says, "It was intended to reverse the policy completely with respect to the unreserved public domain from free, unregulated common use to leased, regulated, exclusive use." 3/

Although this act apparently followed in the steps of those controlling other reserved lands, many of its backers felt that it would only be a temporary measure for the lands until they could be transferred to state or private ownership. Thus the phrase "pending the final disposition" of the public domain appears in the preamble of the act. Clawson and Held said, "This phrase was rather clearly a political compromise, necessary

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1/ Wesley Calef, Private Grazing and Public Lands, Chicago: University of Chicago Press, 1960, pp. 52-53.

2/ Ibid., pp. 55-56.

3/ Ibid., p. 57.

to alleviate the opposition of those who did not want permanent federal ownership of the land. It has repeatedly been cited to suggest that the lands are at some time to be transferred to private or state ownership; but this has not, thus far, seriously affected their actual administration and conservation." 1/

Calef says, "Probably too much emphasis has been placed on the phrase. One Congress cannot irrevocably commit the people of the United States and their congressional representatives to a particular course of action. Future Congresses will act with respect to these lands in the way they think best, which is what they would have done with or without the inclusion of the 'pending' phrase in the Taylor Act." 2/ In any event, the land has remained in federal ownership and control since the passage of the act 29 years ago. It seems generally agreed that in the foreseeable future it will remain in federal ownership. The Taylor Grazing Act was a major step in "closing" the public domain to settlement.

Likelihood of Continued Federal Ownership

Peffer carefully explained what she meant by "closing" as follows:

1. Closing out by transfer of title;

2. Closing to the operation of the land laws by segregation, withdrawal, or reservation (categories of land once withdrawn or reserved are no longer a concern in this account except insofar as administration of the areas involved influenced the trend of general land policy);

1/ Clawson and Held, op. cit., p. 34.

2/ Calef, op. cit., p. 53 f.n.

3. The closing of opportunity because of the inapplicability of the land laws to most of the land which remains, and the unwillingness of the country as a whole, through representatives in Congress, to agree to significant liberalization of the terms of disposition.

   In this context, 'closing' does not mean 'ending,' nor does it mean that the door is tightly locked and sealed. 1/

Peffer, writing of the 1947 committee investigations of Representative Barrett of Wyoming following attempts by the forces behind Senator McCarran to move rangelands into private ownership, states:

> The cumulative evidence before the Barrett Committee emphasized the pronounced shift that has taken place during the course of the present century in western sentiment with respect to public land policy, by revealing the extent to which the West has accepted the idea of federal ownership of much of its area and has turned that fact to its advantage. Dissatisfactions will persist, adjustments in use will be continuous as conflicts in interests appear, and sporadic attempts to reverse established policy may be expected. Nevertheless, future changes in land practice, policy, and jurisdiction will in all likelihood be made within the framework of federal ownership, as long as those changes are not made at the expense of the West. 2/

To the works and words of Peffer can be added those of Ely and Morehouse, who state:

> Whenever a rapid development of land has been desirable, we have put it in the hands of private individuals. On the other hand, when it seemed necessary to withhold land from exploitation, that is, to conserve the services of the land, we have in some instances, transferred it to public ownership. In this way the sphere of public property has first been contracted and later extended, which amounts to the same thing as

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1/ Peffer, op. cit., p. 6.

2/ Ibid.

> extending the sphere of private property and then contracting it. 1/

Clawson and Held also accept the closing for they state:

> One assumption is basic to the entire study; that for an indefinite period into the future the acreage of land in federal ownership will show no major change from the present--377 million acres, excluding Indian lands which are not federally owned, and military reservations. This assumption rests on the belief that the basic policy issue as to the role of federal lands in our national economy and society has been settled, and that the people of the United States will not agree to major additions to federal land holdings nor to major disposition of them. 2/

For them this assumption means that there will continue to be some exchanges and sales of lands but it probably would not exceed five percent of the total federally-owned lands--much the same as Peffer's closing meant to her. 3/ Indeed they are assuming that such transfers would be part of an overall management plan. This general assumption that the land currently in federal ownership will generally remain there is accepted for a basis in this work. Under this assumption, the economic significance this ownership has, under the management programs in operation or proposed, will be considered. Those lands under the administration of the Bureau of Land Management shall be of principal concern; attention is now turned to these lands.

1/ Richard T. Ely and Edward W. Morehouse, Elements of Land Economics, New York: Macmillan Company, 1924, p. 171.

2/ Clawson and Held, op. cit., p. 5.

3/ Ibid., also see Peffer, op. cit., p. 313.

Extent and Distribution of Land Administered by the BLM

That the BLM has any land to manage is somewhat paradoxical in that its very existence came out of a struggle to convert much of the lands it administers into private hands. After appropriations were cut so low as to make the old Grazing Service ineffective, it was further humiliated by merging it with the General Land Office to form the Bureau of Land Management. 1/ From this beginning, by 1960 the BLM was administering lands in 28 of the 50 states. The distribution of these lands by state is shown in Table IV. The bulk of these lands in the 48 contiguous United States are in the plains and western states with smaller amounts in some of the southern and eastern states. Alaska has more than one-half of all BLM administered land.

In terms of total acres or percentage of total acres in the United States the federal government must be considered a large land holder. Since the BLM administers 175.2 of the 354.6 million acres owned by the federal government (see Table III) and more than any other single federal agency, it too must be considered a large holder (in an administrative sense). However, numbers of acres can be misleading. The productivity of these lands varies widely both within and among land use types. It seems generally agreed, irrespective of this variation within federal land, that these lands are "on the average" of a lower productivity than lands

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1/ Peffer, op. cit., p. 271.

TABLE IV. DISTRIBUTION OF LANDS ADMINISTERED BY THE BLM BY STATES.*

State	Public Domain	Acquired a/	Total
	(Acres)	(Acres)	(Acres)
Alabama	3,043.0		3,043.0
Alaska	322,408,642.8		322,408,642.8
Arizona	13,021,678.0	39,127.0	13,060,095.0
Arkansas	3,059.0		3,059.0
California	15,980,164.0		15,980,164.0
Colorado	8,345,780.0	37,538.7	8,383,318.7
Florida	1,394.0		1,394.0
Idaho	12,100,004.0	73,377.5	12,173,341.5
Illinois	254.0		254.0
Indiana	13.0		13.0
Kansas	1,431.0		1,431.0
Louisiana	10,823.0		10,823.0
Michigan	5,140.0		5,140.0
Minnesota	77,688.0		77,688.0
Mississippi	4,467.0		4,467.0
Missouri	280.0		280.0
Montana	6,441,588.0	1,902,046.8	8,343,634.8
Nebraska	10,105.0		10,105.0
Nevada	47,357,392.0	3,395.6	47,360,737.6
New Mexico	13,906,643.0	270,844.0	14,177,487.0

TABLE IV. DISTRIBUTION OF LANDS ADMINISTERED BY THE BLM BY STATES (Cont.)

State	Public Domain	Acquired a/	Total
	(Acres)	(Acres)	(Acres)
North Dakota	83,937.0		83,937.0
Oklahoma	35,602.9		35,602.9
Oregon	15,349,824.0	94,962.4	15,454,786.4
South Dakota	285,485.0		285,485.0
Utah	24,312,518.0	18,767.8	24,331,285.8
Washington	368,732.0		368,732.0
Wisconsin	1,533.0		1,533.0
Wyoming	17,602,520.0	10,021.8	17,612,541.8
Total	497,729,690.7	2,450,041.6	500,179,732.3
Sans Alaska	175,321,047.9	2,450,041.6	177,771,089.5

a/ Acquired acres refers to the land brought under federal ownership by purchase, condemnation, or gift, or by exchange for purchased, condemned, or donated lands, or for timber on such lands.

*Source: U.S. Department of Interior, Statistical Appendix to the Annual Report of the Director, Bureau of Land Management, to the Secretary of the Interior, Washington, D. C., 1961, pp. 2 and 17.

held for general uses by private interests. 1/ They may be even of lower productivity than lands in similar use held by private interests, but this

1/ This could become a hypothesis to be tested as some evidence indicates that, at the margin, public and private land may be about equal in productivity.

also varies from area to area. With the above qualifications a better perspective can be had of the fact that the federal government "owned land . . . and administered reservations . . . amounting to 456 million acres, or almost . . . 24 percent of the total land area of the United States." 1/

Over half (54 percent) of all the land in the 11 western states is federally owned. 2/ Within these 11 western states, the percent of the total land varies from a low of 35 percent in Washington to a high of 85 percent in Nevada. 3/ Outside the 11 western states the percentage varies from lows of 0.6 percent in Kansas and Maine to a high of 18 percent in South Dakota. It seems quite obvious that the federal land ownership, and particularly that administered by BLM, is concentrated in the "range states" and in rangeland.

A comparison of the percentages of the land in these states administered by BLM with their total land area is shown in Table V. Of the 11 western states, Nevada has the highest percentage, 67.4; Washington the lowest, 0.86. The BLM administers 23.54 percent of the total land area of these 11 western states. Although comparing numbers of acres without also considering productivity can be misleading, the location and distribution of BLM lands indicate that any effects from their federal ownership would be concentrated in the western states.

1/ Clawson and Held, op. cit., p. 36.

2/ Ibid., p. 37.

3/ Ibid., p. 38.

TABLE V. TOTAL LAND AREA OF SELECTED WESTERN STATES COMPARED WITH AMOUNT OF THEIR AREA ADMINISTERED BY BLM, 1960.*

State	Total Land Area	Area Administered by BLM	
	(Acres)	(Acres)	(Percent)
Western States:			
Arizona	72,688,000	13,060,805.0	17.79
California	100,206,720	15,980,164.0	15.95
Colorado	66,485,760	8,383,318.7	12.61
Idaho	52,933,120	12,173,341.5	23.00
Montana	93,271,040	8,343,634.8	8.95
Nevada	70,264,320	47,360,737.6	67.40
New Mexico	77,766,400	14,177,487.0	18.23
Oregon	61,598,720	15,454,786.4	25.09
Utah	62,696,960	24,331,285.8	46.17
Washington	42,693,760	368,732.0	0.86
Wyoming	62,343,040	17,612,541.8	28.25
Sub-Total	752,947,840	177,246,834.6	264.48
		Simple Average	24.04
		Weighted Average	23.54
Plains States:			
Kansas	52,510,720	1,431.0	0.00+
Nebraska	49,031,680	10,105.0	0.02
North Dakota	44,452,480	83,937.0	0.19

TABLE V. TOTAL LAND AREA OF SELECTED WESTERN STATES COMPARED WITH AMOUNT OF THEIR AREA ADMINISTERED BY BLM, 1960 (Cont.)

State	Total Land Area	Area Administered by BLM	
	(Acres)	(Acres)	(Percent)
Oklahoma	44,087,680	35,602.9	0.08
South Dakota	48,881,920	285,485.0	0.58
Sub-Total	238,964,480	416,560.9	0.87
		Simple Average	.17
Total	991,912,320	177,663,395.5	

*Source: U.S. Department of Interior, Statistical Appendix to the Annual Report of the Director of the Bureau of Land Management to the Secretary of Interior, Washington, D. C., 1961, pp. 3 and 17.

BLM Administered Land in Montana

Montana has the second lowest percentage and absolute number of acres administered by the BLM in the 11 western states. The amount and percentage of the land in Montana counties administered by BLM varies as shown in Table VI. Glacier County has the lowest with only 0.134 percent of its land under BLM administration, whereas Prairie County has the highest with 40.82 percent. With the exception of the heavy concentration of BLM administered lands in Beaverhead and Madison counties, where some conditions on ranges are similar to those in plains or eastern area of Montana, these

TABLE VI. AREA OF LAND ADMINISTERED BY BLM AND PERCENT OF TOTAL LAND AREA BY COUNTY, MONTANA, 1948-1949.*

County	Total Land		Area Administered By BLM		BLM Land As % of Total Land Area
	(Sq. Miles)	(Acres)	(Sq. Miles)	(Acres)	(Percent)
Montana	145,878	---	13,738	---	9.136
Beaverhead	5,556	3,554,840	1,018	651,520	18.322
Big Horn	5,033	---	53	---	1.053
Blaine	4,267	2,730,880	724	463,360	16.967
Broadwater	1,243	---	102	---	8.206
Carbon	2,070	1,324,800	369	236,160	17.826
Carter	3,313	2,120,320	802	---	24.207
Cascade	2,659	---	57	---	2.143
Chouteau	3,920	---	208	---	5.306
Custer	3,765	2,409,600	539	344,960	14.316
Daniels	1,443	923,520	13	8,320	.909
Dawson	2,358	1,509,120	94	60,160	3.986
Deer Lodge	738	---	24	---	3.252
Fallon	1,633	1,045,120	81	51,840	11.084
Fergus	4,244	2,716,160	610	390,400	14.373
Flathead	5,177	---	8	---	.154
Gallatin	2,517	---	23	---	.914
Garfield	4,595	2,940,800	1,053	673,920	22.916

TABLE VI. AREA OF LAND ADMINISTERED BY BLM AND PERCENT OF TOTAL LAND AREA BY COUNTY, MONTANA, 1948-1949 (Cont.)

County	Total Land		Area Administered By Blm		BLM Land As % of Total Land Area
	(Sq. Miles)	(Acres)	(Sq. Miles)	(Acres)	(Percent)
Glacier	2,974	---	4	---	.134
Golden Valley	1,178	753,920	19	12,160	1.613
Granite	1,733	---	69	---	3.981
Hill	2,926	---	48	---	1.640
Jefferson	1,651	---	140	---	8.479
Judith Basin	1,880	1,203,200	25	16,000	1.329
Lake	1,500	---	45	---	3.000
Lewis & Clark	3,499	---	144	---	4.141
Liberty	1,459	---	20	---	1.371
Lincoln	3,715	---	8	---	.215
Madison	3,530	2,259,200	409	261,760	11.586
McCone	2,594	1,660,160	338	216,320	13.030
Meagher	2,354	---	28	---	1.189
Mineral	1,223	---	7	---	.572
Missoula	2,613	---	54	---	2.066
Musselshell	1,886	1,207,040	199	127,360	10.551
Park	2,627	---	35	---	1.332
Petroleum	1,651	1,056,640	564	360,960	34.161
Phillips	5,229	3,346,560	1,745	1,116,800	33.371

TABLE VI. AREA OF LAND ADMINISTERED BY BLM AND PERCENT OF TOTAL LAND AREA BY COUNTY, MONTANA, 1948-1949 (Cont.)

County	Total Land		Area Administered By Blm		BLM Land As % of Total Land Area
	(Sq. Miles)	(Acres)	(Sq. Miles)	(Acres)	(Percent)
Pondera	1,643	---	22	---	1.339
Powder River	3,285	2,102,400	394	252,160	22.814
Powell	2,337	---	122	---	5.220
Prairie	1,727	1,105,280	705	451,200	40.822
Ravalli	2,384	---	18	---	1.052
Richland	2,065	1,321,600	88	56,320	4.261
Roosevelt	2,385	1,088,000	12	7,680	1.503
Rosebud	5,032	3,220,480	384	245,760	7.631
Sanders	2,811	---	40	---	1.423
Sheridan	1,700	1,088,000	19	12,160	1.117
Silver Bow	716	---	101	---	14.106
Stillwater	1,797	1,150,080	18	11,520	1.001
Sweetgrass	1,846	1,181,440	27	17,280	1.462
Teton	2,294	---	78	---	3.400
Toole	1,965	---	82	---	4.173
Treasure	984	629,760	18	11,520	1.829
Valley	4,961	3,175,040	1,642	1,050,880	33.098

TABLE VI. AREA OF LANDS ADMINISTERED BY BLM AND PERCENT OF TOTAL LAND AREA BY COUNTY, MONTANA, 1948-1949 (Cont.)

County	Total Land		Area Administered By BLM		BLM Land As % of Total Land Area
	(Sq. Miles)	(Acres)	(Sq. Miles)	(Acres)	(Percent)
Wheatland	1,422	910,080	6	3,840	.422
Wibaux	889	568,960	41	26,240	4.612
Yellowstone	2,635	---	142	---	5.389

*Source: The Montana Almanac, 1959-60 Ed., Missoula: Montana State University Press, 1960, p. 5.

lands tend to be concentrated in the eastern counties. A rough visual comprehension of this distribution can be gained from Figure 2.

The percentage of land in a given state or area gives only a part of the picture these lands present when their distribution within an area is also considered. The rectangular survey, distribution of water holes, the checkerboard grants to railroads, along with the preference patterns of the earlier settlers for the more choice sites have led to a wide scattering of many small isolated tracts. For example, a perusal of the land ownership map of the Malta BLM district of Montana shows that there is only one area where as much as five full contiguous townships are under BLM administration, exclusive of the state school sections. By contrast there are about five rather scattered full townships in the same district

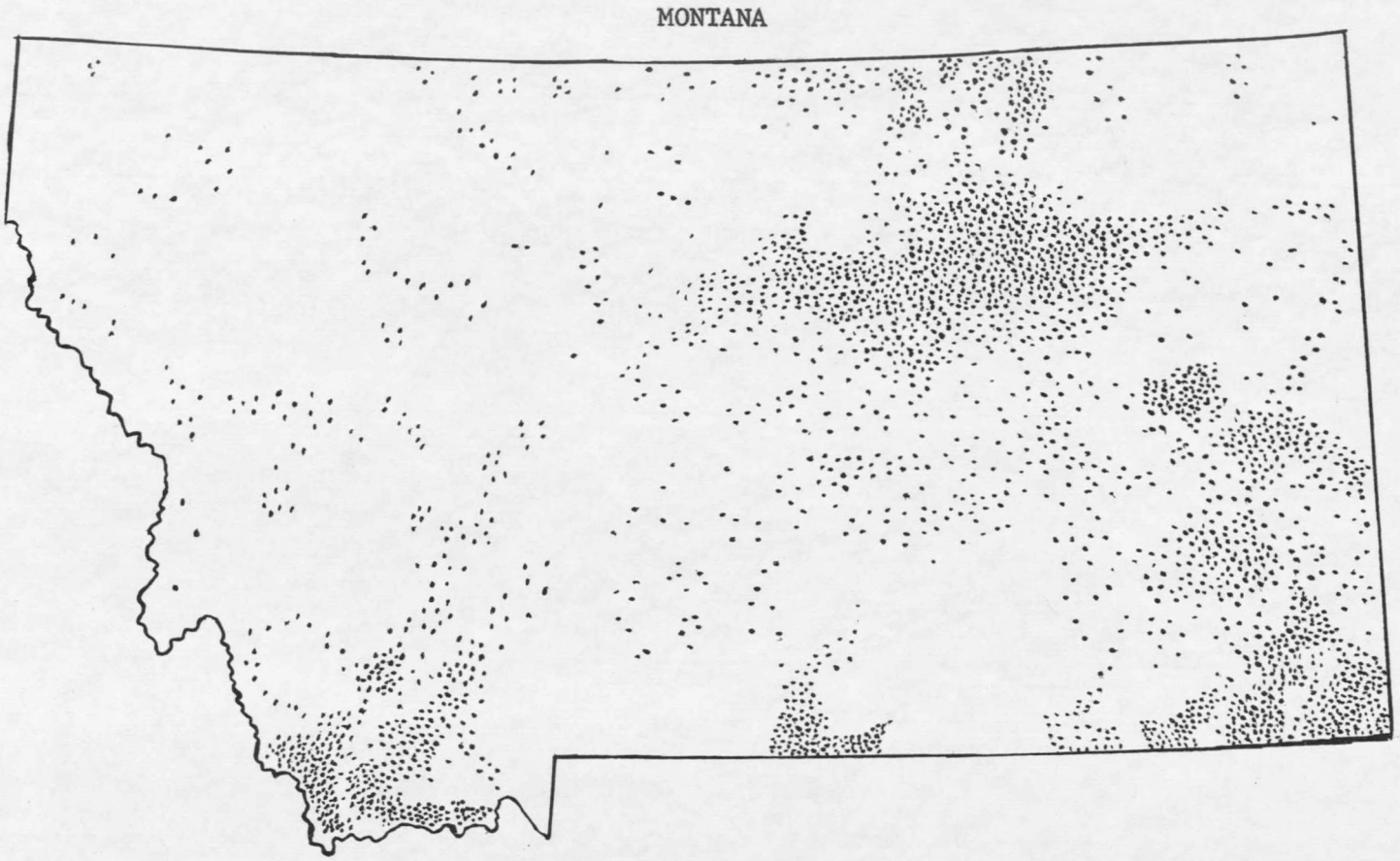

Figure 2. A Schematic Representation of the Relative Distribution of BLM Administered Land in Montana, 1960.

which have no lands under BLM administration. There are about a dozen townships which have less than a section of land in BLM administration--some of these with only a single 40-acre tract. Between these extremes are almost every conceivable combination. Many townships have only the lands along a stream in private ownership. The above situation is not peculiar to Montana, although specific variations from it might be expected. The same general situation is described for Wyoming by Calef in the following:

> The flood plains and low terraces along all the principal streams are in private ownership . . . largest and least interrupted blocks of Taylor land are located in the interstream areas . . . little of the public domain is in uninterrupted blocks . . . 1/

Of this intermingling of public and private lands in general, Clawson and Held wrote:

> The extent of privately-owned land within the boundaries of federal land management units depends largely upon the date the federal unit was established in relation to the history of settlement and economic development of the area . . . at one extreme is Yellowstone Park--established at a very early date . . . at the other extreme are most grazing districts--established comparatively late in western history when all the best lands had already passed into private ownership. 2/

In the Mizpah-Pumkin Creek grazing district, the forerunner to the Taylor grazing districts, "less than 25 percent of the area included was public land, interspersed with other properties." 3/ That the percentage was so

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1/ Calef, op. cit., p. 236.

2/ Clawson and Held, op. cit., p. 49.

3/ Peffer, op. cit., p. 214.

low may have been due to a large acreage of railroad lands in the district. All evidence seems to point out that the BLM administered lands are generally dispersed.

Although there are many BLM administered lands which are used for other than grazing purposes, such lands, other than those used for oil and minerals, are limited in eastern Montana. Here grazing by both domestic and wild livestock is the primary function of these lands. In eastern Montana there are both grazing district land (Section 3) and Section 15 land which is outside districts but leased through BLM. The grazing from both types is distributed to various ranches.

Distribution of Grazing Among Ranches

Second, perhaps, only to the struggle over federal ownership and control of the now BLM administered lands was the question of who should reap how much of the benefits or products of these lands. While this struggle today is important between types of users, at the time of the passage of the Taylor Grazing Act, the major problem to be solved was its equitable distribution among ranchers. Although complete details are unnecessary for present purposes, a review of the nature and results of this process is worthy of consideration.

It has already been pointed out that under the lack of control by government the unappropriated lands were grazed by those livestock growers who got there first with the most livestock. In some cases, in order to prevent others from grazing lands they claimed, ranchers fenced in large areas. In other cases range boundaries were established, in euphemistic

terms, by "gentlemen's agreements." In some cases no agreements were arrived at and range warfare resulted. Foremost among those who would not arrive at agreements were the nomadic sheepmen. Not unexpectedly, they were the first to lose their rights under the local stockmen's associations' guidance of the distribution authorized by the Taylor Grazing Act.

Over-use and general range deterioration were the base upon which the Taylor Grazing Act was passed, and it was obvious that some of the livestock would have to be removed by a system of priorities. A circular setting forth preferences in detail established three classes of priorities:

Priority 1. Qualified applicants with dependent commensurate property and with prior use of public grazing land.

Priority 2. Qualified applicants with prior use, but not adequate commensurate property.

Priority 3. Qualified applicants with adequate commensurate property, but without prior use. 1/

A meeting of western regional stockmen one year after the above priorities were suggested demanded that priorities 2 and 3 be reversed so that "tramp" sheepmen would not have priority over those with commensurate property although they had no history of prior use. This demand resulted in a new order which was "designed to eliminate the 'tramp' operator and largely did so . . . " 2/

1/ Calef, op. cit., p. 60.

2/ Ibid., p. 61.

The system of priorities was obviously set up to give those ranchers who had been most successful in incorporating the public land into their ranch units the advantage in its distribution under the law. In some cases previously illegal fences now became prima facie evidence of prior use--a process whereby a previously illegal act now became accepted; i.e., what they had been taking from the government (howbeit with its "tacit official sanction") they were now given a lease-right to. (In fairness it should be said that it is generally agreed some ranges under fences had been better managed than those not fenced.)

It is difficult to determine how much federal land was under fence at implementation of the Taylor Grazing allotments. It is even more difficult to determine the amount for any particular ranch operation. In 1888 it was reported that at least two companies had a million acres each under fence; while 32 cases under investigation involved 4,431,900 acres with no specific knowledge of how much was actually illegal due to the lack of surveys. 1/ Enclosures of 20 to 50 thousand acres were common; "all told, it was the most unmistakable, wholesale, shameless instance of land grabbing that had yet been practiced in America . . . some had the effrontery to claim in court that a man had a right to as much range as he could fence." 2/ This assertion may have resulted from carrying the idea of pre-emption far

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1/ Hibbard, op. cit., p. 476.

2/ Ibid., p. 477.

beyond the intention of the 1841 law. Even though some extensive but "largely ineffectual" efforts were made to reduce the number and amounts of such cases following the anti-fencing law of 1888, "illegal fences reappeared in numbers during the depression years of the early 1930's . . . " 1/ Irrespective of how the fenced and other allotments were obtained for previous use priority, they stood as validation for the claims to previous use.

> As might have been anticipated large scale, aggressive, alert, politically conscious ranchers tended to seize the initiative and secure election to the advisory boards . . . Everyone concerned with the situation, however, realized that, whatever the reality, it must not be made to appear that the hearings were dominated by the big ranchers and their livestock association. 2/

Irrespective of how they tried to make it appear, the present distribution of use certainly uncovers the true picture. Table VII shows the distribution of permit sizes in terms of number of cattle. It shows that in 1960 the larger (500 or more head) ranchers, who comprise only five percent of the total permittees, are permitted to graze 41 percent of the total cattle and horses. The other 95 percent have the remaining 60 percent for the same year. The top one percent of the permittees have 23 percent of the cattle.

A similar analysis of records of the BLM for the northern Great Plains reveals that the smallest operators who comprised 51.6 percent of the

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1/ Peffer, op. cit., p. 86.

2/ Calef, op. cit., p. 63.

TABLE VII. SIZE-CLASS DISTRIBUTION OF GRAZING PERMITS AND LICENSES ISSUED ON ALL BLM GRAZING DISTRICTS, 1950 and 1960.*

Size of Permit	Number of Head				Number of Permittees			
No. of Head	1950	%	1960	%	1950	%	1960	%
50 or less	175,784	7	150,750	7	6,955	43	7,177	47
51 to 100	238,268	10	213,248	10	3,201	20	2,878	19
101 to 200	386,211	16	350,832	15	2,697	17	2,386	16
201 to 500	656,899	27	620,819	27	2,273	14	1,985	13
501 to 1,000	408,262	16	415,951	18	698	4	592	4
over 1,000	592,965	24	527,650	23	405	2	237	1
Total	2,458,389	100	2,278,250	100	16,229	100	15,255	100

*Source: U.S. Department of Interior, Adjustments in Grazing Use, Washington, D. C., Bureau of Land Management, 1962, p. 8.

total operators using these lands in 1959-60 got only 9.6 percent of the AUM's allowed on them; whereas the largest operators, who comprised only 9.6 percent of all operators using these lands, got 49.7 percent of the allowed AUM's. 1/ The inequity of the distribution is reflected in yet another way. The smallest units, which include 51.6 percent of the total operators, on a weighted average basis, got only 2.6 percent of their total

1/ This distribution is made by arraying all units by size and beginning with the smallest operator taking successively larger ones until 51.6 percent are taken. The large group is determined by starting with the largest operator and taking successively smaller ones until 49.7 percent of the total AUM's are accounted for. The ranch size in terms of numbers was not critical. It is essentially what half gets how much and who gets half.

AUM requirements from BLM land; whereas, the largest operators who comprised only 9.6 percent of the total operators got 24.9 percent. In terms of animal days of grazing, this means that the small operators got about 9.56 days or less than one-third of a month per animal, while the large operators got 90.7 days or about 3 months--or 2 2/3 more months per animal than the small operator. This type of distribution may more nearly fit the trend toward larger units which has been accelerating recently, but it has probably aggravated any size disadvantage the smaller units may have had.

Administrative Control and Grazing Fees

In addition to determining who was to use this land, and in what amount for grazing purposes, was the question of how much if anything should be paid for the privilege. The principle of leasing federal lands had become well established by the practice in mineral, power-site, and forest lands in previous years, beginning around 1900. Since the Taylor Grazing Act itself required only "the payment annually of reasonable fees in each case to be fixed or determined from time to time . . . ," an interpretation of what was reasonable, and to whom it was reasonable, remained to be determined. 1/

Those who had been instrumental in determining who should get permits had already emerged as leaders under the directive in the Taylor Grazing

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1/ United States Statutes at Large, 73rd. Congress 1933-1934, Volume 48, Part 1, Public Laws, Chapter 865, Sec. 3, pp. 1269-1275.

Act providing "for co-operation with local associations of stockmen." 1/ According to Carpenter, the first Director of the Division of Grazing, "the local district advisors had no final authority, but only a recommendatory one, in practice their advice was followed in 98.3 percent of the cases." 2/ These local boards were to become so important and powerful that an amendment to the Taylor Grazing Act in 1939 gave them full "statutory recognition." 3/ Offshoots of these local boards grew into state boards and from these to a powerful National Advisory Board, thus fulfilling Carpenter's characterization of the boards as "the local governing agency as to all matters of range regulatory nature." 4/

These groups and their local supporters and electors Foss identified as being in a "particular kind of political activity which might be called administrative politics . . . to gain a considerable degree of political power primarily through administrative process . . ." 5/ He designated their singular interest as "monopolitical." 6/ That is, since no other

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1/ Ibid., Sec. 9, pp. 1269-1275.

2/ Foss, op. cit., p. 119, quoting Farrington R. Carpenter, "The Law of the Range," an address delivered at the 43rd annual meeting of the Colorado State Bar Association held at Colorado Springs, Colorado, September, 1940.

3/ Ibid., p. 120.

4/ Ibid., p. 119, quoting U.S. Department of Interior, Annual Report of the Secretary, 1935, Washington: Government Printing Office, 1935, p. 16.

5/ Ibid., p. 137.

6/ Ibid.

group, except possibly wildlife associations, were greatly interested in this land, the stockmen were the only "effective public." Thus, "the regulators were being supervised by those who were to be regulated." 1/

With their voice the only effective one being heard, it is not surprising that their thinking, especially in the drought and depression of the 1930's, would prevail in the fee setting procedure under the open directive of "reasonable fees"--"reasonable" of course in their thinking. This thinking began with the basic idea that since they had been paying no fees, any fee would be detrimental to their cost and capital structures even though it covered only the cost of administering regulated, permitted use. This thinking was bolstered by the stand of Secretary of the Interior Ickes during the hearings on the Taylor Grazing Act in his statements: (1) "We are not trying to make money out of it," 2/ and (2) "We have no intention of making this a revenue producer at all. We would like for the range to pay for its own administration, but nothing more." 3/ Whether these statements were issued to encourage passage of the bill or whether Ickes could speak for the whole nation, "western stockmen came to understand that grazing fees were to be fixed according to the cost of

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1/ Peffer, op. cit., p. 86.

2/ Ibid., p. 173, quoting U.S. Congress, House Committee on Lands, Hearings, 73rd. Congress, 1st. Session, 1933. On H.R. 2835, p. 16.

3/ Ibid., quoting U.S. Congress, Senate, Committee on Public Lands and Surveys, Hearings, 73rd. Congress, 2nd. Session, 1934. On H.R. 6462, p. 7.

administering the program, and that the cost of administration would be negligible." 1/

Fee Setting

Perhaps the reasons why Congress devoted so little time to the fee question, and the stockmen so much, is adequately explained by Calef as follows:

> To begin with, it must be clearly understood that grazing fees from the Taylor grazing lands are negligible from the viewpoint of the total federal revenue. Grazing fees from such lands in 1956 totaled less than $2.4 million; this figure was only a small fraction of a hundredth of 1 percent of total federal income. Such an infinitesimal percentage can scarcely command even a moment's consideration by a Congress almost overwhelmed with a multitude of fiscal and legislative problems. When we recall that this income is derived from lands scattered over all the western states, it becomes clear that even if it were all turned over to the states, the grazing revenue from the Taylor lands would be only a minor item in the revenue picture of state governments. We must look elsewhere for the actual or potential importance of grazing fees.
>
> Grazing fees are important to range livestock ranchers because they affect their costs of production. Such fees, therefore, have an effect on the stability of the range livestock industry. The level of fees may affect ranchers' grazing practices and thereby indirectly have an effect on range land conditions. Indirect effects on range conditions will also be exerted by grazing fees that are reinvested in structures and other "improvements" on the range. If these fees were turned over to local taxing units (counties, school districts, etc.) in lieu of taxes, they would be an important item in local tax revenues. 2/

As we have already indicated, the stockman's thinking did result in low fees. Of these low fees Calef says:

1/ Ibid.

2/ Calef, op. cit., p. 73.

On any comparative basis, grazing fees on the Taylor lands are very low. Part of the explanation is historical. The original fees were established in the depression of the 1930's when nearly all range livestock ranches were having difficulty in remaining financially solvent. Ranchers were then extremely reluctant to add grazing fees to their operating costs. The very low first fee (five cents per a.u.m.) was designed partly to enlist rancher co-operation and acquiescence in Taylor Act administration. The original Taylor grazing fees were approximately a third the size of those being charged on the national forests at that time and represented an even smaller fraction of private land leasing fees. For the first year after the formation of each district no grazing fees at all were charged. 1/

That the stockman would set the low fees is expressed by Carpenter as follows:

> If we charge no fee it would amount to a government subsidy, and a government subsidy is always subject to scrutiny, criticism and investigation. You stockmen should set some fair fees, so that you can go before any committee from Boston, or Newport, or anywhere else and show it's fair . . . The only kind of a fee which ever met with any degree of satisfaction on the part of the stockman is that such as they have in the forests, based on a sliding scale, whereby it is apportioned according to the price of beef and mutton. It is my belief that it is the fairest way to have the fee. In other words, the expenses should be in accord with income. 2/

Although Carpenter's remarks indicate that the value productivity of these lands should be considered in setting the five cent fee:

> No one seriously argued at this time that the grazing district license holders were paying for the forage what it was worth. 3/

1/ Ibid.

2/ Foss, op. cit., p. 174, quoting from Transcript of Remarks of F. R. Carpenter, Director, Division of Grazing, Vale, Oregon, December 14, 1934, p. 82, Emphasis by this author.

3/ Calef, op. cit., p. 74

> On the contrary it was well known that permittees were paying a relatively small fraction of the value of the forage. Western ranching interests did not want to pay fees representing true value of the forage, and they were particularly desirous not to have any principle established under which grazing fees would ever be related to the value of forage. 1/

The idea that the fees should be low and based on cost of administration prevailed in the "monopolitical" administration and policy making for nearly a quarter of a century. Perhaps it still prevails to some extent, but changes are being made.

The Interior Department at present maintains that the cost of administration basis for determining fees has been abandoned, as indicated by the following statement in the Annual Report of the Secretary of Interior for 1955:

> The highlight of grazing administration in the past year was the adoption of a new formula for determining grazing fees. Instead of basing fees on administrative costs, the new formula provides for charging fees equal to the average price per pound of cattle and sheep at Western markets. 2/

Whereas the Department of Interior saw tying the fee to livestock prices as a "highlight" in 1955, it hardly seems reasonable to expect that the then prevailing monthly fee of the price of one pound of grass fed livestock was all the forage was worth. "After two decades of uncertainty and bitter dispute, it appears that a politically acceptable formula for determining fees has been established. While this formula has no direct

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1/ Ibid.

2/ Ibid., p. 75.

relation to the value of the forage, it does have some economic justification in that fees now vary according to average market prices." 1/ That fees are low either in relation to grazing fees on other lands or relative to the productive value seems generally agreed. If they are low, how low are they, and what are the implications? The following chapter is devoted to exploring these implications in the light of known economic principles and interrelationships.

1/ Phillip O. Foss, "The Determination of Grazing Fees on Federally-Owned Range Land," Journal of Farm Economics, XLI (August, 1959) p. 547.

CHAPTER III

INTEGRATION OF FEDERAL LANDS INTO LOCAL ECONOMIC AREAS

In the previous chapter it was determined that any major effect federal ownership might have on local areas would be determined by the returns the users of public land receive from its use in relation to the fees they pay for the use. The available evidence indicated that this payment was and is less than the expected return on public grazing lands. The possible ways the difference could affect the total income (or output, depending upon how total production in measured) of a local region is developed in this chapter. In order to see more clearly the effects this difference could have, it is necessary to define a structure of the local region's income. This structure gives the framework into which the effects of the difference between costs and returns could be illustrated.

The Concept of Economic Units

The idea of measuring the output of political or economic areas was first developed in attempting to determine how well a nation was doing in trading on the international markets. This concept has developed over several centuries into a very useable tool for formulating national policies. More recently it is being applied to smaller (smaller in the sense that states, counties, cities, at least in the United States, are subdivisions of the nation, state, etc.) political and economic units or regions. A brief look at what the concept is and how it has developed follows.

"The concept of national income was first formulated in the seventeenth century by Sir William Petty in England and by Pierre le Pesant Sieur de Boisguillebert in France." 1/ They saw income as composed of goods and services as opposed to the mercantilist doctrine which saw it as a stock of gold. The development of the rudiments of input-output models on a national scale is credited to Francois Quesnay (chief of a group of 18th Century economists known as the "physiocrats") who developed the Tableau Economique. While the Tableau itself might well be "reduced to an embarrassed footnote" in present day writings, it contained the important idea "that wealth flowed through a community and that the health of the community depended on how it flowed, and might be imperiled by undue diversion in one direction, was however, a useful conception . . . the significance of the Tableau Economique." 2/

Including the above-mentioned beginnings, national income theory has developed through six stages (mercantilist, comprehensive production, physiocratic, material production, modified comprehensive production, restricted material production--via Marx) to a "new, dynamic concept of national income . . . a measure of past or current national production . . . also seen as a forecast of a program for future national production." 3/

1/ Paul Studenski, The Income of Nations, New York: New York University Press, 1958, p. 11.

2/ Alexander Gray, The Development of Economic Doctrine, London: Longmans, Green and Company, 1951, pp. 106-108.

3/ Studenski, op. cit., pp. 11-12.

In short, national income is now conceived of as "an expression, in monetary terms, of the current achievements--manifest . . . in the many commodities and services, or economic goods, that the economy produces for the consumption of its members or for the addition to their existing productive assets during a given period usually a year." 1/ In a general way, the same type of attempt is made when studying regions.

Methods of Measuring Output of Economic Units

In a closed national economy, the national income, or product, can be measured in at least three alternative ways or combinations of them. They are:

(1) net output of the producing branches,

(2) sum of the distributive shares of the producers, and

(3) an aggregate of final products. 2/

Each measures the output somewhat differently. Thus a combination of them, i.e., using two or more methods somewhat simultaneously as a cross check on the other, gives a more complete analysis of the economy. As late as 1951 the U.S. Department of Commerce used only two--"the aggregate of factor shares" and "net value of the final products." 3/ Earlier attempts used only one, however different ones, of the three. Only as the concept

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1/ Ibid., p. 163.

2/ Ibid., p. 168.

3/ Ibid., p. 169.

developed, have all three been used simultaneously.

Since most nations do not operate in a closed economy, some allowance for imports and exports need to be made. "Theoretically, national income or product must always include net income earned from activities carried on abroad." 1/ In a large, relatively isolated, national economy, this can be partially or totally ignored, if it is a small percent of the total, without serious damage. In regional analysis where isolation is not achieved to any great extent it cannot be ignored. This is a major difficulty in developing the accounting of a small region, e. g., a county.

The method chosen for measuring national output will tend to determine the type of data needed. According to Studenski:

> Depending upon which phase of national income is to be analyzed--its production, distribution, or expenditure--different data and methods are required. For the first phase, production, the net output method is generally used; for distribution, the income-distributed method; and for expenditure, the income-disposed or final products method is used.
>
> The availability of data, which is a most important factor in determining the estimating method, depends in a large part, upon the economic structure of the country . . . Many agricultural countries, in addition to having data on their agricultural output, either take current or periodic censuses of output of their few branches of industrial production or at least possess scattered statistics for some of them. They thus have some of the requisite data for the larger portion of the operations of their economy. Under these circumstances, estimates for predominantly agricultural countries use the net output method. 2/

1/ Ibid., p. 173.

2/ Ibid., pp. 251-252.

It seems likely that in largely agricultural regions similar reasoning might apply; i.e., the net output method could be used. The goal, of course, is to arrive at the estimate, with the least imperfection possible, considering the "gaps and inaccuracies in the data" available or obtainable. 1/

On the national level, "the net output method, sometimes called the production method, consists, in its standard form, of the three stages: (1) estimating the gross value of domestic output in the various branches of production; (2) determining the costs of materials used and of services rendered in these branches by other branches as well as of annual depreciation on the physical plant; and (3) deducting these costs and depreciation from gross value to obtain the net value of domestic output in these branches, and then adjusting the latter for net capital income from abroad." 2/ These three steps will lead us to "value added" or "income produced" in a given economic division. On a regional level, it seems possible that fewer steps may be needed, indeed, perhaps only the first one if all other factors are fixed within the region. This gross value can be obtained through "computing the aggregate output from production data . . . by aggregating sales, the value of home consumption, and net additions to livestock and inventories." 3/ "For nearly all countries,

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1/ Ibid., p. 254.

2/ Ibid., p. 264.

3/ Ibid., p. 267.

agricultural income is measured by the net output method." 1/ This would appear to be a likely choice of methods for an agricultural region if an income (production) estimate is to be made.

Regional Accounts

Attention can now be turned from the basic concepts under which national income is counted to similar problems on a regional basis. While there are difficulties in defining a region, the various states, counties or cities can be thought of as regions. They are the ones in which attempts to measure outputs have been focused. Choosing a political entity has the advantage of having quite well defined geographic boundaries. It is also a disadvantage in that "these different circles of regional interest identification are paralleled by a confusing multiplicity of overlapping institutional jurisdictions, ranging all the way from the small school district with less than 50 pupils and the neighborhood store organized as a single proprietorship, via corporate business of regional size and the traditional state governments, to the national corporation and federal agencies without regional identification." 2/

Although the problem of defining a region can be partially solved by using existing political boundaries, the problem of outside influences working on the chosen unit may be multiplied:

1/ Ibid., p. 267.

2/ Werner Hockwald (ed.), Design of Regional Accounts, Baltimore: The John Hopkins Press, 1961, p. xiv.

> The smaller the region, and the more integrated that national economy, the wider it is open to outside influences which will determine its economic activities. In this respect, the region is like a business firm continuously adjusting itself to external changes beyond its control, rather than like a nation driven by its own internal forces of economic development. 1/

Thus a region with a minimum of outside influences might be relatively more simple to analyze. A given region producing a single product might be the easiest to analyze from a net product standpoint; for example, a region producing only cattle from year around grazing, where land and labor are the only costs. The more products produced and the more inputs required, the more complicated the analysis would tend to become. In other words, a region with a large external carrying capacity from a single product might be simpler to analyze than one somewhere between it and one with a high internal carrying capacity of many types of enterprises or economic activities.

Hockwald summarized the difference in approach necessary between regional and national estimates and among regional accounts as follows:

> On tha national level, income estimates have been extended into a closed system and product accounts to show how expenditures of past income determine product flows. On the regional level, such an approach appears less fruitful as the view "from the outside in" suggests that strategic production decisions are made in response to expected "foreign" market demand rather than local expenditures of past income. Regional accounts therefore, are "open" to trace the impact of external forces on local production flows; their design depends on the choice of exogenous and endogenous sectors to trace the relations between the region and the "rest of the world." . . . Any regional accounting system,

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1/ Ibid., p. xv.

> to form an internally consistent framework, must therefore, carefully define its components and their aggregation into endogenous or exogenous sectors. 1/

If these endogenous or exogenous sectors, referred to by Hockwald, cannot be isolated from obtainable data, the estimates of those sectors in which they can, can be utilized as an initial step. In other words work should proceed in those sections in which they can be isolated rather than delaying analysis until all sectors can be isolated.

Hirsh recognizes the difficulties which may be encountered in constructing regional accounts. He also recognizes that policies may currently be made on data which are "all too often scanty, faulty, or altogether absent." 2/ He offers the premise "that the construction of an integrated conceptual framework for subnational economies and the development of a system of data collection for its implementation are not only desirable but feasible" if a "more useful framework for economic policy making" at the subnational level is to be available to policy makers. 3/ This improving of the public policy makers' understanding of the regional forces and their interaction is the basis upon which efforts to develop regional analysis should be made.

1/ Ibid., p. xvii

2/ Werner Z. Hirsch, "A General Structure for Regional Economics Analysis," Hockwald, op. cit., p. 2.

3/ Ibid.

Barnett is as emphatic as Hirsch in expressing the need for regional accounts, but he is, perhaps, less optimistic about the progress that has or can made. He says:

> In summary, despite the facts (a) that input-output tables are conceptually the best means we know for tracing effects of an inpulse on an economy, (b) that we know how to construct tables, and (c) that there have been a number of large, regional planning studies, nevertheless regional input-output tables have not been constructed and used in definitive regional planning and decisions.
>
> The reason is that construction of input-output tables adequate for applied regional decisions is difficult, expensive, and time consuming. It is not simply an input-output table that is needed for regional planning. The table must be appropriate to the major regional problems--those associated with long-term regional growth. The coefficients must be adjustable for the feature of trend and for the more violent changes due to regional exports and imports shifts. In turn, this means that a succession of input-output tables must be constructed if there is to be any chance at all of making estimates of the trend and external trade influences on coefficients. And therefore, a rough estimate is that a capable empirical research group and a source of funds have to agree to invest roughly 10 years and a million dollars or more in model formulation and empirical research capital formation, merely in order to provide a basis for definitive use of input-output analysis in regional planning. Beyond the initial investment time and cost is the need for continuing replacement investment to keep the accounts up-to-data. 1/

If Barnett's estimate is correct, such extensive regional analysis is obviously beyond the scope of this project. The efforts here will have to be content with a lesser model aimed at one industry and its gross output. Specifically, the concern shall be for the effect multiple use of public

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1/ Harold J. Barnett, "Comment," in Hockwalk, op. cit., p. 36. (Underlining by this author.

grazing land at low fees will have on the agricultural industry along with the possible effects on the recreational output of the public land.

The general form of the national model, after which regional models are patterned, is illustrated in Table VIII. This model is an attempt to show the interdependence of the various economic activities. "This technique is known as 'interindustry' or 'input-output' analysis. Both terms suggest the same basic idea, which is that the output of every industry is an input to another industry or to final consumers." 1/ In Table VIII the industries (including government and households) are listed vertically as sellers and horizontally as purchasers by the same number (1, 2, . . . n). Each row is totalled to arrive at a total gross output from each industry. Each column is totalled to arrive at total gross outlay by each industry. Total gross output and total gross outlay should be identical if returns to investments (profits) are made in the entries. If we let i be the rows and j be the columns, then the a_{ij} designates the production of the ith industry being purchased by the jth industry. Where $i=j$ this is the amount of the product produced in an industry which becomes an input to other enterprises within that industry. 2/ A table for a given region could be similarly illustrated.

1/ Clark Lee Allen, James M. Buchanan, Marshall R. Colberg, Prices, Income, and Public Policy, New York: McGraw-Hill Book Company, Inc., 1954, p. 11.

2/ For an empirical table of an hypothetical national account see Allen, Buchanan, and Colberg, op. cit., insert of p. 12.

TABLE VIII. SCHEMATIC REPRESENTATION OF INPUT-OUTPUT ANALYSIS

Purchasers →									Totals
Sellers ↓		1	2	3	.	.	.	n	.
	1	a_{11}	a_{12}	a_{13}	...	...	...	a_{1n}	$\sum_{j=1}^{n} a_{1j}$
	2	a_{21}	a_{22}	a_{23}	...	...	...	a_{2n}	$\sum_{j=1}^{n} a_{2j}$
	3	a_{31}	a_{32}	a_{33}	...	...	...	a_{3n}	$\sum_{j=1}^{n} a_{3j}$
	.	...	...	...	...	...	...	...	.
	.	...	...	...	...	...	...	...	.
	.	...	...	...	...	...	...	...	.
	n	a_{n1}	a_{n2}	a_{n3}	...	...	...	a_{nn}	$\sum_{j=1}^{n} a_{nj}$
Totals	.	$\sum_{i=1}^{n} a_{i1}$	$\sum_{i=1}^{n} a_{i2}$	$\sum_{i=1}^{n} a_{i3}$	.	.	.	$\sum_{i=1}^{n} a_{in}$	$\sum_{i=1}^{n} \sum_{j=1}^{n} a_{ij}$

A somewhat more abstract presentation of the data can be shown in algebraic form. It is adequately presented by Levan as follows:

> A starting point in laying down the specifications for regional income and product accounts is to consider the applicability of national income and product accounts. In their simplest form, the underlying theoretical specifications of the latter can be indicated by:
>
> (5) $Y = C + I + G + (e-m)$
>
> (6) $C = a + bY$
>
> Where Y is gross national product, C is consumption expenditure, I is gross private domestic investment, G is government purchases of goods and services, (e-m) is the balance of trade, with e representing exports and m imports. Moreover, the accounts corresponding to this model can be derived from the double definition of Y, both as gross national product or gross national income, namely,
>
> (7) $Y \equiv \sum_{i=1}^{n} \left[s_f^i \right] - m$
>
> (8) $Y \equiv \sum_{i=1}^{n} v_p^i$
>
> where s_f^i is sales for final use and v_p^i is value added in production by the ith enterprise, n is the number of enterprises in the economy, and m is imports as above. Equating the right-hand sides of these two identies gives us the simplest possible set of accounts, namely one with a single T-account as follows:
>
> Consolidated income and product account
>
> (9) $\sum_{i=1}^{n} v_p^i = \left[\sum_{i=1}^{n} s_f^i \right] - m$
>
> This consolidated account could be disaggregated, of course, into the individual accounts as indicated by (5), but there would seem

to be no need to repeat these results here. 1/

It has already been pointed out that there is some difficulty in shifting directly from national product accounts to regional accounts due to the diversity between the two in the methods needed to account for imports, exports, exogenous changes in demand, indirect business taxes, payments to capital, and handling government purchases and payments. Since a complete set of accounts is beyond the scope of this work, these difficulties need not be belabored here. Rather, attention will be focused on attempting to isolate a particular industry in a given region. In short, attention will be focused on the agricultural sector (a single cell of an input-output model as shown in Table VIII) of a particular region (county or counties) in an effort to determine what effects federal ownership of a part of the land input factor will have on the region's output, where this ownership has apparently resulted in a charge for the factor which is below its marginal value productivity.

Low Fees and Their Implications

Low is a relative term, as it has already been pointed out, particularly in the case of the fees under discussion. To understand how the low fees came to be, it is necessary to see them as the stockmen probably did when the fees were first imposed. It has been shown that one of the general requirements to receive a permit was prior use. This prior use had been

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1/ Charles L. Levan, "Regional Income and Product Accounts: Construction and Application," Hochwald, op. cit., pp. 152-153.

"free" in the sense that while the nation's people (government) owned the land, no charge was being made for its use.

Subsidization Possibilities

Since it had been free, somewhat incompatible statements need to be considered: (1) Carpenter's previously cited, "If we charge no fee, it would amount to a government subsidy . . . " and (2) "no charge basis should be made effective . . . which results in depreciating investment values in the privately owned dependent properties of the holders of such rights ..."1/ What Carpenter failed to mention, or possibly recognize, was that a possible subsidy could already have been capitalized into the private holdings using these public lands, as brought out in the second statement.

The second statement was made in opposing a raise in forest grazing fees. It is bolstered by the wording of the Taylor Grazing Act itself: "Except that no permittee . . . shall be denied the renewal of such permit, if such unit is pledged as security for any bonafide loan." 2/ While fees were not the specific concern in this case, the impairment of ranch value by a decrease in permitted use which presumably would lower income was. It seems reasonable to expect that a change in cost through a raise in fees would have the same effect.

1/ Peffer, op. cit., p. 194, quoting U.S. Congress, Senate, Committee on Public Lands and Surveys, "National Forests and the Public Domain," Hearings, 69th Congress, 1st Session, Pursuant to S. Res. 347 (14 vol., 1925) VII, p. 1898.

2/ United States Statutes at Large, op. cit.

Carpenter was not, and has not been, alone in reading a subsidy into the low fees. As late as 1961, the idea of a subsidy was alluded to in a University of Hawaii bulletin as follows:

> Many of the grazing lands in the mainland west are federally-owned Taylor Grazing and National Forest lands, which are leased to ranchers below their productive value. The low rentals are in effect a large federal subsidy to mainland ranchers. Hawaiian ranchers must bid for public land at public auction. 1/

A later reference refutes the idea that present day ranchers receive a subsidy as follows: "Todays ranchers paid a competitive price for the privilege of ranching in our society. Therefore, they are not 'subsidized' by relatively low grazing fees on public lands." 2/ For Roberts, the competitive price paid consists of two parts, the permit's sale value and the capitalized value of the difference between the fees charged and the value of the forage. 3/ Irrespective of the division, his statement recognizes that the value could be capitalized into the private holdings. The present generation of ranchers who have purchased these ranch firms have paid, or agreed to pay, the previous owners for the capitalized value of the difference between the value of the grazing and the low fees. (If the ranches have not been sold, the value would exist in the form of an opportunity cost).

1/ Perry F. Phillips and C. Richard, The Economics of the Hawaiian Beef in 1962, Hawaii Agricultural Experiment Station, Technical Progress Report No. 135, Honolulu: University of Hawaii, 1961, p. 4.

2/ N. K. Roberts, "Economic Foundations for Grazing Use Fees on Public Lands," Journal of Farm Economics, Vol. 45, No. 4, (November, 1963) p. 726.

3/ Ibid.

Which of the two apparently conflicting views above is correct, if either? The answer depends upon the assumptions one makes and the interpretation, or definition, of a subsidy. Webster 1/ lists two definitions which appear relevant: (1) "Any gift made by way of financial aid," (2) "A government grant to assist a private enterprise deemed advantageous to the public . . . " In addition to this, Webster gives "to aid or promote, as a private enterprise with public money . . ." as a definition of subsidize. Of the three, the first seems generally to apply here, as the gift is actually the difference between the value productivity of the forage and the fee charged, not a direct grant of money. The second or third would tend to refute Roberts negative statement as to the subsidy, for if the low fees were raised to be equal to the value productivity of the forage, it would certainly not "assist," "aid," or "promote" the present owners in maintaining the capital structure which they purchased. Alternatively it can be said that raising fees would destroy the capital structure which has developed. In this second and third sense, the argument that they are not subsidized must be rejected. Roberts recognizes the possibility of this type of subsidization when he said, "an increase in fees would result in a capital loss for ranchers and a capital gain for society." 2/ However, he has not specifically labelled it as a subsidy.

1/ Webster's New Collegiate Dictionary, 6th Ed., Cambridge: G. and C Merriam Co., 1949, p. 845.

2/ Roberts, op. cit., p. 728.

Calef looked upon the low fees in a similar, yet somewhat different light, as he wrote:

> It is more accurate to think of the original under-pricing of Taylor leases as a gift to the original permittees rather than a subsidy, because low fees confer no advantage on the purchaser of a permit--only on the original recipient who obtained it free.
>
> The fact that the original permits were gifts that could be sold makes the problem of modifying the fees so difficult. If the fees were raised to the level of their true value, the government's original gift would be retracted, but in all cases, where the permit had been sold, the gift would be reclaimed, not from the original recipient, but from a third party who had bought the lease in good faith and had paid its full value. 1/

The question seems to be one of what to call the gift rather than whether or not it exists. The time of purchase which varies from firm to firm is apparently important in determining whether the protection will be in the form of a subsidy or support--i.e., whether it is called a gift (subsidy) to the original user as the fees lag, or a support to the capital structure if sold, or considered an opportunity cost of the capital value of the firm. Roberts picked out one large group, "ranchers in business at the time public grazing fees and permits were established." 2/ It is probably the only group that can really be defined because since that time many of these ranches have changed hands. When and under what circumstances these sales were made, would bear upon the type of support currently received.

1/ Calef, op. cit., p. 273.

2/ Roberts, op. cit.

Present users are subsidized in yet another aspect. To the extent that fees do not keep changing in relation to the value of the forage, which in the past has meant they have lagged behind this value, a new subsidy or protection is granted. Nowhere in the literature, up to Roberts' article, was any specific attempt made to define this value and the difference.

Also, it should be pointed out there are those still ranching who began shortly after the turn of the century who may have been "desubsidized" to some extent, when the first Taylor grazing fees were adopted. The indefinite "may have been" is used because the original fees were to pay only for administrative expense; this, along with more secure tenure and less competition, may have offset the fees charged in the rancher's accounting of his operation. Greater security in his use expectations may lead him to choose a lower discount rate of capitalization.

Capitalization Principle

To develop an example, it is assumed that a rancher's process of capitalization is based on the modern theory of rent which "treats rent simply as the surplus of income above cost." 1/ That is, when a marginal productivity analysis shows a surplus accrues through average revenue exceeding average cost, when a firm is operating at its optimum output where marginal cost equals marginal revenue, then an economic rent exists. These

1/ Raleigh Barlowe, Land Resource Economics, Englewood Cliffs: Prentice-Hall Inc., 1958, p. 162.

"unearned increments are ordinarily capitalized into the selling price . . . " 1/ Now consider a hypothetical ranch unit which prior to the allocations of permitted use in 1936 was able to get 50 percent of its feed requirements free from public land and realize a net of $10,000 to be capitalized at five percent. Under the postulated conditions the ranch would have been worth $200,000, if it is assumed that value is arrived at through the use of the perpetual annuity formula $V = a/r$; where a = annual return, r = capitalization rate and V = present value. 2/ If it is now assumed that he paid the five cent fee and received a reduction--but an assured use--to something less than fifty percent so that the ranch now has a net of $8,000 which he is willing to capitalize at four percent, because of the more certain use, his ranch would still be worth the original $200,000. Alternatively, if he were able to maintain his amount of use at the former fifty percent level and had his net reduced by only the amount of the fees (say $1,000), so that his net is now a more certain $9,000 to be capitalized at four percent, his ranch would now be worth $225,000--a gain of $25,000. While these may not be considered typical cases, it does illustrate the directions the capitalization procedure could go.

1/ Ibid., p. 165.

2/ Ibid., p. 169. Here Barlowe discusses the general assumptions and derivation of this formula.

Implications for Property Taxation

To the previous ideas expressed, concerning the possibility of capitalization, another example can be introduced which further illustrates the principle, along with its possibilities for property tax purposes. During a court fight to prevent the five cent fee of 1936 from being imposed, it was argued by stockmen that they "had built . . . or purchased . . . their livestock operations on the assumption that they would continue to enjoy free use of the range." 1/ "Ranchers also maintained that, since property values (and hence assessed values) were based on capitalized income they had in actuality been paying property taxes on federally owned lands." 2/ It seems quite apparent that there were those who understood that the benefit from low fees could (or would) be capitalized into the private holdings. Their claim that this would cause them to pay taxes on the federal lands may be brought under consideration.

To the extent that assessors use unit assessment, 3/ agree that fees would remain low, and were willing to capitalize the difference between the low fees and the value productivity of the public land into the private holdings, the present expected value of the future stream of revenues over which the private land had claim would be taxed. A look at the

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1/ Foss, op. cit., p. 174.

2/ Ibid.

3/ Unit assessment is used here to mean arriving at a value for the fixed assets (land and buildings) of a ranch by capitalizing the returns net of other cost.

history of past assessment practices would tend to lead one to speculate that assessors have fallen short of arriving at full capitalized values. Assessment practices have tended to allow assessed values to lag far behind property sale or capitalized earnings values. With this type of assessment it is unlikely that a full capture of capitalized value would have occurred. In view of the manner in which property was assessed, some of the capitalized value of the difference between the low fees and the value productivity of the public land may have been assessed and taxed. To the extent that this difference was capitalized into the value of the private land, it can be said that the future stream of revenues from public land, accruing to the private land, were being taxed.

If the federal land was being taxed similar to private property, as argued by the ranchers, and fees were supposed to cover only the administrative cost, it appears inconsistent for them to also argue that "in lieu" payments should be provided for in the fee structure. The ranchers' insistence that in-lieu payments be included in the fee structure seems to deny that they were really convinced that the federal land was being taxed. Alternatively, if the claim that federal land was being taxed was valid then the insistence of the in-lieu payment in the supposed administrative cost fee would be difficult to defend. In-lieu payments would actually be a grant (subsidy) to the local taxing unit where the capitalization of the public land's value above fees was being carried into assessments and thus taxed comparable to other private property.

The foregoing has been based on the general proposition that assessment would be done on a ranch unit basis. Assessments can be made on an acreage basis where the acres are classified as to type and assigned values by type. This is currently the case in Montana under the present law. 1/ Under this type of assessment, there would be little possibility of the value of the federal range being included in the assessed value of the private ranch holdings using it. If this is so, the users of these lands could get a reduced assessment when the values based on the classification go into effect--a form of subsidy or support relative to other units of comparable input in terms of cattle unit carrying capacity of the ranch.

Effects of Subsidies on County Input-Output

Webster's definition of a subsidy has been previously cited. These meanings are close to, or incorporated into, the definition used by those who make or study economic policy in the United States. For example: (1) "Financial assistance or its equivalent given for a service which, though uneconomic from a profit-making standpoint, is considered essential to public welfare;" 2/ (2) " . . . transfer payments to businesses of the economy. Those businesses that fall into certain categories are eligible to receive money payments from the government even though they do not

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1/ Revised Codes of Montana, 84-401

2/ Harold S. Sloan and Arnold J. Zurcher, A Dictionary of Economics, New York: Barnes and Noble, Inc., 1961, p. 320.

render any service or transfer any product to the government in return;" 1/ (3) " . . . for the state to pay an outright bounty . . . to an industry whose expansion it desires to foster;" 2/ (4) " . . . is merely a 'negative' tax. That is to say, instead of taking away from the price paid by the consumer, the government adds something to that price." 3/ These include a rather broad range of possible ways of subsidizing a firm consumer, or industry. All the foregoing carry the connotation of government action in a subsidy. It may have become popular to think of subsidies in terms of government, but subsidies can be given by private firms, industries, or enterprises to other firms, industries, or enterprises or some combination of these. Definition (4) above implies the possible type of subsidies involved in low fees; i.e., "taking away from the price paid" or selling a service at less than its value productivity. Holje and Stucky have come close to this as follows:

> A subsidy, in the strict economic sense, is a lump sum capital transfer or an income transfer from a group (e.g., the taxpaying public) to an individual or sub-groups (e.g., a farmer, or agriculture in general). Interest free capital to irrigation projects or the diversion of power revenues to pay reclamation costs may or may not be subsidies in the strict sense. It is suggested that a subsidy is (quantitatively) the amount by which

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1/ E. T. Weiler and W. H. Martin, The American Economic System, New York: The Macmillan Company, 1957, p. 179.

2/ Raymond T. Bye and Willam W. Hewett, Applied Economics, 5th ed., New York, Appleton-Century-Crofts, Inc., 1960, p. 463.

3/ Kenneth E. Boulding, Economic Analysis, 3rd ed., New York: Harper and Brothers, 1955, p. 145.

> the public expenditures enhance the value of the asset (land) which the individual holds. 1/

They, apparently, are thinking in terms of a direct expenditure of money for reclaiming land rather than an enhancement of value through supplying a service at less than its opportunity cost. They do mention specifically "interest free capital" as a form of subsidy which is providing a factor at less than its opportunity cost in any "normal" circumstance. Other types of subsidies are supplying mail service at differential rates, with the implication that some are provided at less than cost, underwriting insurance premiums, and loan guarantees.

If subsidies are given and expected only in the short run, their equivalent is available to the firm to which it is given for alternative uses. In the case of reduced grazing fees, the money not expended for fees could be used for alternative purchases. For example, those ranchers who initially settled their property, and used federal lands free, were able to use the returns (value productivity of these public lands) for building up their private landholdings, herds, buildings, and other enterprises more rapidly than they would have been able to do if they had been required to pay for the use of the public land. In this way, firms selling to them may have enjoyed a better market and firms which bought from them might have enjoyed a lower price from the purchase of their product than might have been the case otherwise.

1/ Helmer C. Holje and H. R. Stucky, Letter to Charles D. Curren, August 2, 1954.

Dr. A. F. Vass always used to teach his ranch management classes that there is a positive relationship between ranch earnings and percent of investment in livestock--the ranchers with the largest percentage of investment in cattle are usually making the highest profit. 1/ This statement appears to be based on an assumption which denies the opportunity cost principal involved in the capitalization process. It appears to assume some given value per acre for owned land rather than considering the total value of the combination of private and low fee public land. If it does not make these assumptions, then it implies that land is not being utilized at an economic optimum in the sense that more of the variable (cattle) are needed to utilize the fixed asset (land or range) than is available to operate where marginal costs equals marginal return.

From our previous discussion of the principle of capitalization of economic rents into the value of the fixed asset in inelastic supply, it would appear that subsidies are only possible in the short run; in the long run, their value is capitalized into fixed assets. Since the question of low fees has been of a long run nature, it would appear the capitalization principle has had sufficient time to become operative. If this is so, their value (returns over charges) is now part of the capital structure of the firms paying them. In history, low fees may have made a difference in the rate of return on capital, and where it went, but their

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1/ Delwin M. Stevens, Associate Professor, University of Wyoming, letter to the author, April 19, 1963.

value has now become capitalized into the fixed assets of the firm to the extent the fees remain or are expected to remain at a given low level.

As already argued by Roberts, the firms which bought out these subsidized firms paid for the full capital value. The subsidy to the purchasers exists in the sense that if fees are not raised, their capital will be protected. If the fees are raised, then their capital structure will be devalued. In this manner they are being supported or subsidized. 1/

The lower the fees, the more completely are the returns to the lands in question being retained by those who use them. For example, when the fees were zero, all the returns went to local users. Only when the fees increase beyond administrative expense (assuming it to be equal for either public or private ownership) does any of the capital return begin to flow outside the local region to the general public, via the federal government. The total return from the public land would be assumed to be the same in either case, but a difference would exist in the local economic activity if the payment from these lands went to the general public instead of to local private users. Also, if it goes directly out of the county, it would not generate a local multiplier effect as it would if it were retained in the county by the users--although it might, nationally. 2/

1/ If it should become the policy to change the fees up to their marginal value productivity, the government could grant a lump sum capital payment to the devalued firms. This assumes that we are to continue supporting the policy of allowing the initial grab to have our tacit approval, or at least not to punish those who now use the lands.

2/ This assumes that all units are fully owned by local operators. If they are not, it would depend upon whether the ownership of capital were in or out of the county.

If fees are capturing only part of the marginal value product of the lands, a whole range of possible flows to capital exist.

In summary, it seems that the previous discussion illustrates that the effects of federal ownership of grazing lands on a local economy is related to the fees charged for the use of the public land. Whereas the free use of this land may have allowed early operators (those settling near the time the west opened) to accumulate capital more rapidly than would have been the case if full value fees had been charged, it is expected that current owners now operate with the value of the difference between the fees charged and the public land's value productivity capitalized into their private holdings. With fees having been held near administrative costs as they apparently have been and with the knowledge of the operation of the capitalization process, the hypothesis of non-significant effects on local economies from federal ownership presents itself. The test of this hypothesis and its corollaries is made in subsequent chapters.

CHAPTER IV

THE EFFECTS OF USING LOW FEE PUBLIC RANGE LAND ON RANCH COSTS, RETURNS, AND VALUATION

In the preceding chapters it has been shown that federal ownership and administration of rangeland developed to protect and conserve the land when no suitable method for transferring it to private ownership could be developed. It was also demonstrated that although other interests prevented the ranchers who were using the public range from getting title to it, the ranchers were successful in keeping a large measure of administrative control. The ranchers' "monopolitical" control was utilized to keep fees at, or near, administrative costs levels. This left a difference between these low fees and the value productivity of the land. The economic theory of rent capitalization led to the expectation that the value of the difference would be capitalized into the privately owned, fixed assets of the ranches.

This chapter brings together the empirical data from primary and secondary sources which indicates capitalization has occurred. To the extent that it has, the evidence supports the hypothesis that public ownership of this land has had a non-significant effect on the economies of the local regions in which it is located.

Review of Literature

Fee Level Studies

There has been some recent attempts to determine the amount of difference between the fees charged and the value of the forage on public

range. These attempts follow two somewhat different approaches: (1) comparison of the fees on these public lands with those leased in a private competitive market, and (2) determination of the value productivity of the forage and comparison with the fees. A notable example of the former is one made by Gardner in a study of various fees charged in selected areas of the Plains and Inter-mountain areas of the eleven Western States.1/

Here Gardner looked at fees charged by the Forest Service, BLM, Bureau of Indian Affairs, railroads, and other private lessors. A comparison of some of these fees for 1952 through 1958 is shown in Table IX. Gardner assumes that the fees charged on private leases, exclusive of railroad leases, is a competitive price. By subtracting the added costs of running livestock on federal leases, he arrives at a "net differential." 2/ This net differential is then capitalized into an expected value of a permitted animal unit month (AUM) of grazing. 3/ He explained the difference between this calculated value and known sales values of permits as due to restrictions on transferability which imply a "misallocation of permits." 4/ Nowhere does he even suggest that any of the permit values may have been capitalized into the fixed assets of the firms using the permits prior to the time of the actual sale. Indeed, he appears to ignore opportunity cost entirely.

1/ Gardner, op. cit.

2/ Ibid., pp. 58-59

3/ Ibid.

4/ Ibid., p. 59.

TABLE IX. COMPARISON OF FEES ON PUBLIC AND PRIVATE RANGE LEASES PER AUM, 1952-1958.*

Year	Competitive Rent on Private Lands	Forest Service Fee	BLM Fee	Crow Indian Reservation Fee	Assumed Added Cost
	($)	($)	($)	($)	($)
1958	3.03	.57	.19	---	1.33
1957	3.50	.44	.15	---	1.33
1956	3.31	.46	.15	.80	1.33
1955	3.51	.35	.12	.67	1.33
1954	3.36	.36	.12	.69	1.33
1953	2.56	.54	.12	.70	1.33
1952	3.31	.64	.12	.69	1.33

*Source: B. Delworth Gardner, "Transfer Restrictions and Misallocation in Grazing Public Range," Journal of Farm Economics, XLIV (February, 1962) pp. 53 and 57.

Roberts also appears to have almost ignored the opportunity cost for he wrote: "A rancher in the business at the time public grazing fees and permits were established received a windfall gain when he sold his ranch or sought credit with the ranch property as collateral." 1/ He apparently recognized the value for loan purposes but not for accounting purposes until an actual sale was consummated. The capitalization of value occurs

1/ Roberts, op. cit., p. 726.

whether a sale is made or not, as he recognizes in saying it is available for loan purposes.

Roberts suggests the second approach to determining the value productivity of range lands--i.e., from combining variable numbers of animals with a fixed unit (in acres) of range land. 1/ While one might disagree with the shape of the marginal value productivity curve he proposes, the method has merit. By this method a physical product can be determined and converted into a value product by multiplying by the price of the product. For example, if a 600 pound steer is placed on a range where he will gain $1\frac{1}{2}$ pounds per day, or 45 pounds per month, the gross value productivity, if grass fed steers sell for $25.00 per hundred-weight, is $11.25. The net value productivity will be $11.25 per AUM minus utilization costs. The difference between this remainder and fee per AUM, less administration costs, will be the amount per month or one-twelfth of the annual amount to be capitalized. In a perfectly competitive economic system, this final remainder may be capitalized at a rate which would include some accounting for uncertainty in the level of fees.

Ranch Value Studies

Although some recent studies of range and ranch management have been completed, empirical studies designed to determine the extent of capitalization were not found. A brief review of some of these recent studies,

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1/ Ibid., p. 722.

made by state experiment stations and USDA personnel in various western states, show that the problem of valuing land was approached in one of two different ways.

The first approach consisted of determining a value per acre for various types and productivities of land. For example, the value Stevens and Agee put on "most grazing land was between $15 and $20 per acre, although a little was as high as $30 and some as low as $10 per acre." 1/ These ranches utilized from 0 to 10.52 AUM's of public land per animal unit (AU) on the ranch. 2/ This method of applying uniform per-acre values to owned land does not specifically deny the possibility of capitalization; neither does it support it. It makes the already discredited assumption of a uniform amount of dependency on public land by all ranches. Where capitalization occurs, this method would distort the values of the private lands through giving uniform values to the owned acres in the ranch irrespective of the amount of their association with public lands. Those units with little association would tend to be over-valued and those with greater association would be under-valued. A range of possibilities is shown in Table X. Myles, using the same system, assigned per-acre values of "$12 for unirrigated, fenced pasture adjacent to the farm land and $6

1/ Delwin M. Stevens and Douglas Agee, Mountain Valley Cattle Ranching in Wyoming, University of Wyoming, Agr. Exp. Station, Bul. 386, June, 1962, pp. 12-13.

2/ The use of the term AU is subject to whatever bias may be present from not including horses in the total animal units on the ranch.

per acre for owned range land." 1/ Specific data on the amount of utilization of public lands was not given, but "there was considerable variation in the percentage of grazing supplied by permits." 2/

The second approach consists of arriving at a value per AU carrying capacity (the amount of feed to carry one of any kind of cattle, omitting only unweaned calves) of the ranch. This value is presumably from appraisals or some average of sales values of comparable ranches, but published data on these ranch sales are not available. The values reported in various studies vary quite widely. Wheeler and McConnen used a "charge . . . only for deeded land" at "$360 per animal unit on hand January 1, 1959." 3/ No specific explanation was given as to how the value was determined. Bevan used a similar approach, but "the value used for land and grazing rights is $250 per animal unit of carrying capacity." 4/ Here grazing rights are specifically mentioned as part of the value of an animal unit of carrying capacity. Bevan points out that the $250 value is lower than the selling prices "ranging from $300 to $600 per animal unit

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1/ George A. Myles, Costs and Returns on Livestock Ranches in North-Eastern Nevada in 1961, University of Nevada, Agr. Exp. Station, Mimeo Circular No. 166, Sept., 1962, p. 3.

2/ Ibid., p. 4.

3/ R. O. Wheeler and R. J. McConnen, Organization, Costs, and Returns Commercial Family-Operated Cattle Ranches Northern Great Plains, Agr. Res. Service, USDA, in cooperation with Mont. Agr. Exp. Station, Bulletin 557, June, 1961, p. 15.

4/ Roland Bevan, Costs and Returns to Mountain Type Cattle Ranches in Central Idaho in 1961, University of Idaho, Agr. Exp. Station, Progress Report No. 73, March, 1963, p. 6.

and even higher than this in some cases." 1/ He further explains that "ranchers consider that these values are inflated and difficult to support on the basis of earnings. The more conservative value of $250 per animal unit is therefore used." 2/ Irrespective of the particular value placed on grazing rights and lands, the use of a single value implies that these researchers either considered fee levels to be at administrative cost or uniform in the percent of AUM's furnished by public lands to various ranches which is contrary to the known general distribution, unless the selection of ranches was made so that it is true in the particular sample.

An Arizona study also uses the second method to arrive at a series of three values. 3/ The background and distribution of these values were, for the three areas studied, given as follows:

> Ranches in all areas are composed of combinations of owned and leased land. Owned land as a percent of total land operated is as follows: Area 3, 0.4 percent; Area 2, 4.0 percent; and Area 1, 11.0 percent. Land is leased from the Bureau of Land Management or from the state of Arizona. Typical ranches lease lands as follows: Area 3--85% from BLM, 15% from the state; Area 1--50% from each source; Area 2--10% from the BLM, 90% from the state. BLM lands in Areas 1 and 2 are leased by acreage, while in Area 3, leases are based on the number of AU's pastured. All state lands are leased by acreage. Actual grazing capacities of all types of range land are assumed to be 12 AU's per section in Area 1, 3.75 AU's per section in Area 3, and 1.25 AU's per

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1/ Ibid.

2/ Ibid.

3/ William E. Martin and William K. Goss, Cost-size Relationships for Southwestern Arizona Cattle Ranches, University of Arizona, Agr. Exp. Station, Technical Bulletin 155, November, 1963, p. 36.

section in Area 2. During years when steers can be pastured, average grazing capacities are 5 AU's per section in Area 3 and 11 AU's per section in Area 2.

Land values are standardized over each area to eliminate variations in speculative values. These values, including building and improvement values are as follows: Area 1--owned land at $75 per acre and leased land at $500 per cow-unit (breeding cow and calf); Area 3--owned land and leased land at $350 per cow-unit; Area 2--owned land at $75 per acre and leased land at $350 per cow unit. 1/

Personal correspondence with the senior author of the Arizona study reveals that the values were arrived at "from interviews with knowledgeable ranch real estate dealers" and "a detailed investigation of ranch sales now underway appears to confirm the real estate dealers' estimates." 2/ The values thus arrived at for leased range can only be valid if the lease fees charged by the state and national governments to the ranch firm are less than the land's value productivity. That is, if fees are sufficiently below the land's value productivity to leave a difference to capitalize into the leased AU values quoted. If one recalls that the Idaho study quoted sales at from "$300 to $600" per AU carrying capacity, and assumes this is a competitive market price (which they did not), the $500 value figure would seem to indicate that the range is being leased at near the administrative costs. (This assumes similar net value productivity per AU carrying capacity in Arizona and Idaho.) In short, the sales value of these leases tend to confirm that the excess of productive

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1/ Ibid.

2/ William E. Martin, Associate Professor Agr. Econ., University of Arizona, Letter to the author, January 14, 1964.

value over its costs has been capitalized into the private ranch holdings, even though it is accounted for separately for analytical purposes by the authors of the Arizona study.

An alternative method of arriving at the value productivity, per AU of carrying capacity, would be to determine whether the annual economic rent implied in the $500 AU value through the capitalization formula is $25.00.

This Arizona study appears to be a most realistic approach in determining to what extent the failure of the federal government (and possibly the state of Arizona) to charge fees equal to the value productivity of the range has on the capital structure of ranches using public land. It also accounts for a difference in amounts of use of public lands by various ranches in determining investment. This study supports the theoretical expectation that the excess values will be capitalized and thus the returns from the public land go to the private holders.

The theoretical expectations and the results of these studies lead to the expectation that similar results would be found in other areas. Since the concern of this work is with the Plains area of Montana, attention is turned to the ranches in that area which use public range.

Phillips County Ranch Data

In Chapter V a method of comparing various Montana counties with two different average levels of acreage under BLM administration will be described. From the group with the highest percentage of total acres under BLM administration, Phillips county was selected as a pilot county in

which to draw a sample of ranches obtaining varying percentages of their total AUM's of feed or range requirements from BLM administered lands.

General Assumptions

It is assumed that, in a random sample, levels of management within groups with low or high percentage dependence on BLM administered lands will be equal. While there is evidence of differences in levels of ability in management, there should be no a priori reason to expect that higher or lower levels of management should be correlated to use of public lands.

Further, it is assumed that the firms variable costs will not be significantly different on an AU basis, for those firms using greater or lesser percentage amounts of BLM administered lands; that is, it is expected that cash or variable costs (exclusive of public range fees) will be similar for firms of like size. Also, lack of evidence to the contrary leads to the assumption that the output in terms of salable products will be comparable for the firms using either high or low percentage amounts of BLM administered lands.

Sampling Procedure

On request, the state office of the BLM furnished a list of all permittees in Phillips county. A total of 310 operators were included in the list; 303 listed the livestock enterprise as primarily or totally cattle operations. Seven were listed as sheep operations. Assuming that sheep and cattle operations would not be affected differently by utilization of like quantities of federally administered lands, and in the face of the declining numbers of sheep ranches, it was somewhat arbitrarily decided

not to include sheep operations. In addition to these sheep operations, a total of 46 cattle operations were dropped from the list because of lack of information as to numbers of cattle or permitted use. Under the assumption that the data furnished by the BLM on the remaining 259 would reflect accurately the size of operations, six strata of sizes by AU's reported were chosen.

These six sizes in AU's are (1) 35 to 74, (2) 75 to 124, (3) 125 to 199, (4) 200 to 299, (5) 300 to 499, and (6) 500 and over. The AU chosen corresponds to that used by the BLM and described by Bevan as "one head of any kind of cattle, omitting only unweaned calves." 1/ These size-groupings are smaller than those used by Wheeler and McConnen (i.e., 50-109, 110-243, and 244-488) but more than cover their range of sizes, although their unit was somewhat different. 2/ The sizes used here are within the limits of the various sizes, with averages ranging from 61 to 1960 AU's used by Caton, et. al., on a basis similar to Wheeler and McConnen. 3/

The six size groups were subdivided into four sub-strata of percent dependency upon BLM administered lands. These sub-strata, a, b, c, d, were in percent <20, ≥ 20 but <35, ≥ 35 but <50, and >50 respectively. 4/

1/ Bevan, op. cit., p. 1

2/ Wheeler and McConnen, op. cit., p. 4. Their unit was based on cows 1-2 years or older as one animal unit; each bull 1.2 animal units; steers as 0.7; and calves as 0.4 animal units.

3/ Caton, et. al., op. cit., pp. 27-28.

4/ The symbols used have the following meanings: $<$ means less than, $>$ means greater than, $\geq$ means greater than or equal to, and $\leq$ means less than or equal to.

The percent dependency was determined by multiplying the total cattle reported by 12 (the number of months in the year), to determine the total amount of AUM's of feed required, and dividing this result into the reported AUM's permitted. From these sub-strata, the sample ranches and alternates were drawn randomly. The stratified sampling was done in an effort to get a more representative sample than would be obtained without stratifying. Thus the sample is random within sub-strata but not necessarily random for all ranches in the county, or for any other broad area such as eastern Montana or the northern Great Plains, although it may be quite representative and only negligibly different.

The 259 ranches were divided into the size strata and percent dependency sub-strata, as described above. Those ranches with less than thirty-five cattle listed with the BLM were arbitrarily deleted to conform to the size categories chosen. After making the mentioned deletions, there were the following numbers of ranches in the sub-stratum: 1a - 18, 1b - 13, 1c - 10, 1d - 8; 2a - 12, 2b - 24, 2c - 13, 2d - 6; 3a - 14, 3b - 12, 3c - 12, 3d - 13; 4a - 13, 4b - 11, 4c - 7, 4d - 9; 5a - 2, 5b - 2, 5c - 8, 5d - 5; 6a - 2, 6b - 5, 6c - 2, 6d - 3. Random sample ranches in the respective sub-strata of 4,4,3,2; 3,4,3,3; 4,3,3,3; 5,3,2,2; 2,2,3,3; 2,2,2,2, for a total of 69 were interviewed. The samples from a given sub-strata were chosen so that at least 20 percent of the number in the sub-strata would be drawn. From this minimum of 20 percent, the percent drawn ranged to 100 percent where there were only two in a sub-

strata, to avoid using a single case study if possible. 1/ Interviews with the ranchers drawn in the sub-strata were taken by the author using a prepared interview schedule.

Environmental and Operating Conditions for Ranching

In Phillips County, located in the northern Great Plains, ranching is carried on under the general environmental conditions of this type area. Livestock and crops are grown under the extremes of weather conditions which may occur in these semi-arid Plains, not " . . . halfway between humid and arid . . . not half dry and half wet; rather, some years they are dry and even arid; other years they are very wet; and still other years they are wet or dry at the wrong times from the standpoint of agricultural production and yields." 2/ To this variation in moisture conditions can be added the uncertainties of hailstorms, blizzards, hot,searing winds, prairie fires, and sudden and wide variations in temperature. Crop and range production are as variable as the climatic conditions suggest.

Cropping in the northern Plains probably began as a result of the need for supplemental winter feed which was so forcibly brought to attention by the now famous winter of 1886-87 in which cattle losses were extremely heavy. From early operations of putting up native hay for winter,

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1/ Where consolidations or purchases had occurred which placed a particular schedule clearly out of the sub-strata, the schedule was added to those in the sub-strata which it matched, thereby increasing the number in both the sub-strata and the sample.

2/ Kraenzel, op. cit., p. 12.

a practice still widely used, cropping of domestic hay and small grains has become widespread. All the 69 ranches in the sample reported cropping of one or both types. Of the 69 ranches in the sample, eight reported cropping of hay only; 59 reported some of both hay and small grain for their own use; and 51 reported small grains as a cash crop in addition to hay or grain for livestock feed. Most of the hay and grain is grown as a dryland crop; although some is grown under irrigation along the streams or river in the county.

Thirty-six ranches in the sample listed their operation as cow-calf, and 33 as cow-calf-yearling. Those listed as cow-calf-yearling operations rarely carried all calves over to yearlings; many reported some carryover as a means to achieve the flexibility needed to meet the uncertainty of range production from rainfall variation. None were reported as strictly yearling operations without a basic cow herd. Cattle are run on the open range for most of the year. Feeding, if necessary, is usually done between January 1 and April 1; however early fall or late spring storms may require feeding to be done earlier or later in the season. Calving is begun on some ranches as early as February, but March and April are the months when most calves are dropped.

Cow herds are generally maintained by ranchers raising their own replacement heifers. In periods of expansion following drouths, or during rises in the cattle cycle, some heifers may be purchased. Bull replacements were generally purchased. The usual practice was for the rancher to buy a registered bull of the same breed as the cow herd although some

cross-breeding does occur between Angus bulls and Hereford heifers because the calves tend to be smaller when born. It is believed that this cross may reduce death losses in both calves and heifers during calving.

Machinery inventories vary with the amount of cropping done. Ranches where large acreages of small grains are produced require more power and tillage equipment than those with smaller acreages. Within wide variations in age, condition, and number, items commonly found in the machinery inventory include: a two-plow tractor, a three-plow tractor, a one-half ton pick-up, and one and one-half ton truck, a car, a mower, a side-delivery rake, a loader, tillage equipment, and assorted small tools.

A wide variation in the amount and type of buildings and improvements was found. Variation in improvements within and between sizes was present. The range went from literally a "tumble-down," unkempt set of buildings and fences, to nearly new, well-built and organized systems. Ranchers reported approximately one-tenth of a mile of three or four wire fence per AU; smaller ranches tended to have more than this and larger ones less. Various types of windbreaks, stock shelters, and sheds were reported. Water improvements in the form of dams and dugouts were almost universally reported. A small number of wells and windmills were also used, with others depending on springs or streams.

These stated conditions of climate, operational procedures, equipment and improvements are combined with given acreages of land to form the various ranches. Attention is now turned to this land-base.

Land-base

Basic to any agricultural unit is the amount, type and productivity of the land which underlies its operation. This is as true for Plains ranches as for Iowa farms. However, while the farm tends to rely on a highly productive small number of acres for its production, the western stock ranch depends upon larger numbers of acres of somewhat less productive lands. The number of acres of range required for a given amount of forage (e.g., AUM or a year long AU) will vary with the quality of the range. These acres can be owned or leased.

The basic land units are those owned. These basic acres may be supplemented with leased acres. This leased land may be owned by private or public sources. The combination of owned and leased acres, along with their productivity, largely determines the carrying capacity of a ranch unit, when a given level of range conservation is chosen.

One would expect that any given size of operation, in terms of animal unit carrying capacity, could be composed of an almost infinite combination of owned and leased acres of various productivities. Specifically, if one is to choose a given size ranch unit, its composition can vary from a small amount of owned land with a large amount of leased land, and vice versa. To trace these variations in owned and leased land, it is necessary to have a knowledge of the productivity of the various acres of lands in terms of carrying capacity; i.e., area alone is insufficient for comparative purposes. A recent statute in Montana has required that

all non-public lands be so classified. 1/ The results of this classification provide a source of data for making comparisons. 2/

Some of the questions asked of the ranchers in the sample were designed to obtain information on the amounts of crop, pasture, and range land owned and leased. This information on owned land was supplemented with data on its quantity and classification from the county records, through the work done under the Montana statute requiring reclassification. Under the assumption that the per acre carrying capacities used in the classification are reasonably accurate, the total amount of carrying capacity owned by each ranch was calculated. The carrying capacity for land leased from sources other than the BLM was assumed to be of equivalent capacity to that owned by the ranch; its carrying capacity was calculated using the weighted average of the owned land capacity. The results of these calculations were used to determine the total and per AU carrying capacities from non-BLM sources for each ranch. A summary of the carrying capacities in the forms of the range of variation and average per AU for each sub-strata in the sample are shown in Table X.

For example, in Table X under ranch size 1 (35 to 74 AU's) in substrata a (< 20 percent dependent on BLM land) it is shown that these

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1/ Laws of Montana, 1957, Chapter 191.

2/ While one may have reservations about the objectivity of some of the classifications, those made in Phillips County were under the direction of a professional appraisal firm, J.M. Cleminshaw and Co., of Nebraska.

TABLE X. DISTRIBUTIONS OF CARRYING CAPACITIES OWNED AND LEASED FROM NON-BLM SOURCES PER ANIMAL UNIT, BY PERCENT DEPENDENCY ON BLM ADMINISTERED LANDS AND RANCH SIZE.*

Percent Dependency on BLM**	Item	Ranch Size* 1	2	3	4	5	6	Average#
		capacity per AU	capacity per AU	capacity per AU	capacity per AU	capacity per AU	capacity per AU	capacity per AU
a	Range	.96-1.50	.51-1.00	.44-1.08	.24-1.23	.24- .85	.66- .76	
	Mean***	1.23	.70	.74	.68	.54	.71	.766
b	Range	.25- .58	.29- .64	.42- .83	.46- .77	.57- .76	.65- .73	
	Mean	.43	.45	.68	.64	.67	.69	.593
c	Range	.66-1.00	.23- .81	.21-1.23	.53- .61	.32- .53	.65- .38	
	Mean	.81	.52	.64	.57	.42	.52	.580
d	Range	.08- .70	.39- .46	.12- .57	.24- .27	.20- .57	.43- .50	
	Mean	.39	.43	.28	.25	.34	.46	.358

*Ranch in cattle units are (1) 35 to 74, (2) 75 to 124, (3) 125 to 199, (4) 200 to 299, (5) 300 to 499 and (6) 500 and over.

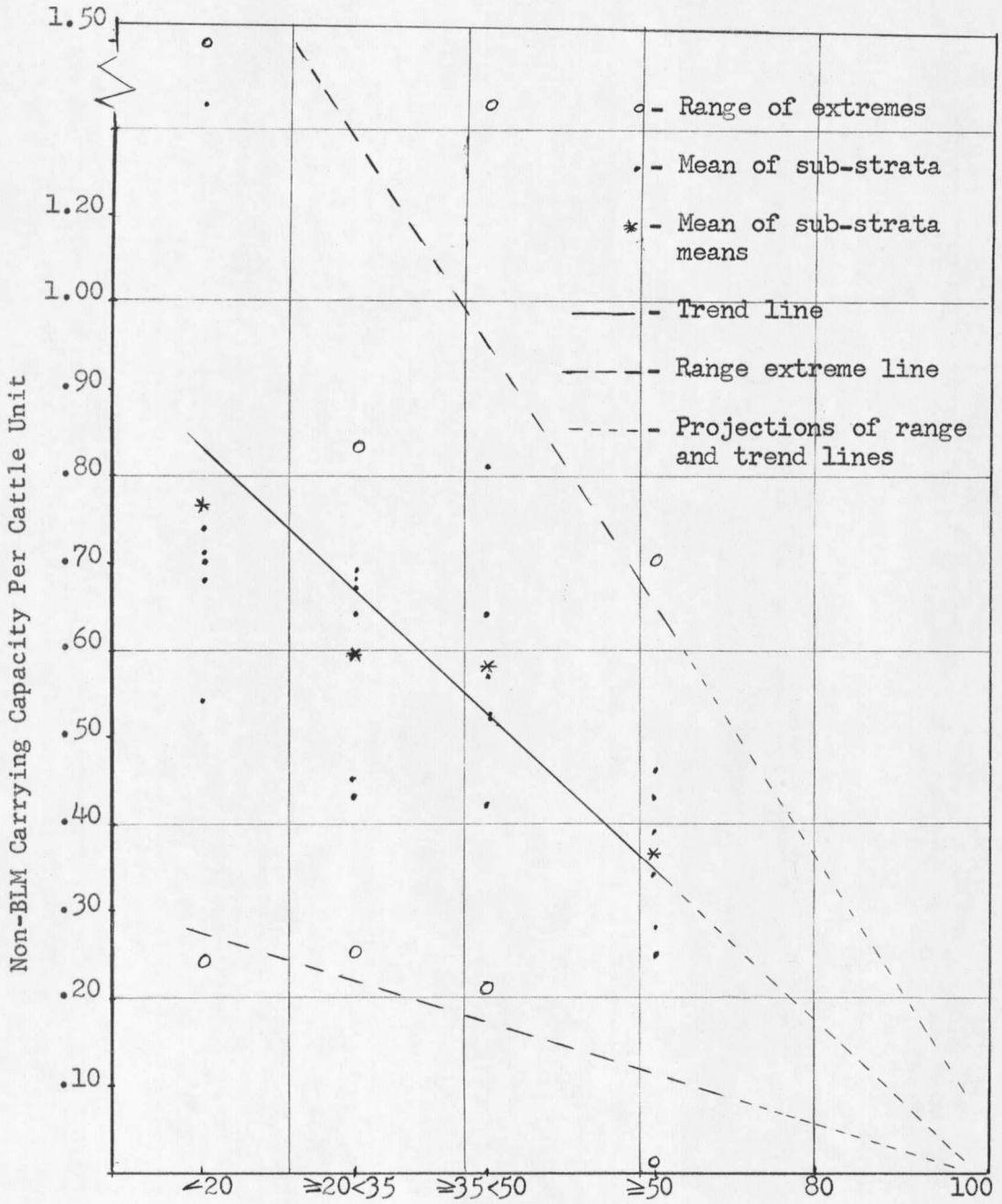
**Percent dependencies on Bureau of Land Management land are (a)$<$20, (b)$\geq$ 20$<$35, (c)$\geq$35 but$<$50 and (d)$>$50.

***Arithmetical average of capacity per CU of ranches in sub-strata.

#Arithmetical average of sub-strata means.

ranches owned, or leased from non-BLM sources, from .96 to 1.50 units of carrying capacity per AU on the ranch. The average for all ranches in the sub-strata was 1.23 units--implying that these ranches were not stocked to capacity. Alternatively, under size 6 (500 or over AU's) in sub-strata d (> 50 percent dependent on BLM land) it is shown that the ranches in this sub-strata owned, or leased from non-BLM sources, .43 to .50 units of carrying capacity per AU on the ranch. The lowest amount of owned, or leased from non-BLM sources, per AU is shown under size 4, sub-strata d with a range from .24 to .27 units of carrying capacity per AU on the ranch and an average of .25. A summary of Table X is shown graphically in Figure 3, which illustrates the trend toward lesser amounts of carrying capacity from owned or non-BLM sources as percent dependency on BLM administered land increases.

As could be expected, the percent of dependency upon BLM administered lands increased as the amount of owned land and land leased from other sources utilized per AU decreased. (Note particularly in Table X the difference between those units less than 20 percent dependent and those over 50 percent dependent.) While there is a large variation in the amount owned or leased from non-BLM sources in the various dependency groups, the general relationship is shown. The standard statistical "t" test for similarity of means shows that per AU carrying capacities from owned or leased from non-BLM sources in sub-strata a and d are significantly



(Points are located at mid-range of strata. In the ≥50 strata the mid-range of the percent dependency reported in this group is used.

Figure 3. Distribution of averages and ranges of carrying capacity per cattle unit from non-BLM sources in relation to percent dependency on BLM administered land.

different even with the relatively large variation. 1/ This difference illustrates that ranch productivity, and thus values, could be different if BLM lands were not available at fees below the value productivity of the land.

Digression on Variation

This variation in carrying capacity could at least partially be explained by four factors which have not been accounted for: (1) levels of stocking rates; (2) irrigated or other pasture aftermath grazing not classified as range in the classification of owned land used; (3) use of the mid-range acres per AU used in the classification for all leased land; and (4) rate of herd build-up in relation to land capacity (i.e., some may own land but not be utilizing it fully). Stocking rates may vary with the desire of managers to maintain high or low levels of range conservation. These desires may affect the amount of cattle on the ranch. Throughout the sample there is a wide variation among ranches in the amount of cropland which may have varying aftermath grazing value. In some cases the operators specifically mentioned having developed rather extensive spring flood irrigated pastures. While one would expect variation to be minimized by using a mid-range as the classification to compute leased land capacity, the possibility of this land having a higher or lower

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1/ A calculated t-value of 4.3555 is larger than the t-value of 3.59, in the Table, even at the .0005 level. The method and assumptions of the test are described by Ostle. See: Bernard Ostle, Statistics in Research, Ames: University of Iowa Press, 1954, p. 98.

carrying capacity than the given ranch capacity exists. Some operators may own more land than is necessary for their current herd level while they are in the process of enlarging their operation; others may have fewer numbers due to some herd sell-off during the severe drought two years prior to the time the sample was taken. While no attempt was made to quantify these sources of variation, it should be recognized that they exist. The magnitude of this variation within groups does not give as concise an expose of the relationship as might be expected. The existence of the significant difference in the amount of land owned or leased from non-BLM sources per AU between high and low dependency groups verifies that the expectation of a difference was warranted.

Dependency Expectation

The mean (arithmetical average) percent dependency reported by BLM, for the sample of ranches using over 50 percent BLM administered land is 57.65, of those using under 20 percent, 10.57. This would lead to the expectation, if they were homogeneous in other respects, that those under 20 percent would be required on the average to own or lease 89.43 percent of their AU feed requirements. Those over 50 percent dependent on the same basis would be expected to have 42.35 percent of the AU feed requirements. In other words, the less dependent groups would be expected to own 47.08 percent more of their AU feed requirements than would the more dependent group.

In the sample data above, it was determined that the less than 20 percent dependent groups had 76.6 percent of their ten months range

requirement, while the over 50 percent dependent group had 35.8 percent of their ten month requirement. If these are converted to a 12 months' basis, they are 63.8 percent and 29.8 percent, respectively, of the total AU requirements that are supplied by their owned range or range leased from other than BLM sources. These, compared with the expected values, would leave 25.63 percent to be supplied from lands classified as other than range in the under 20 percent group and 12.55 percent in the over 50 percent dependency group. That is, feed, forage, and aftermath grazing on farm lands would have to supply 3.08 months of feed in the under 20 percent group and 1.51 months in the over 50 percent group. The difference can be explained in the variations previously cited--the ceteris paribus expectation would be that they should be equal.

If the difference (47.08 percent of requirements) is assumed to be correct (i.e., a one percent change in dependency results in an equal and opposite change in ownership or other leasing) as the expectation led us to believe, and the sample data and other data cited supports, ranch returns and values can be approached for the sample ranches in the various sizes and dependencies.

Ranch Returns and Expected Values

The value of a given ranch is based on its expected future net returns. This means that the residual returns, after other than fixed factors have been paid, will be capitalized into what one can afford to pay for the fixed assets (land and buildings). If it can be assumed that payments for non-fixed factors are similar for ranches with high or low

percent dependency, then an approach to valuing land and buildings can be made by determining gross returns, subtracting costs of all other assets, and capitalizing the remainder. Units of comparable size on an AU basis will be expected to produce like gross dollar returns irrespective of their percent dependency. The gross for both the high and low percent dependency groups can be assumed to be the same from a check of the one-year returns from the 69 ranches in the sample which shows weighted average gross cattle sales of $73.41 per AU, which compares with weighted averages of $71.97 in the under 20 percent group and $74.57 in the over 50 percent group.

These returns are comparable with those reported in other studies. Wheeler and McConnen reported gross sales by size of $89.09, $89.11, and $87.82 per cow unit in 1959. 1/ Caton, et. al., reported sales of $61.49, $61.91, $62.30 for various sizes at projected prices in 1962. 2/ Bevan reported cattle sales of $82.10, $79.75, $71.86 per animal unit for central Idaho ranches in 1961 on the same AU basis used here. 3/ Kearl reported net cattle sales of $88.90, $91.66, and $82.97 for small, medium,

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1/ Wheeler and McConnan, op. cit., p. 15. The animal unit they used is not strictly comparable to the one used in this study. Prices received were also somewhat different.

2/ Caton, et. al., op. cit., p. 30. Animal units were comparable to those used by Wheeler and McConnen.

3/ Bevan, op. cit., p. 9. The figures reported were for cattle sold per AU from an average of 29 ranches, 6 high return per cow ranches, and 6 low return per cow ranches, respectively.

and large ranches respectively. 1/ Three of the four reported sales are above the $73.41 reported by the ranchers in the sample. The differences can largely be attributed to the prices used. Since only an illustrative exposition of the capitalization principle is intended, the exact level of gross sales is not critical to this analysis.

It should clearly be recognized that the level of sales as an estimate of the whole array of unknown future returns would be critical for anyone purchasing a ranch. The effects of changes in the estimated level of gross sales on ranch values can be shown when a set of costs associated with the estimated return is developed in order to establish a net return to be inputed to and capitalized into the fixed assets. To illustrate the effects on ranch values from changes in the gross sales estimate, three possible levels can be selected from the data shown: (1) $61.90, the average of those reported by Caton, et. al.; (2) $84.80, the average of the three higher groups reported by Wheeler and McConnen, Bevan, and Kearl; and (3) $73.41, determined from the sample.

From whichever level of gross returns is selected, a measure of costs for management, depreciation, cash expenses, return on non-land and building capital, and all labor must be determined in order to find a residual to impute to the land and buildings. This method implies that these costs can be determined at least in an opportunity cost fashion, particularly

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1/ Willis G. Kearl, Cattle Ranching in the Northern Great Plains Area of Wyoming, University of Wyoming, Agr. Exp. Station, Mimeo Circular No. 155, June, 1961, p. 11. His small, medium, and large sizes are, respectively, 192, 423, and 1031 animal units.

for labor. This is essentially the method described by Barlowe as follows: "Farm appraisers . . . compute the average expected gross income . . . then subtract the estimated operating expenses (including an allowance for the operator's labor and management) from the estimated gross income to get the net return or economic rent attributable to land and buildings."1/

Since many of the ranches in the sample have both livestock and grain operations, a problem of imputation of costs arises. As an alternative, the ranches reported for the Northern Great Plains area by Wheeler and McConnen were livestock (cattle operations) as were those reported by Kearl which received only "three to six percent" of their income from other than "cattle sales and change in cattle inventories." 2/

Wheeler and McConnen reported cash expenses, depreciation of machinery, and depreciation of improvements of $41.19, $42.24, and $47.42 respectively for an average of $43.62. 3/ These did not include a charge for family labor and management, interest on operating capital, or a return to capital invested in assets other than land and improvements. Kearl arrived at a weighted average ranch labor income of $10.70 per AU. Stevens and Agee reported interest on operating costs averaging $1.13 per AU. 4/

1/ Barlowe, op. cit., p. 190.

2/ Kearl, op. cit., p. 2.

3/ Wheeler and McConnen, op. cit., p. 15.

4/ Stevens and Agee, op. cit., pp. 29-32.

A charge for capital other than land and buildings of $11.39 is assumed. If these are reasonable estimates and are totaled, they sum to $66.84. These costs can be subtracted from the gross income to determine a net per AU to be capitalized. The magnitude of the capitalized value, using the formula V = a/r will depend upon the interest rate chosen. Five percent is assumed to be reasonable.

If the costs of $66.84 are subtracted from the $73.41 reported in the sample, a residual of $6.57 can be capitalized into a value of $131.40 per AU. This is much below any of the AU values reported.

The costs of $66.84 computed here are greater than the average projected returns of $61.90 reported by Caton, et. al. This implies that if these returns prevail and costs remain the same that there is a negative return to be capitalized and thus a negative value for the fixed assets. 1/

If the $84.80 average returns reported by Wheeler and McConnen, Bevan, and Kearl is reduced by the $66.84 costs, $17.96 remains. 2/ Using this remainder a value of $359.20 per AU is computed on a perpetual annuity basis. This is more than the $250 used by Bevan but less than sales values he reported or the values reported and used by Martin and Goss. 3/ Obviously a whole array of possible values can be determined depending upon management levels, discount rates, costs, and returns, but this level serves to

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1/ Caton, et. al., op. cit., p. 30. The returns in this study were based on long run projected prices.

2/ This is comparable to the $17.65, $18.60, and $18.84 reported by Caton, et. al., op. cit., p. 30.

3/ Bevan, op. cit., and Martin and Goss, op. cit.

illustrate the capitalization principle. It should not be interpreted to have a meaning beyond the purpose stated.

If this is assumed to be representative of the value of the fixed assets of a ranch for producing feed for an AU, then it can be utilized in determining the role the lands leased from BLM have in establishing the values of the ranches utilizing them. As pointed out earlier, if no fee is charged, the public land's full value would accrue to the privately owned fixed assets. If, however, the fees move upward from zero, the amount to be capitalized will fall. As previously discussed in Chapter III, fees for BLM administered lands began at $0.05 per AUM under the old Grazing Service and have risen very slowly over a period of approximately 30 years until, in 1963, they were about $0.30 per AUM. If the fees of $0.30 per AUM and $0.05 per AUM are converted to a 12-month AU basis they become $0.60 and $3.60 respectively. If this net return of $17.96 determined above is reduced by these amounts, the residual returns of $17.36 and $16.16 to be capitalized are obtained. These give capitalized values of $347.20 and $287.20 per AU. 1/

Assuming AU values are uniform throughout the ranch unit, 2/ a capitalized value for any given ranch unit can be determined. For example, if a 100 AU ranch is ten percent owned and 90 percent leased from BLM

1/ These calculations are made by relaxing the assumption that administrative costs are equal under public or private ownership and assuming the full fees to be a cost in either case, when it is known that the $0.05 fee was designed to cover only administrative costs. It is unknown to what extent the $0.30 fee covers anything above administrative costs.

2/ Those units with buildings, etc., may be more valuable.

with fees at $0.30, we would expect the ten owned units to be worth $3592 and the 90 leased units would be worth $29,080 for a total of $32, 680. 1/

An array of some of the possible combinations for a 100 AU ranch is shown in Table XI. It is quite apparent that as the percent dependency goes up the amount of value attributed to public land goes up at any given fee level. It is equally apparent that as fees approach the value productivity of the feed produced, that the residual value to be capitalized into the ranch approaches zero. That is, the value (what one could economically pay for a ranch) declines as either fees or percent dependency increases. The entire Table XI can be converted to an AU basis by pointing off two decimals in the figures shown; in this form they could be adapted to any given size ranch.

It would be desirable to check the values computed with what ranches are actually selling for in the sample area. Although the questionnaires used in the interviews were designed to gain information on ranch values, none of the ranchers interviewed had their places for sale. Therefore, only the ranchers' estimates could be obtained. Those which gave responses included land used for crops as well as for livestock in the estimate. No suitable method could be found to separate the value attributed to each type. Thus no direct comparison can be made. 2/

1/ This is done under the assumption that the $0.30 fee is above any administrative cost, which has been assumed equal under public or private ownership.

2/ In a personal interview with Dr. Andrew Vanvig, Chairman of the Department of Agricultural Economics at the University of Wyoming, he indicated that a broad study of ranch sales is being undertaken. It may include data on this question.

TABLE XI. RELATIONSHIP OF DERIVATION OF RANCH VALUE TO PERCENT DEPENDENCY ON BLM ADMINISTERED LANDS AT VARIOUS FEE LEVELS FOR A 100 ANIMAL UNIT RANCH, AT $359.20 PER ANIMAL UNIT.

	Fee Levels (Dollars per AUM)											
	0.00 Value Source			0.30 Value Source			0.90 Value Source			1.40 Value Source		
Dependency on BLM	Owned Capacity (Dollars)	BLM Capacity (Dollars)	Total (Dollars)	Owned Capacity (Dollars)	BLM Capacity (Dollars)	Total (Dollars)	Owned Capacity (Dollars)	BLM Capacity (Dollars)	Total (Dollars)	Owned Capacity (Dollars)	BLM Capacity (Dollars)	Total (Dollars)
0	35,920	---	35,920	35,920	---	35,920	35,920	---	35,920	35,920	---	35,920
10	32,328	3,592	35,920	32,328	2,872	35,200	32,328	1,432	33,760	32,328	232	32,560
20	28,736	7,184	35,920	28,736	5,744	34,480	28,736	2,864	31,600	28,736	464	29,200
40	21,552	14,368	35,920	21,552	11,488	33,040	21,552	5,728	27,280	21,552	928	22,480
80	7,184	28,736	35,920	7,184	22,976	30,160	7,184	11,456	18,640	7,184	1,856	9,040
100a/	0	35,920	35,920	0	28,720	28,720	0	14,320	---	0	2,320	2,320

a/ This can only occur where a water right is the only form of commensurate property used for claim to BLM administered land, as a right to water from the Los Angeles Aqueduct has given rights to the adjacent land. The water right would probably have a value from its claim to surrounding public land as private lands have.

In summary it appears that capitalization of the difference between the fees charged for grazing land by the federal government and the value productivity of this land is demonstrated by data from both the primary and secondary sources. The extent to which the value of these federal lands remains in the regions in which they are located was shown to be sensitively related to the level of fee charged. Inasmuch as the fees charged have remained near what is called administrative cost level, the inference that most of the productive value has remained with the ranchers using the public land seems warranted. Further, since the value of the public land has remained with the local ranches, a minimum of detriment to the local economies has occurred.

Implications for Property Taxation

It is quite apparent from Table XI that a differential in property taxes can exist for comparable sized ranches (in terms of gross or net revenue productivity), if per acre classification (AU capacity on owned land) assessment occurs as contrasted with complete unit assessment. For example, if "full value complete unit assessment" is applied to the 80 percent dependent unit, with BLM fees at $0.30, the assessed value is $30,160. If, however, the AU capacity on owned land assessment is chosen, the lower figure ($7184) is used. Irrespective then of the mill levy chosen, the property tax bill for the "AU capacity method" will only be 32.42 percent of that from a full value complete unit assessment. Comparable discrepancies will be associated with other combinations of fees

and percent dependencies. Equality would exist only at zero fees and zero dependency and complete dependency and "full value fees." Additional tax aspects are discussed in subsequent chapters.

CHAPTER V

AGGREGATE SOCIO-ECONOMIC ACTIVITY IN SELECTED EASTERN MONTANA COUNTIES

Data are occasionally presented which make it appear that local regions in which publicly owned range land is concentrated are not experiencing the economic growth and activity that the nation or state as a whole are. Implicit in this presentation is the idea that public ownership of land is the cause of the lower rate of growth or lesser activity.

In the previous chapter a study of the effects the use of public land could have on the ranch firms utilizing this land was developed. From this analysis it was determined that past leasing practices of the federal government have allowed the value of the public grazing lands to remain with the local ranchers. Since this value remained with local ranchers, it was inferred that public ownership of range land had a minimal effect on economic activity in the local areas.

In this chapter a check of this inference will be made by comparing a set of selected socio-economic phenomena and activities for two groups of Plains counties. One group of counties will have the highest average percent of land under BLM administration; the other group will have the lowest percent.

Methodology of Comparison

Case study comparisons for analytical purposes in socio-economic research is a method that is gaining acceptance by various workers. The rational behind comparing two cases is expressed by Goldschmidt as follows:

> They are cases, a method which has gained acceptance in the social sciences generally and particularly in the study of the community.
>
> It has been the method used by Lynd for Middletown, by Warren for Yankee City, and by every student of the rural community. The case study depends not upon adequacy of sample but upon the soundness of the selection of the cases as representative of the phenomena subjected to analysis. 1/

In the cases proposed for comparison here, the groups of counties will perhaps exhibit some differences. This does not mean that they will not be closely representative of the phenomena being subjected to analysis. We shall expect the counties and groups of counties to "vary in some degree with respect to this or that crop, with respect to age, . . . water . . . for irrigation, etc., . . . controls as perfect as are possible in the chemist's laboratory are not found in social organization." 2/

Selection of Counties for Comparison

The basis for selecting the counties for the two groups was the percentage of land in the county administered by the BLM. In general those with more than fourteen percent administered by BLM were placed in the "study group;" those with less than fourteen percent were placed in the "control group." 3/ The selection is made under the expectation that the phenomena chosen to be studied are not causally related to the quantity

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1/ Goldschmidt, op. cit., p. 9.

2/ Ibid., p. 4.

3/ Two exceptions to this general rule are explained in the specific naming of the counties.

of land under the BLM administration. That is, no significant correlation is expected and this is tested by comparing the means of the various phenomena of two groups rather than through the more formal establishment of regression functions and testing for the significance of the slope of the regression line and correlation between measured variables. The procedure assumes that if there is no significant difference in the means of the two groups, the BLM administration of the federally owned lands is not a factor in any differences which may exist between phenomena tested in the study group of counties and the national or state occurrences in comparable phenomena.

Figure 2, page 40, illustrates the general distribution of BLM lands in Montana. Four areas have especially large concentrations of these lands: the southwest, southcentral, southeast, and northcentral. Other parts of the state have varying amounts and distributions of these lands. The percentage of total land under BLM administration for the counties selected is shown in Figure 4. For the state as a whole the percentage administered by BLM varies from a low of 0.134 percent in Glacier County to a high of 40.822 percent in Prairie County, as shown in Table VI, page 36.

The twelve counties with relatively higher percentages of land under BLM administration (the study group) are Beaverhead, Blaine, Carbon, Carter, Fergus, Garfield, McCone, Petroleum, Phillips, Powder River, Prairie, and Valley. They have a total area of 39,248 square miles. The twelve counties in the study group have an average of 24.3 percent of their land under BLM administration. McCone County, with 13.030 percent under BLM, was arbitrarily substituted for Custer, with 14.3 percent under BLM,

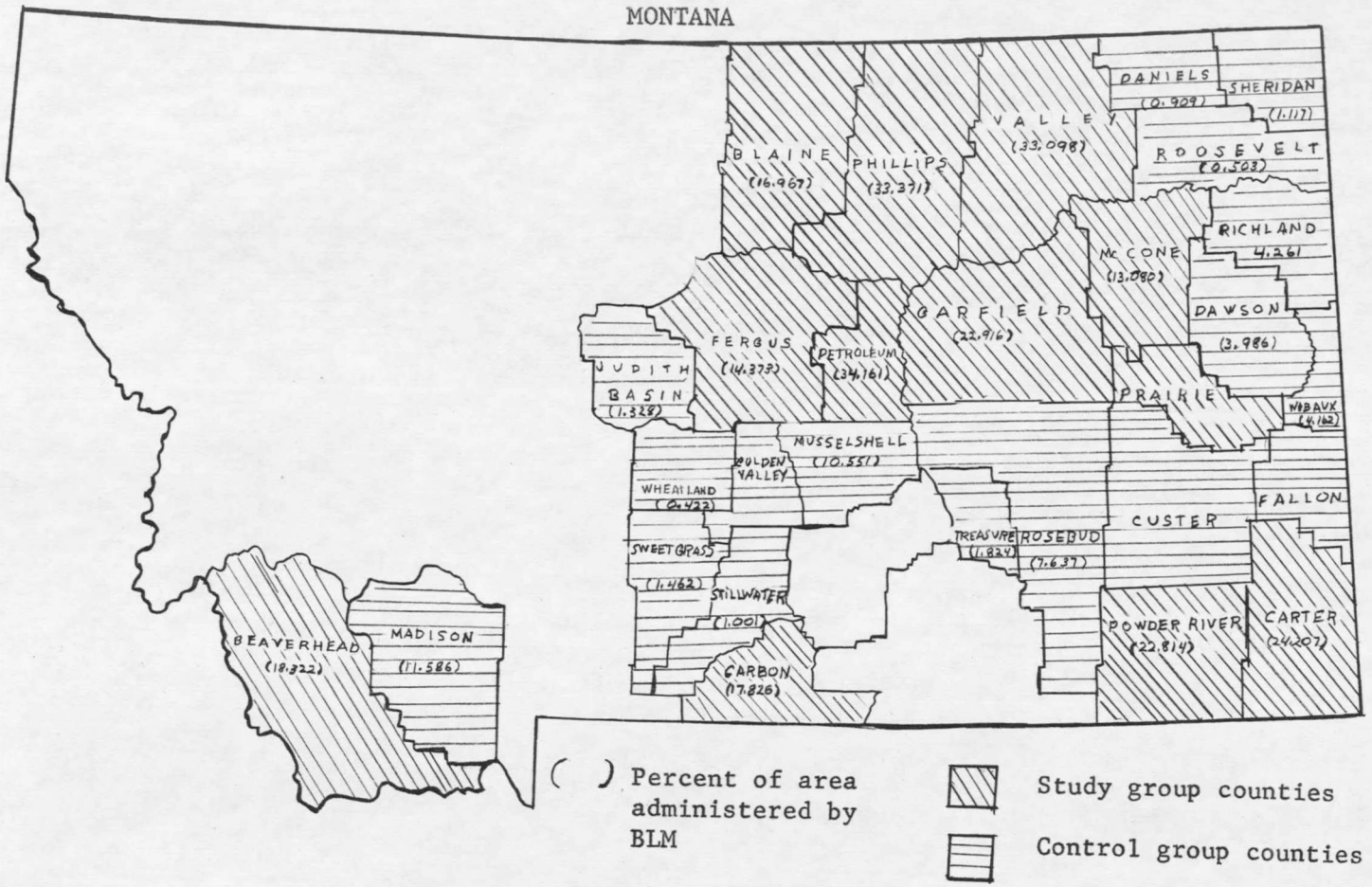

Figure 4. Location of control and study group counties with their percentages of Bureau of Land Management administered land.

in the twelve-county study group. This substitution was made because Custer includes one of the larger urban populations in eastern Montana. Its inclusion in the study group was to balance the urban population of Fergus county in the control group. Silver Bow (14.106 percent) was eliminated as not being a typical county dependent upon these lands, as mining, transportation, and wholesaling are much more important in its economy.

In addition to Custer County, 16 other counties were placed in the 17-county control group, for a total area of 35,793 square miles. The counties of the control group have an average of 4.2 percent of their land under BLM administration (from a high of 14.316 in Custer County to a low of 0.503 percent in Roosevelt.) Both groups have what Webb describes as a Great Plains environment. 1/ Beaverhead and Madison counties are generally considered to be inter-mountain at least in location, but the BLM administered lands exhibit mostly plains characteristics and thus can logically be included. Selection of a control group assumes that choosing counties of a similar environment will make a more valid comparison than would a comparison with only the state or national attributes and characteristics. Even this is somewhat tenuous since there must be some underlying reason why the difference in ownership patterns developed between counties. (This is generally thought to have been a lack of water facilities and other necessary items for establishing basic ranching operations.)

1/ Webb, op. cit., pp. 4-5.

Population Trends

Changes in Numbers

According to demographers, Montana is one of a few states that has failed to gain in population as the nation has done in recent years. As is shown in Appendix Table I, a number of eastern Montana counties have lost population while the state as a whole was gaining population.

Of the twelve counties in the study group only two, Beaverhead and Valley, have shown growth in the 1930 to 1960 period. Beaverhead lost in the 1920 to 1960 period, as did the other counties where data were available. (Since a number of Montana Counties were not formed prior to the 1930 census of population, comparable data for 1920 cannot be obtained.) The gain in Valley County from 1950 to 1960 can be attributed to military buildup there in that decade. The growth of Beaverhead County is probably part of a general growth in the western area of the state.

Of the seventeen counties in the control group, Custer, Dawson, Richland, and Roosevelt have shown growth in the 1930 to 1960 period. Custer County, and particularly its county seat, has become a distribution and service center for a large area in central and eastern Montana and much of the growth has been in this city. Roosevelt County's growth has probably reflected both military and petroleum activity. Richland County's growth may be attributed to petroleum activity and irrigation development in the area, as can Dawson's in the 1920-1960 period and particularly the 1950-1960 decade.

The similar pattern of population change for the two groups in the 1930 to 1960 period is shown in Table XII.

TABLE XII. COMPARISON OF SELECTED POPULATION CHARACTERISTICS FOR THE STUDY AND CONTROL GROUPS OF COUNTIES, 1930-1960. *

Item and Group	Year			
	1930	1940	1950	1960
Total Population:				
Study Group	87,224	81,855	71,454	74,221
Control Group	108, 070	96,732	93,551	96,845
Population Per Square Mile:				
Study Group	2.1	1.9	1.7	1.7
Control Group	3.1	2.7	2.6	2.7
Percent of Population Classified as Rural Farm:				
Study Group	68.1	45.3	40.7	42.1
Control Group	58.0	45.2	36.6	33.1
Urban Population:				
Study Group	8,384	15,637	16,392	17,496
Control Group	14,381	12,935	26,070	27,714

*Source: Adapted from Appendix Tables I, II, and III.

Percentage Changes

The 1960 population in both groups of counties is 85.3 percent of their 1930 population and 79.5 percent of their 1920 population, as shown in Appendix Table I. The average percent that the 1960 populations are of the 1930 populations in the study group is 76.5 percent. The comparable figure for the control group is 80.0 percent, a difference of 3.5 percent. This is hardly significant when the wide ranges within groups,

as shown in Appendix Table I, are considered. Thus we are unable to conclude that the population decline is correlated, much less caused by, the percentage of land administered by the BLM.

Density of Population

It is generally agreed, by those who have written of the Great Plains, that the productivity of these lands was insufficient to support a large population. One measure of ability to support population is the number of persons per square mile. A summary of the distribution of this measure for the study and control groups for the 1930 to 1960 period is shown in Table XII. (The breakdown by county is shown in Appendix Table II.) In 1930, the first year for which data for all the study counties are available--the first census year after all counties had been created--the average population per square mile in the study group was 2.1. This is one less than that for the control group which had 3.1. The standard statistical Z test for similarity of means showed significant difference at the five percent level; that is, in 1930 the study group did not have the population density that the other Plains counties did as stated in the general case above. 1/

By 1960 the average population density had declined to 1.7 in the study group and to 2.7 in the seventeen control counties--a decline of

1/ See Ostle, op. cit., for assumptions and methods of this test.

approximately 0.4 per square mile in each group, as shown in Table XII. Alternatively, the percentage decline was most rapid in the study group--19.05 percent compared to 12.90 percent. This is a logical expectation in that, as the margin of habitability was approached in settlement, any decline could be expected to occur in these areas first and more rapidly when depopulation occurs.

Distribution of Population by Urban and Rural Categories

The data in Table XII indicate that in 1930 the population in the study group was more predominantly rural-farm (68.1 percent) than it was in the control group (58.0 percent). 1/ By 1960 these percentages for the two groups had declined to 42.1 and 33.1 respectively. That is, a 26.0 and 24.9 percentage point decline, respectively, occurred in 30 years. Alternatively, the study group declined by 38.1 percent and the control group declined by 42.9 percent. In neither case are the percentage declines sufficiently dissimilar to indicate a significant difference. The detailed county changes are shown in Appendix Table III.

There were only five places considered as urban by the 1920 census, three in the study group and two in the control group. These had grown to eight in 1960. 2/ In 1960 there were still three urban places in the study group, but a change from an urban area in Carbon County to Valley

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1/ The Z test for similarity of means showed a significant difference at the 5 percent level.

2/ The 1920 figure may have a slight but unknown error due to a part of Cascade County being used in the formation of Judith Basin County.

County was made--probably a reflection of the decline of mining in Carbon County and the growth of military and associated activities in Valley County. A total of five urban areas were enumerated in 1960 in the control group.

From data in Appendix Table III it can be determined that Montana's urban population grew from 181,036 in 1930 to 338,457 in 1960. This is an increase from 33.7 percent to 50.2 percent of the total population. Of 181,036 urban dwellers in the state in 1930 only 8,384 or 4.6 percent were in the study group, and 14,381 or 7.9 percent were in the control group. This makes a total of 12.5 percent of the urban population in both groups. The number of urban dwellers in the study and control groups by census years from 1930 to 1960 are shown in Table XII. In other words, these areas were not as generally urbanized as the state as a whole.

By 1960 the study group had 17,496 or 5.2 percent of the state's population classed as urban. The control group had 27,714, or 8.2 percent of the state's total urban population. Their combined percentage of the state's total urban population was 13.4 percent in 1960, only slightly more than their 1930 percentage of 12.5. In terms of their own populations they were 11.7 percent and 26.0 percent urban in 1930 and 1960, respectively, compared to the state's 33.7 percent and 50.2 percent for the same years. They were approximately one-third and one-half as urban in 1930 and 1960, respectively, as the state as a whole.

Farm Operations

Number of Farms

The distribution of changes in number of farms by county in both the study and control groups for selected years from 1920 to 1959 is shown in Appendix Table IV. All counties have shown a decline in number of farms from 1930 to 1959--also from 1920 to 1959 where data are available. This decline is true of the state and nation as well. Montana (ignoring changes in census definitions) had a decrease in number of farms from 57,627 in 1920, to 28,959 in 1959. In the study and control groups the number declined from 32,756 in 1920, to 13,713 in 1959, or to 41.9 percent of the 1920 total--a somewhat more rapid decline than in the state as a whole.

Since 1930 is the first year data are available for all counties in both groups, a comparison of the decline in the two groups from 1930 to 1959 will be made. A summary of this comparison is shown in Table XIII. The study group had 13,205 farms in 1930. These had declined to 6,368 in 1959, or to 48.2 percent of the 1930 number. The control group had 13,327 farms in 1930; by 1959 this number had declined to 7,345 farms, or 55.1 percent of the 1930 number. (If the 1959 decline due to definitions is considered, the percentages are 48.5 and 55.5 respectively.) The nation's 1959 number of farms is 58.9 percent of its 1930 number; the state's is 60.9 percent on a similar basis.

TABLE XIII. COMPARISON OF SELECTED FARM CHARACTERISTICS FOR THE STUDY AND CONTROL GROUPS OF COUNTIES, 1930-1960.*

Item and Group	Year			
	1930	1940	1950	1959
Number of Farms:				
Study Group	13,205	9,541	7,737	6,368
Control Group	13,327	10,733	9,012	7,345
Average Size of Farms (acres):				
Study Group	1,068.6	1,510.9	2,698.7	3,668.2
Control Group	1,150.9	1,605.2	2,461.4	3,172.8
Value of Land and Buildings Per Farm (dollars):				
Study Group	10,299.40	7,341.75	29,734.83	76,241.90
Control Group	11,331.20	7,975.35	29,916.70	72,726.00
Percent of Farms Operated by Tenants:				
Study Group	19.4	24.3	12.2	12.3
Control Group	27.6	33.2	15.2	14.7
Average Value of Farm Products Sold Per Farm (dollars):				
Study Group	2,984	2,182	10,225	15,844
Control Group	2,940	2,325	8,848	13,370

*Source: Adapted from Appendix Tables IV, V, VI, VII, and X.

If the percentage decline in individual counties is considered, the study group counties' 1959 number of farms average 46.96 percent of their 1930 number. The number of farms in 1959 in the counties of the control group average 53.94 percent of their 1930 number. While this is a difference of 6.98 percent, it is not significantly different when tested with the Z test for similarity of means. That is, the within-group variation

in percentage decline is larger than the between-group variation. Therefore it cannot be said that the number of farms have had a greater percentage decline in the study group than in the control group in the period in question. The greater decline than in the state or nation may be due to land type rather than ownership.

Size of Farms

The farm size in the study and control groups increased from 1930 to 1959, as shown in Table XIII. This size increase followed the general trend in Montana as a whole, and the nation, as shown in Appendix Table V. The average farm size in Montana was 940.3 acres in 1930 and 2212.8 acres in 1959. In the nation, farm size increased from 156.9 acres in 1930 to 303.0 in 1959, 193.1 percent of the 1930 acreage. In Montana, the 1959 average farm acreage is 235.3 percent of the 1930 figure. The average farm size in the study group increased from 1068.6 acres in 1930 to 3668.2 acres in 1959, with a major part of the increase coming from 1950 to 1959. In the control group farm size increased from 1150.9 to 3172.8 acres for the same period. The increase was over 2,000 acres in each group.

The percentage increase in farm size was much larger in the study group than in the control group; i.e., 343.3 and 275.7 percent, respectively. 1/ These percentage increases are larger than for either the

1/ If there was a tendency for farmers to include some of the public land in their ranch size, this might create a bias which would be greater in the study group.

nation or the state as a whole. Also the 1959 acreage as a percentage of the 1930 acreage is statistically greater, as determined in the Z test for similarity of means, in the study group than in the control group. That is, there is some positive correlation between the percentage the 1959 average farm acreage is of the 1930 farm acreage and federal ownership of land in these two groups. This correlation does not say for certain they are causally related. Even though farm sizes increased more rapidly in these counties, it is uncertain as to why or whether the increase would be detrimental to the local economies.

Investment Per Farm

It has been postulated in earlier chapters that the value of a farm (the investment in it) is a function of the flow of future net revenues from its operation. If it is assumed that this is the basis used by the farmer in giving the Agricultural Census enumerators his estimate of what he "would expect to receive for the land and buildings if he were to sell them on the day of enumeration." 1/ The values given may include the value of the federally owned range land they use. To the extent the ranchers include these capitalized values in their estimates, they appear in the census data. The comparison of ranch investments in the two groups of counties is made under the assumption that whatever capitalization occurs has been uniform throughout the two groups. Average investment per farm,

1/ U.S. Bureau of Census, Census of Agriculture: 1959, Vol. I, Part 38, "Montana Counties," p. xvii.

in current dollars, for land and buildings is shown in Table XIII for selected years of the 1930 to 1960 period. (More detailed figures are shown in Appendix Table VI.)

In 1935, a year reflecting the depression effects on values, the study group's average land and buildings investment per farm was $7,849.30; in the control counties it was $7,263.70, with wide variations within groups. By 1959 the average investment in lands and buildings per farm had increased to $76,241.90 in the study group, and to $72,726.00 in the control group--approximately a ten-fold increase over the period for both groups. Wide variations in increases within groups indicate that the difference between groups would not be statistically significant.

Farm Tenancy

There has been some concern that homesteading did not alleviate tenant farming as much as had been hoped. There is some evidence that it may even have fostered it. 1/ Since the last to be homesteaded and the lands now under BLM administration are closely related--indeed may have been a part of them at one time--it may be possible to discern some difference in tenancy where these lands are more abundant. Appendix Table VII shows the percentage of farms operated by tenants from 1930 to 1959. The study group had a lower average percentage of tenancy in both 1930 (19.4) and 1959 (12.3) than did the control group for the same years with

1/ Roland R. Renne, Land Economics, Rev. Ed., New York: Harper and Brothers, 1958, p. 373.

27.6 percent and 13.6 percent, respectively, as shown in Table XIII.

Percent of farm tenancy was lower in the study group and higher in the control group than the state's 24.5 percent in 1930. While farm tenancy had declined in the study group counties by an average of 7.1 percentage points (or by 36.6 percent) the farm tenancy in the control group declined by 14.0 percentage points (or by 50.7 percent) in the 1930 to 1959 period. The study group's 19.4 percent was less than half the nation's 42.4 percent in 1930. The nation's 19.8 percent in 1959 was less than half its 42.4 percent of 1930--a decline of 53.3 percent. The nation, state, and the control group percentage of tenancy declined more than the study group--but all started at higher levels. It is problematic whether the "free" utilization of land prior to the Taylor Grazing Act was partially responsible for these initially lower percentages.

Irrigation

Irrigation has played a role in Plains and Mountain States' agriculture since the settling of Utah in 1847. The magnitude of the role has been a somewhat direct function of the availability of water--and this a function of technology and policy. This is true in both the groups of counties under consideration. Counties with large rivers running through them or located near the mountain streams have accessible water; others do not. In the study group, Beaverhead and Carbon Counties have major rivers arising in them. In the control group, Madison, Stillwater, Sweetgrass, and Treasure counties have utilized the water available to a greater or lesser degree. Appendix Table VIII shows the number

of irrigated farms and their percentage of total farms in the counties for the 1945 to 1959 Census of Agriculture years. The average percent of farms having some irrigated land in the study group increased from 25.8 (with a between-county range of 0.2 to 91.1 percent) in 1945 to 38.0 in 1959. The total number of farms with irrigated land in the study group increased from 2,180 to 2,341 in the same period, while the total number of all farms was declining. The number of farms with irrigated land in the control group decreased from 2,214 to 2,179 in the same period, while the average percentage of the farms having some irrigated land increased from 24.1 to 33.8. New technology and increased ability to survive with irrigation may be factors in the increase.

Appendix Table IX shows the numbers of acres of harvested irrigated cropland in the counties under consideration for selected census years for which data are available, from 1940 to 1959. In the study counties, Beaverhead County alone accounts for approximately one-half of the total irrigated cropland harvested. If we consider this as atypical and compare the average of the remaining counties to the control group, we find that there is an average of 15,384 acres of this land in the study group and 12,901 acres in the control group in 1940. A similar comparison for 1959 shows 20,727 and 16,573 acres respectively. The growth of irrigated cropland harvested in the study counties was 63,453 acres from 1940 to 1959; 62,418 acres of increase occurred in the control group in the same period.

Irrigated cropland harvested in 1949 in the study and control groups as a percentage of total cropland harvested the same year was 21.9 and 19.7 percent respectively--hardly a significant difference with the

variation within groups. These are slightly higher than the state average of 18.0 percent, but not likely to be significantly higher, due to variation. All are higher than the nation's 8.2 percent. They have not, however, kept up with the growth of harvested irrigated cropland in the nation which increased from 19,883,014 acres in 1940 to 34,584,226 acres in 1954--a 73.9 percent increase.

Value of Farm Products

The value of farm products sold per farm is shown for selected census years from 1930 to 1959 in Appendix Table X. Changes in census definitions and tabulations are not made explicit as their effect is assumed to be uniform. Neither the study group nor the control group of counties show a value of farm product per farm very different than the state as a whole. Both groups have shown current dollar growth in the period, as shown in Table XIII. Although the 1959 average is higher in the study group, variations within groups indicate that the difference would not be statistically significant.

Of the total value of farm products sold in the two groups of counties, the proportion furnished by livestock and crops is shown for 1940 and 1945 in Appendix Table XI. Although it is recognized that there are differences in relative returns from crops and livestock over time, and thus shifts between them, it shall be assumed that these two years are representative of some "normal" distribution of the returns from the two categories. In 1940 the counties in the study group received an average of 34.4 percent of the total value of farm products sold from crops and

56.7 percent from livestock and livestock products. The control group percentages were 45.5 and 46.4 respectively. The 1945 average percentages from crops and livestock are 36.8 and 57.8, respectively, for the study group and 41.9 and 53.1 for the control group. These percentages indicate that the study group may sell more of its farm produce in the form of livestock and livestock products. Although this pattern of sales appears to be correlated with federal land ownership, it may occur because of the range feed available, irrespective of the ownership it might be in.

Farm Indebtedness

The only years for which the available censuses give data on farm indebtedness are 1930 and 1940. These data are shown in Table XIV. The average percent of farms mortgaged in the study group was 51.1 in 1930 and 47.3 in 1940. This compares with 60.1 percent in 1930 and 52.1 percent in 1940 for the control group. These are similar to state averages of 53.7 and 49.5 percent for 1930 and 1940, respectively. Wide variations within groups would indicate that the differences are not statistically significant.

Farm Family Level-of-Living

The "farm-operator family level-of-living index" computed by the USDA gives some indication of farm family well being. This index is based on the following items: "(1) percentage of farms with electricity; (2) percentage of farms with telephones; (3) percentage of farms with automobile, and (4) average value products sold or traded in the year preceding

TABLE XIV. PROPORTION OF FARMS MORTGAGED IN SELECTED MONTANA COUNTIES, 1930 and 1940.

County	1930 a/	1940 b/
	Percent	Percent
Study Group:		
Beaverhead	41.8	49.3
Blaine	47.7	46.2
Carbon	57.6	58.8
Carter	38.8	43.5
Fergus	67.3	57.9
Garfield	35.1	28.4
McCone	67.5	50.3
Petroleum	54.2	34.1
Phillips	46.9	49.1
Powder River	38.1	42.3
Prairie	54.1	48.1
Valley	64.6	59.2
Study Group Averages	51.1	47.3
Control Group:		
Custer	49.5	39.8
Daniels	75.2	62.1
Dawson	68.8	60.2
Fallon	62.1	52.2
Golden Valley	57.0	34.6

TABLE XIV. PROPORTION OF FARMS MORTGAGED IN SELECTED MONTANA COUNTIES, 1930 and 1940. (Cont.)

County	1930 a/	1940 b/
	Percent	Percent
Judith Basin	69.5	56.6
Madison	56.8	56.0
Musselshell	50.4	37.5
Richland	63.7	58.5
Roosevelt	52.9	49.4
Rosebud	44.7	42.9
Sheridan	62.3	60.6
Stillwater	61.9	56.0
Sweetgrass	59.8	53.1
Treasure	51.6	48.0
Wheatland	63.0	57.2
Wibaux	72.2	61.4
Control Group Averages	60.1	52.1
Montana	53.7	49.5

a/ U.S. Bureau of Census, Fifteenth Census of the United States, Agriculture, Vol. II, Part 3, pp. 162-164.

b/ U.S. Bureau of Census, Sixteenth Census of the United States, Agriculture, Vol. I, Part 6, pp. 50-54.

the census (adjusted for changes in purchasing power of the farmer's dollar)." 1/ These items may have been useful in comparing levels of living in the early years (1930's) before they became so widely used. Items lose usefulness for comparison as they become more universally used. The data for 1930 to 1954 in Table XV demonstrate this as a rise is seen in the indexes of counties with low population densities as electricity has been introduced in recent years. Recognizing that the life of the index being utilized was limited and drawing to a close, the USDA developed a new index for 1950 and 1959. The results of this new index are shown in Table XVI.

Under the old index for 1950, if the counties for the two groups are compared, where indexes are not from overlapping pooled indexes, it is found that the study group has an average index of 107.7 as compared to the state's 130 and the nation's 122. The control group index from a similar selection is 128.6. Under the new 1950 index for the same selected counties the average indexes are 59.6 and 71.2 for the study and control groups respectively. While both of these appear to indicate a differency, by 1959 they are 119.7 and 120.0 for the same groups of counties in the study and control groups respectively. The simple averages of both groups are shown in Table XVI for 1950 and 1959. In 1959 the average indexes for the study and control groups are the very similar 122.7 and

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1/ USDA, AMS, Farm-Operator Family Level-of-Living Indexes for Counties of the United States, 1945, 1950 and 1954, Statistical Bulletin No. 204, Washington, D. C., March, 1957, p. 98.

TABLE XV. FARM. OPERATOR FAMILY LEVEL AND RURAL LEVEL-OF-LIVING INDEXES FOR SELECTED MONTANA COUNTIES, 1930-1959.

County	1930[a]	1940[b]	1945[a]	1950[b]	1954[c]	1959[d]
Study Group	Farm-Operator Family Level-of-Living Index				Rural Level-of-Living Index	
Beaverhead	120	142	171	175	179	149
Blaine	60	65	95	106	146	111
Carbon	81	81	114	140	158	120
Carter	53	67	76	103	128	118
Fergus	74	79	113	152	158	132
Garfield	43	45	76	108	121	117
McCone	60	66	97	115	124	124
Petroleum	59	53	69	108	121	117
Phillips	53	63	83	109	133	115
Powder River	60	62	82	103	128	118
Prairie	73	82	122	115	124	124
Valley	60	67	91	103	131	128
Study Group Average	66.3	72.7	99.1	107.7[d]	137.6	122.7
Control Group						
Custer	74	87	116	125	153	128
Daniels	61	71	118	103	133	113
Dawson	78	74	106	119	133	110

TABLE XV (CONTINUED). FARM. OPERATOR FAMILY LEVEL AND RURAL LEVEL-OF-LIVING INDEXES FOR SELECTED MONTANA COUNTIES, 1930-1959.

County	1930	1940	1945	1950	1954	1959
	Farm-Operator Family Level-of-Living Index			Rural Level-of-Living Index		
Fallon	72	67	91	119	133	110
Golden Valley	73	83	102	155	157	127
Judith Basin	83	85	121	152	158	132
Madison	95	105	122	175	179	149
Musselshell	67	72	84	108	121	117
Richland	71	84	117	141	153	121
Roosevelt	73	71	105	103	133	121
Rosebud	64	70	83	125	153	128
Sheridan	76	72	118	128	138	114
Stillwater	85	86	108	140	158	120
Sweetgrass	95	105	113	155	157	127
Treasure	62	86	98	125	153	128
Wheatland	89	93	108	155	157	127
Wibaux	89	74	109	119	133	110
Control Group Average	76.9	81.5	107.0	128.6[d]	147.2	122.5

TABLE XV (CONTINUED). FARM. OPERATOR FAMILY LEVEL AND RURAL LEVEL-OF-LIVING INDEXES FOR SELECTED MONTANA COUNTIES, 1930-1959.

	1930	1940	1945	1950	1954	1959
Montana	76	83	107	130	149	126
United States	75	79	100	122	140	100

a/ These are not averages of the groups, but of selected counties where no overlapping of pooled indexes occurred in the census data.

b/ Margaret Jarman Haygood, Farm Operator Family Level-of-Living Indexes, U. S., Dept. of Agriculture, Washington, D. C., May 1952, pp. 31-32.

c/ Margaret Jarman Haygood, Gladys K. Bowles, and Robert R. Mount, Farm Operator Family Level-of-Living Indexes, U. S., Dept. of Agriculture Statistical Bulletin No. 204, Washington, D. C., March 1957, pp. 50-52.

d/ James D. Cowhig, Farm Operator Level-of-Living Indexes, 1950 and 1959, U. S., Dept. of Agriculture Statistical Bulletin No. 204, Washington, D. C., September 1962, pp. 43-44.

TABLE XVI. EFFECTS OF CHANGE OF USDA INDEX ON COMPARATIVE FAMILY LEVEL-OF-LIVING INDEX FOR SELECTED MONTANA COUNTIES, 1950-1959.*

Rural Level of Living Index	1950	1959
Study Group:		
Beaverhead & Madison	98	149
Blaine	59	111
Carbon & Stillwater	68	120
Carter & Powder River	56	118
Fergus & Judith Basin	82	132
Garfield, Musselshell & Petroleum	59	117
McCone & Prairie	63	124
Petroleum, Garfield & Musselshell	59	117
Phillips	63	115
Powder River & Carter	56	118
Prairie & McCone	63	124
Valley	57	128
Study Group Average	65.2	122.7
Control Group:		
Custer, Rosebud & Treasure	72	128
Daniels & Roosevelt	52	113
Dawson, Fallon & Wibaux	67	110
Fallon, Dawson & Wibaux	67	110
Golden Valley, Sweetgrass, & Wheatland	81	127

TABLE XVI. EFFECTS OF CHANGE OF USDA INDEX ON COMPARATIVE FAMILY LEVEL-OF-LIVING INDEX FOR SELECTED MONTANA COUNTIES, 1950-1959. (Cont.)

Rural Level of Living Index	1950	1959
Judith Basin & Fergus	82	132
Madison & Beaverhead	98	149
Musselshell, Garfield & Petroleum	59	117
Richland	75	121
Roosevelt & Daniels	65	121
Rosebud, Carter & Treasure	72	128
Sheridan	73	114
Stillwater & Carbon	88	120
Sweetgrass, Golden Valley & Wheatland	81	127
Treasure, Custer & Rosebud	72	128
Wheatland, Sweetgrass & Golden Valley	81	127
Wibaux, Dawson & Fallon	67	110
Control Group Average	73.6	122.5
Montana	71	126
United States	59	100

*Source: James D. Cowhig, Farm-Operator Level-of-Living Indexes, 1950 and 1959, U.S. Dept. of Agriculture Statistical Bulletin No. 204, Washington, D. C., September, 1962, pp. 43-44.

122.5, respectively. These are slightly less than the state's index of 126, but several points above the nation's 100. These increasingly higher indexes probably reflect the continuing spread of electricity into these less populated areas. While the index was changed in 1959, some items still reflect the use of electricity, as the items included: "(1) average value of sales per farm, (2) average value of land and buildings per farm, (3) percentages of farms with telephones, (4) percentage of farms with home freezers, and (5) percentage of farms with automobiles." 1/ This is particularly true since the weighting procedure put much of the emphasis on the last three items. 2/ It is not possible to say, by the use of this revised index, that any difference existed in the farm family level-of-living between the study and control groups in 1959.

Income

Data for incomes on a county basis are limited. They are even more limited for a distinction between rural and urban, or farm and nonfarm people. Those data that are available are shown in Table XVII. The income estimates show that the study group and the control group had similar average amounts of $457 and $470 per capita income in 1939. By 1951 these average estimates were $2,243 and $1,959 for the study and control groups respectively; in 1956 they were $1,929 and $1,613 for the same

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1/ James D. Cowhig, Farm Operator Level of Living Indexes, 1950 and 1959, USDA, ERS, Washington, D. C., September, 1962, p. 5.

2/ Ibid., p. 24.

TABLE XVII. MEASURES AND RANKING OF INCOME FOR SELECTED MONTANA COUNTIES, 1939-1959.

County	1939[a] Per Capita	1939[a] Rank in State	1951[a] Per Capita	1951[a] Rank in State	1956[a] Per Capita	1956[a] Rank in State	1959 Per Capita	1959 Rural Farm Families and Individuals[b]	1959 All Families and Individuals[b]
Study Group	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	Dollars	Dollars
Beaverhead	651	3	2,616	9	2,208	18	1,695	2,300	2,486
Blaine	447	36	1,628	40	1,734	27	1,318	2,679	3,032
Carbon	343	54	1,207	54	1,263	53	1,378	2,927	2,775
Carter	416	46	2,619	8	2,166	13	1,547	3,292	2,958
Fergus	502	23	1,803	30	1,580	39	1,509	4,530	3,755
Garfield	381	51	2,837	5	2,281	10	1,229	2,851	2,556
McCone	435	41	2,272	15	2,255	11	1,270	3,470	3,440
Petroleum	536	17	3,581	1	2,366	6	1,553	2,741	4,286
Phillips	436	38	1,863	28	1,640	31	1,375	2,661	3,010
Powder River	451	35	2,743	7	2,463	4	1,746	3,827	3,818
Prairie	429	44	1,977	24	1,521	44	1,416	4,582	3,604
Valley	458	33	1,776	32	1,854	22	1,638	2,800	3,862
Study Group Averages	457	--	2,243	--	1,929	--	1,473	3,140	3,299

TABLE XVII (CONTINUED). MEASURES AND RANKING OF INCOME FOR SELECTED MONTANA COUNTIES, 1939-1959.

County	1939		1951		1956		1959		
	Per Capita	Rank in State	Per Capita	Rank in State	Per Capita	Rank in State	Per Capita	Rural Farm Families and Individuals	All Families and Individuals
Control Group	Dollars	No.	Dollars	No.	Dollars	No.	Dollars	Dollars	Dollars
Custer	571	11	1,651	38	1,750	26	1,653	2,820	3,947
Daniels	454	34	2,309	13	2,162	14	1,280	1,754	2,576
Dawson	473	28	1,878	27	1,685	28	1,576	2,878	4,164
Fallon	471	30	1,579	42	1,306	52	1,355	2,899	3,638
Golden Valley	472	29	2,805	6	2,320	7	1,418	4,018	3,085
Judith Basin	579	10	2,956	4	1,533	41	1,749	4,265	3,990
Madison	433	42	1,910	26	1,307	51	1,421	2,984	3,012
Musselshell	470	31	1,434	50	1,516	45	1,520	3,477	3,917
Richland	431	43	1,346	52	1,491	46	1,324	3,000	3,423
Roosevelt	398	49	1,526	46	1,478	47	1,304	3,054	3,202
Rosebud	512	22	1,659	37	1,645	30	1,344	2,522	2,771
Sheridan	334	55	1,575	43	1,780	24	1,347	3,374	3,284
Stillwater	483	26	1,543	45	1,180	54	1,513	3,343	3,086
Sweetgrass	417	45	2,167	18	1,397	49	1,458	2,950	3,113

TABLE XVII (CONTINUED). MEASURES AND RANKING OF INCOME FOR SELECTED MONTANA COUNTIES, 1939-1959.

County	1939		1951		1956		1959		
	Per Capita	Rank in State	Per Capita	Rank in State	Per Capita	Rank in State	Per Capita	Rural Farm Families and Individuals	All Families and Individuals
Treasure	500	24	2,296	14	1,662	29	1,229	3,243	4,418
Wheatland	562	13	2,176	17	1,617	33	1,677	3,243	3,543
Wibaux	438	37	2,500	10	1,595	37	1,655	3,102	3,364
Control Group Average	470	--	1,959	--	1,613	--	1,460	3,113	3,443
Montana	525	--	1,771	--	1,877	--	--	3,132	3,832
United States	556	--	1,649	--	1,975	--	--	2,438	4,680

a/ Edward J. Chambers, Personal Income Estimates for Montana Counties Selected Years 1939-1956, Regional Study 13, Bureau of Business and Economic Research, Montana State University, Missoula: June 1960, pp. 27-28.

b/ Frank T. Bachmura, et. al., County Median Income Estimates, 1959, U. S., Dept. of Agriculture, Economic Research Service, Washington, D. C.: August 1961, pp. 22-23.

groups. Although the variation within groups appears to deny any statistical significance, the average per capita income has become larger in the study group than in the control group. In 1939, both the control and study group average per capita incomes were lower than for the state and nation; in 1951, they were both larger than either. In 1956, the study group average was between the state and nation; in the same year the control group income was lowest of all.

One other source of per capita income data is the 1960 Census of Population. 1/ This estimate of income is subject to whatever "under bias" there may be in the collection of census data. 2/ It is calculated by multiplying the mean income per recipient by the number of recipients and dividing the result by the 1960 population for the county, which is not strictly comparable to the 1959 income data being used. The results of these calculations are shown in the seventh column of Table XVII. A comparison of these figures with those estimated for 1956 shows that they are lower. The average of the 1956 estimates for the study group is $1,929.00 and for the control group $1,613.00. This indicates higher incomes in the study group. The averages as calculated for the study and control groups are, respectively, $1,473 and $1,460--a quite similar pair. Thus, one cannot say the percent of land under BLM administration has had an adverse effect on per capita income in the study group.

1/ U.S. Bureau of Census, United States Census of Population, 1960, Vol. I, Part 28, Washington, D. C.: 1961, pp. 151-155.

2/ Ibid., p. xxv.

It is interesting to note, in the eighth and ninth columns of Table XVII, that in 7 of the 12 study counties the rural farm families' and individuals' median incomes exceed that for all families and individuals in the county. Similarly it is larger in 4 of the 17 control counties. (This is perhaps an indication of the decline of small rural towns and businesses.) 1/ The rural farm families' and individuals' median incomes in the study and control groups are $3,140 and $3,113 respectively. For all families and individuals it is $3,299 and $3,443--similar in both cases.

The 1960 distribution of percentages of family incomes above $10,000 and below $3,000 for the two groups is shown in Table XVIII. The average percent of families with incomes of over $10,000 in the study and control groups were 9.9 and 8.7 respectively in 1960. This is a non-significant difference as determined from the Z test, and indicative that there was no adverse effect from the large percentage of BLM administered land. For the same year, the average percent of families with less than a $3,000 income was 29.1 in the study group and 28.3 in the control group, a difference of less than 1 percent (0.8). Thus it appears that neither high nor low incomes are correlated with percentage of BLM administered lands in the county.

1/ Earl Peterson, "Credit As An Influence Upon Trade Centers, Patronage Patterns in Central Montana" (Unpublished Masters' Thesis, Library, Montana State College, 1963.)

TABLE XVIII. PERCENT OF FAMILIES WITH INCOMES UNDER $3,000 OR OVER $10,000 IN SELECTED MONTANA COUNTIES, 1960.*

County	Percent Under $3,000	Percent Over $10,000
Study Group:		
Beaverhead	24.0	11.4
Blaine	30.8	9.4
Carbon	30.3	5.6
Carter	30.2	13.1
Fergus	24.2	9.6
Garfield	46.2	9.3
McCone	37.1	8.3
Petroleum	17.8	7.3
Phillips	30.6	7.5
Powder River	28.1	14.8
Prairie	28.8	10.8
Valley	21.1	11.6
Study Group Average	29.1	9.9
Control Group:		
Custer	21.9	10.6
Daniels	29.1	6.1
Dawson	18.7	11.9
Fallon	26.1	5.9

TABLE XVIII. PERCENT OF FAMILIES WITH INCOMES UNDER $3,000 OR OVER $10,000 IN SELECTED MONTANA COUNTIES, 1960.

County	Percent Under $3,000	Percent Over $10,000
Golden Valley	35.4	7.6
Judith Basin	21.8	16.6
Madison	31.5	7.6
Musselshell	27.8	7.6
Richland	28.6	8.4
Roosevelt	30.7	8.6
Rosebud	31.6	9.0
Sheridan	27.6	6.6
Stillwater	22.2	7.4
Sweetgrass	28.6	9.1
Treasure	32.8	7.2
Wheatland	21.8	14.5
Wibaux	44.0	3.1
Control Group Average	28.3	8.7

*Source: U.S. Bureau of Census, County and City Data Book, 1962, Washington, D.C.: 1962, p. 223.

Trades and Services

Number of Retail Establishments

Economic activity can be reflected in a variety of ways. One of those activities closest to income is level of retail sales. In making a comparison of retail sales over time an assumption as to the constancy of purchasing habits is made; that is, people continue to buy in the same places, that they buy about the same things, and that amounts vary over time with income. In the case of the counties which have been selected for the study group, there is evidence that these assumptions, particularly the one concerning constancy of where people buy is not true. 1/ The changes in roads, types and variety of services demanded, and increased purchasing power have given shoppers from these counties an opportunity to be more selective in where to trade, and for what. With average per capita incomes higher in these counties in the late 1950's than in earlier years this mobility is probably more of a causative factor in the 26.4 percent decline in number of retail establishments in the study group as compared to 4.8 percent decline in the control group, than is the land ownership pattern. With the known flow of trade from the study to the control group of counties, the 405.8 percent increase in current dollar expenditure at retail in the control group might be expected as compared with the 303 percent increase in the study group. 2/ The number of

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1/ See Peterson, op. cit.

2/ Ibid., p. 50.

retail establishments and their dollar volume of sales for selected years are shown in Appendix Table XII. An increase in the number of retail establishments from 1939 to 1958 occurred in Custer, Dawson, Fallon, and Richland counties of the control group, although the general trend was downward in both groups. The major city or town in each of these four counties gained in population by approximately 500 in the 1950 to 1960 period--county populations as a whole grew as shown in Table XII. By comparison, all counties in the study group lost population except Valley which had a population growth due to increased national defense activities.

Wholesale Firms

The number of wholesale firms and their current dollar volume of sales for both county groups is shown in Appendix Table XIII. The number of firms declined from 237 to 201 in the study group, and from 308 to 266 in the control group from 1939 to 1958. The current dollar volume of business in the study group increased from $11,294,000 to $54,226,000 between 1939 and 1958. 1/ In the control group the rise was from $11,839,000 to $85,970,000 in the same period. Thus, wholesale dollar volume of sales in the two groups have followed the trend in retail sales; i.e., the control group increased most rapidly and probably for reasons not related to federal ownership of land, as already mentioned.

1/ In some counties only a single firm was listed. The volume of sales for these firms were not given in order to avoid disclosure. The figures shown are calculated by assuming the volume in the firms that were not given are equal to the average of those that were.

Manufacturing

Manufacturing has been rather limited in both the study and control groups of counties. Appendix Table XIV shows the number of firms and the value added by manufacture for both groups. The number of firms in the study group declined from 60 in 1939 to 53 in 1958. In the control group an increase from 70 to 79 occurred in the same years.

The average value added per firm of those shown in the study group in 1939 was $27,400; in 1958, $64,000. By using these average figures, it was found that the total value added in current dollars increased from $1,644,000 in 1939 to $3,392,000 in 1958. The total value added, again in current dollars, in the control group increased from $700,000 to $7,678,800 from 1939 to 1958. This is an increase of $1,748,000 in the study group compared to the control group's $6,978,800, but difficult to relate to BLM land administration, particularly with nearly half the total in one county, Richland.

Bank Deposits

Bank deposits are also used as an indicator of the level of economic activity. The growth of bank deposits (total and time) in current dollars is shown in Appendix Table XV for selected years from 1944 to 1960 (earlier deposits were not available). Total bank deposits grew from $36,018,000 to $78,623,000 in the study group from 1944 to 1960 and from $49,497,000 to $107,033,000 in the control group. 1/ Using an average of the 1940 and

1/ Ignoring differences in date of tabulation which probably reduced the growth as deposits would tend to be higher in the fall.

1950 Census of Population to determine a per capita figure for 1944 and the 1960 Census of Population to determine a per capita figure for 1960, there are $470 and $1059 dollars deposited per capita in 1944 and 1960, respectively, for the study group; $520 and $1105 for the control group in the respective years, 1/ These are similar to the state average per capita deposits of $530 in 1944 and $1134 for 1960.

Employment

Agricultural Employment

Both the study and control groups of counties have had a large percent of their labor force employed in agriculture. In 1930 the study group had an average of 66.8 percent of the labor force in agriculture; the control group 56.1 percent--these compare to Montana's 36.8 percent. By 1960 these percentages had declined to 45.6 for the study group, 35.6 for the control group, and 17.1 for the state, with the study group still the highest. The range and distribution of these percentages, for census years from 1930 to 1960, are shown in Appendix Table XVI. For 1940, the percentage of employment in the next highest or higher employment group is also shown. Without any specification of what it is, only Musselshell County in the control group had a higher percentage in the category "Other Than Agriculture"--probably coal mining.

1/ Peterson, op. cit., p. 61.

Employment by Various Industries

The numbers employed in the basic industries of agriculture, forest and fishery, construction, manufacturing, and transportation are shown in Appendix Table XVII. As previously mentioned, Musselshell was the only county with more people employed outside of agriculture in any single category in 1930. By 1960, the number employed in agriculture exceeded all other single categories shown for all counties in either group. In 1930 the total employed in agriculture in the study group was 21,291; in 1960 it was 9,367. For the same years the control group had 22,311 and 9,984. In the study and control groups respectively, the 1960 number is 44.0 percent and 44.7 percent of the 1930 number, a very similar percentage decline.

Forestry and fishery apparently play a rather minor role in the employment picture in any of these counties.

Mining which includes coal mines, oil and gas wells, and other mines and quarries, has fluctuated in its role as an employer both within and between groups of counties. The total employed in mining in the study group in 1930 was 1295; in 1960 it was 238. In the control group it was 1693 and 1093 for the same years. The decline in mining in the study group is almost totally associated with the decline of coal mining in Carbon County. The employment decline in mining in the control group is traceable to Musselshell County as the declines in other counties, Madison, Judith Basin, and Rosebud, is essentially offset by the rise in petroleum activities in Dawson, Fallon, and other counties.

Employment in manufacturing increased from 623 in 1940 to 720 in 1960 in the study group. It increased from 553 to 1,017 in the same years in the control group.

The construction industry employed 1,423 and 2,232 people in the study group in 1940 and 1960 respectively--over half of these in Valley County in 1940 and somewhat less than half in 1960. It employed 1,036 and 1,809 for the same years in the control group.

Transportation, the remaining category shown in Appendix Table XVII, shows that the study group gained from 817 to 982 while the control group was gaining from 1,887 to 2,003 from 1940 to 1960.

Taxation

Local governments rely upon property taxes for revenue in many states. This reliance is almost complete in Montana. In counties where there are concentrations of public lands the complaint is often voiced that these lands are not making their equitable contribution to the financial support of the local government. In the Taylor Grazing Act and its subsequent amendments provisions have been made for certain parts of the fees which are collected under the administration of the act to go to these local governments in lieu of property taxes.

Payments in Lieu of Taxes

These in-lieu payments have been discussed briefly in earlier chapters. It was shown that these payments could become a subsidy to local governments under an assessment procedure which used ranch unit appraisal to determine assessment values for taxation purposes. Further, it was

illustrated that if assessment were done by classifying land into productivity grades for the owned land in a ranch unit the full ranch value would not be brought under assessment. With this latter type of assessment, in-lieu payments would be necessary if the public lands are to help support local governments.

A schedule of these in-lieu payments to the counties in the study and control groups for selected years is shown in Table XIX. In 1960, these in-lieu payments to the two groups of counties totaled $31,078.81. This represents the payment from the 7,651,840 acres of land under BLM administration in the two groups of counties. If all these lands are assumed to be grazing lands, and it is assumed that they would on an average be classified as grazing land grade 4 under Montana's classification system, they would have a total assessed value of $17,446,195.20. Then if this assessed value is multiplied by the 30 percent required in Montana, a taxable value of $5,233,858.56 is determined. Applying the 100 mill levy, which approximates the average number used on rural property in recent years in Montana, they would yield a tax of $523,385.86. The in-lieu payments actually are only a small fraction (about 1/16) of this. However, this does not consider the possibility of capitalization of the low fees into the private lands; therefore, if the two figures are considered as for 1960 they cannot be considered comparable. When the new Montana Classification and assessment became effective in 1964 they could be compared.

Since the new classification has become effective, the possibility that these public lands will carry a smaller proportion of the responsibility for financing local government exists. To the extent that the

TABLE XIX. IN-LIEU PAYMENTS MADE TO SELECTED MONTANA COUNTIES IN VARIOUS FISCAL YEARS, 1946-1961*

County	Fiscal 1946	Fiscal 1950	Fiscal 1955	Fiscal 1956	Fiscal 1960	Fiscal 1961
Study Group						
Beaverhead	5,457.74	12,540.34	7,284.83	5,488.44	6,298.63	6,352.29
Blaine	1,665.37	447.24	615.45	361.32	808.12	688.54
Carbon	700.34	913.08	500.83	376.44	496.49	395.23
Carter	3,412.81	1,077.68	1,696.24	1,899.39	2,373.39	2,057.00
Fergus	1,388.97	978.02	867.92	870.30	998.37	992.27
Garfield	3,806.40	1,277.85	1,970.25	2,137.70	2,616.04	2,248.39
McCone	1,293.03	328.76	506.44	550.03	843.03	725.06
Petroleum	975.16	373.43	493.26	516.52	595.51	529.50
Phillips	5,693.19	1,594.15	2,129.86	1,260.58	2,280.98	1,940.56
Powder River	1,759.52	589.42	1,029.43	953.27	1,184.12	1,024.74
Prairie	333.16	97.13	151.34	166.63	245.69	212.02
Valley	4,708.31	1,306.31	2,482.69	1,044.20	2,055.69	1,751.39
Control Group						
Custer	1,941.44	540.21	844.02	940.15	1,051.97	1,053.16
Daniels	128.07	227.12	105.25	121.90	163.26	--
Dawson	358.48	85.22	128.31	139.04	228.08	195.68
Fallon	342.36	90.14	162.72	180.73	221.05	191.80

TABLE XIX (CONTINUED). IN-LIEU PAYMENTS MADE TO SELECTED MONTANA COUNTIES IN VARIOUS FISCAL YEARS, 1946-1961.*

County	Fiscal 1946	Fiscal 1950	Fiscal 1955	Fiscal 1956	Fiscal 1960	Fiscal 1961
Golden Valley	60.56	33.15	35.83	44.62	51.85	28.50
Judith Basin	122.67	251.26	182.68	230.77	286.69	292.90
Madison	2,221.70	5,320.44	2,482.69	2,273.06	2,666.35	2,317.69
Musselshell	116.06	304.89	236.62	55.63	159.97	307.97
Richland	827.36	1,306.49	888.67	1,179.36	2,581.48	1,465.91
Roosevelt	143.13	230.55	112.70	163.54	136.85	222.78
Rosebud	1,913.44	2,407.94	1,568.41	2,147.10	2,581.48	2,411.32
Sheridan	186.43	306.36	181.45	240.12	21.09	1.26
Stillwater	78.48	351.26	90.78	101.43	164.17	119.81
Sweetgrass	159.99	748.86	295.88	282.25	337.91	402.76
Treasure	41.44	121.90	179.42	137.26	249.06	263.20
Wheatland	12.79	125.20	29.76	23.30	35.88	71.07
Wibaux	307.36	632.61	459.47	428.27	770.12	647.60

*Source: Data were obtained from unpublished records available in the Treasurer's office of the State of Montana, Helena.

classified assessment lowered the assessed value of the ranch firms utilizing public land, these ranches will be carrying less of the cost of the local government than they were prior to the change in assessment. Thus the ranchers or others not using this land may be faced with carrying more of the local government cost.

This analysis seems to suggest that in-lieu payments may have changed from a subsidy to an inadequate payment (if they are supposed to replace taxes fully) when the assessment was changed.

Summary

The aggregate data available to compare the two groups of largely agricultural counties illustrates that their general levels of soci-economic activity are similar, even though a greater percentage of the land is under BLM administration in the study counties. General trends in population decline, decline in farm numbers, increase in level-of-living indexes, increase in per capita income, and level of bank deposits were similar in both groups. The study group showed a greater increase in farm size, lower farm tenancy, greater farm income from livestock, and a greater percent of the working force in agriculture. It is uncertain as to why or whether these differences should be causally related to federal ownership. If they are, the question of the criterion by which they should be judged detrimental to the local economies needs to be developed.

Differences between the activities in these counties and those of the state or nation appear to arise from factors other than land ownership.

The comparison of the data for the two groups support the hypothesis of non-significant effects on county economic activity from the greater concentration of publicly owned range land in the study group.

CHAPTER VI

ECONOMIC AND ADMINISTRATIVE PROBLEMS ASSOCIATED WITH TRANSFER OF FEDERAL LANDS UNDER BLM ADMINISTRATION TO PRIVATE OWNERSHIP

It has generally been assumed in this study that lands currently in federal ownership will remain there with some small deletions or additions. Even though this general presupposition is accepted, the issue of transferring federal range and other lands into private hands cannot necessarily be considered a dead one. If a transfer of public land into private ownership were to come to pass, the immediate problem of how the land should be distributed would have to be solved.

Possibilities for distributing public lands into private ownership range over an almost limitless spectrum. One method of distributing public range lands into private hands consists of selling them to their present lessees. Although other possibilities exist, the transfer to present users has been actively supported. Some of the effects which might be expected from a transfer of this type are discussed in this chapter.

Efforts to Effect Transfer

While no major, concerted effort to effect transfer has been made in very recent years, "at Salt Lake City in August, 1946, 150 leading livestock men called together by the American National Livestock and the National Wool Growers Associations were reminded that the Taylor Grazing Act had been intended as a temporary expedient." 1/ Referring of course

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1/ Peffer, op. cit., p. 279.

to the opening clause of the Taylor Grazing Act which declares one of its purposes to be "to promote the highest use of the public lands pending its [sic] final disposal." 1/ "The suggestion was then advanced that the time was ripe to take action toward bringing about that final disposal." 2/ From this suggestion, a six point program for carrying out the final disposal into private hands was developed. The six points included provisions for permittees to buy the lands they were using, appraisal as to market value, payment terms, disposition of funds received from the sale, reservation of mineral rights to the federal government, and provisions for payments from any damages from prospecting. 3/

As the stockmen's program for disposal progressed, the idea to include in addition to Taylor lands, the forest grazing lands was promoted. This suggestion "that grazing lands be eliminated from national forests and made a part of grazing districts, thus including them within the intent of the sale proposal . . . aroused the conservationists." 4/ With this opposition from the conservationists, the proposal attracted national attention and was to be beaten down in Congress, so much so that not even a bill was introduced.

1/ Ibid.

2/ Ibid., p. 280.

3/ Ibid.

4/ Ibid., p. 281.

Calef summarizes the stockmen's position as follows:

> The western livestock associations' campaign generated rather a considerable flow of argument and comment in various publications concerning, particularly, the sale of the public lands. As the controversy continued, neither side advanced very rational or cogent arguments to support its positions. The principal argument of the western livestock interests seemed to be that they wanted the land, and therefore, it was grossly unfair, illegal, unconstitutional, and immoral for the Federal Government to continue holding it; moreover, it was "communistic." They advocated that the land be sold at a "reasonable" price, with an absolute preference for the current lessee. Their principal argument, not based on legal, ethical, or metaphysical grounds, concerned the desirability of getting the disputed lands on the local taxrolls. They did not explain why, in the light of their concern about local revenues, they had successfully thrown all their grazing fees, which could have been used for any state or county purpose, into developments and improvements on the very range lands they were using; nor did they explain why they had backed a bill which sharply cut the proportion of these fees that were available to the local taxing units. The idea that they would gladly pay as taxes what they had strenuously and successfully opposed as fee allocation did not seem very convincing. 1/

(The tax implications alluded to have been discussed in Chapter IV and V and are expanded on briefly below.)

The failure of the stockman to achieve his purpose and his surprise at the failure is adequately described by a London periodical:

> Stockmen have been badly led and advised. Shut off in isolated ranches as they are, hearing little but the general righteousness of their cause as fed to them by their own officials and propagandists, they have been genuinely hurt and surprised at the vigor of the opposition. The stockmen thought they saw their opportunity in the election of a Republican Congress supposedly dedicated to the strengthening of private enterprise. They missed their guess . . . badly . . . 2/

1/ Calef, op. cit., p. 8. Emphasis by this author.

2/ Peffer, op. cit., p. 284, quoting "The Public Domain," The Economist (London), February 21, 1948, p. 304.

With the conservationists emerging victorious from the 1948 skirmish, they have demonstrated the power behind the idea that "lands suspected of future values, especially for water conservation, recreation, minerals, or homesteading, should be retained in public ownership until those values have been determined." 1/ Although this strong opposition to the movement of public land into private ownership exists, those who desire the transfer are still working to bring it to pass. Attention is now turned to some of the economic effects which might occur if they are successful in getting the transfer.

Adjustments in Ranch Values

If referral is made to Table X, page 98, it can be seen that, as fees change for federal land, the amount of the ranch value contributed by the public land also changes. Specifically as fees approach the value productivity of the public land, the residual value from these lands to be capitalized into the privately owned fixed assets of the ranch decreases. Since fees have been below the value productivity of the public land, much of the value has been capitalized into the private ranch holdings. If these federal grazing lands are to be sold to their lessees at their capitalized earnings price, ranchers would suffer a capital loss. Unless the sale price for public range were set "so low as to amount to a grant, the situation would be less satisfactory than at present." 2/ Ranches with

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1/ Peffer, op. cit., p. 293.

2/ Ibid., p. 200.

high percentage dependencies would suffer the greatest capital losses. The general array of possibilities for losses by percent dependency would follow the capitalization trend shown in Table X.

It seems possible that extreme hardships would occur in some cases. As an illustration, consider a ranch which was recently purchased on credit with a small down payment. Assume that the ranch is a 100 AU operation, fifty percent dependent on federal land. If the ranch sold at the hypothetical $359.20 per AU (the amount estimated in Chapter IV) with ten percent down, there would be an outstanding indebtedness of $32,328. If he now must buy the public range at the same price per AU, with no down payment, he will owe an additional $17,960. The total indebtedness will now be $50,288--$14,368 more than the unit is worth. If he chooses not to buy the federal land, and it is sold to another ranch, his ranch is reduced by half but he will still owe $32,328 on a unit worth only $17,960. Unless the title to the public land is given to him, as its value was given to the owner when rights under low fees were established, his capital position will be poorer than it is under leasing. Indeed, it may become economically improbable for him to continue to own his ranch. While this illustration is only one of many that could be developed, it serves to indicate the nature of the problem that could develop for ranchers should a proposal to sell these lands to their lessees develop into an active program. Even a rancher with a debt-free unit at such a time would find his capital position diminished in relation to his percent dependency. Being debt-free, his ranch operation could probably survive but he could

find himself making a capital payment to the public and thus have a smaller net income as well as a smaller net worth.

It seems possible that the clause in the Taylor Grazing Act which required, "that no permittee . . . shall be denied the renewal of such permit, if such denial will impair the value of the grazing unit of the permittee, when such a unit is pledged as security for any bonafide loan," might have legal implications to give some aid in extreme circumstances. Why debt should be a criterion for judging who should or should not receive aid seems to require a justification and answer.

Tax Implications

If capitalization has been as complete as the indications seem to point out, then a sale of these lands into private hands would not increase the property tax base where unit assessment has been practiced. The analysis shown in Table X illustrates how the value could have already been included in the ranch assessment at zero or low fees. In-lieu payments would cease if these lands were sold and the local revenue picture might be worsened instead of improved (see Chapter V, page 153). Clawson summarized the general situation as follows:

> In considering this general problem, it is necessary to consider where and how the income originates out of which taxes are paid, the place where the taxes are paid and the place and agency where the costs of government are borne or made. In the last analysis, taxes are paid out of income. If the private citizens of a western county are using all the Federal grazing lands in that county, they are getting the full income from it. They make some payment to the Federal Government for the use of this land, but there are no idle and unused resources . . . The fact that Federal land and Federally developed water are used by private individuals means that income is being produced.

> It may be, and often is, true that this income escapes local taxation. Local taxes are usually levied against property rather than against income, and hence the income derived from use of Federal land may escape taxation. <u>However, the private property so often used in connection with Federal land may take on a value and be taxed because of the use of Federal land.</u> 1/

It has already been pointed out that the capitalized future stream of revenues is what is being taxed by local property taxes under unit assessment. 2/ This Clawson recognizes in the closing statement irrespective of his explanation of the conditions under which public lands might not be included in local taxation.

Effects on County Income and Capital

It has been shown that the sale of BLM administered lands to private users at values approaching their capitalized value productivity would tend to diminish the capital position of the ranchers. This type of sale would result in a shift of capital from private to public hands. In the short run, the county product might be reduced while the potential and actual distribution of capital was being made. In the long run, one would expect that all resources would move back into utilization. In addition to these considerations, Calef, ignoring the possibility of long-term government loans for purchases, suggests:

> If all the land were offered for sale simultaneously, the market would be overwhelmed. Many ranchers would be unable to raise sufficient cash on such short notice, to buy even the tracts

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1/ Clawson, op. cit., pp. 341-2. Emphasis by this author.

2/ Ciriacy-Wantrup, Resource Conservation, op. cit., p. 174.

> they are currently using under Taylor leases. Under such circumstances, the land would either not be sold, would be sold at a ridiculously low price (with much of it being concentrated into a relatively few large corporate ownerships), or would sell at widely divergent prices to various purchasers. 1/

In summary, the evidence from the sources quoted and the analysis developed herein seems to indicate that a movement of public range lands into private hands, at their true value, would generally be detrimental to the local economy and the affected units within it.

1/ Calef, op. cit., p. 284.

CHAPTER VII

CONSIDERATIONS IN EXPANDING MULTIPLE USE FOR RECREATION PURPOSES ON PUBLIC GRAZING LANDS

Recreational Use of BLM Administered Lands

The general lands administered by this agency are concerned with recreation as an aspect of multiple use. For the purposes intended here, major concern will center around how and to what extent this type of use may affect the total county output, if these lands were to be organized into definable blocks and concentrated efforts to advertise their whereabouts, products, and access were to be made.

In general these lands are now open to public access for legitimate recreational pursuits, but their boundaries are not well defined and their intermingling with private lands may be a deterrent to full use for recreational (particularly hunting) pursuits. Whether such privileges would exist undiminished under private ownership is unknown.

The ranchers interviewed in the sample were asked what their position on permitting hunting was. Of the 69 interviewed, 33 indicated that their ranches were open to hunting; 23 said theirs were open with permission; and 13 said theirs were closed. Two specifically mentioned that theirs were open because of the BLM administered lands that were intermingled. This would appear to indicate that a transfer into private hands could decrease hunting.

The fear of a decrease in hunting was one of the major arguments used by sportsmen and conservationists against selling range lands to private interests in the late 1940's. Of the validity of their argument, Calef

says, "this supposition would, if Eastern and Texas experience is any guide, be born out . . ." 1/ Any decrease in hunting could result in one or two types of decreases in total county income. The first could occur through increased competition to domestic livestock from increases in the game population that would not be hunted. For example, during World War II, "with hunting curtailed, there was a distinct increase in the numbers of big game . . . on the national forests and . . . on the public domain" which some in the livestock industry felt were "responsible for cuts (reducing the number of animals per permittee) in . . . grazing permits." 2/ The second could occur from reduced expenditures by hunters coming into the area to hunt. In order to bring the first problem into focus, a framework within which it can rationally be considered needs to be developed.

Physical Data Requirements for Allocating and Using Range Forage

In wildlife conservation, as in many other fields and areas of economic decision-making, the relationships between physical components are the underlying determinants. In game management, there are two physical fields of concern: (1) the habitat and (2) the animal population. The physical characteristics of primary importance are the amount, type, and seasonal availability of forage on the habitat. Closely associated with--in the extreme cases, a function of--this is the number and type of animals

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1/ Calef, op. cit., p. 9.

2/ Peffer, op. cit., p. 283.

that the given forage base will maintain within the limits of the proposed use rates for the desired state of conservation. The basic determination for a range, upon which forage production for grazing animals is critical, is the measurement of this forage production. The accuracy of this determination is largely the responsibility of range technicians; its usefulness for economic and conservation decisions, in turn, is a function of its accuracy.

In addition to accuracy, the terms in which production is stated is of equal or perhaps even greater relevance: "The economist would like to have data of physical range output that relate to the final product--for example pounds of beef, wool, venison, or animal unit months of pasture for maintenance'." 1/ For conservation decisions a note of warning in using only final products needs to be sounded. There is increasing evidence that final output can be maintained over a period of time while some detrimental change in range plant composition and vigor occur. 2/ Thus both types of measures may be necessary. The latter may be vital in establishing timely use rates to achieve the state of conservation for optimum physical range condition.

1/ S. V. Ciriacy-Wantrup, "Problems Involving Conservation in Range Economics Research," Journal of Range Management, Vol. 10, No. 1, January, 1957, pp. 12-16.

2/ This point may require further research for if a range is stocked to the margin of total number of animals with respect to total pounds of saleable product, the results may appear immediately under completely controlled conditions.

Under the assumption that the above measurements can be made for a given range area, the question of what the measurements' applications are needs to be answered. One of ten suggested by one writer is: "How can grazing capacity of range be determined for game and combined use of game and livestock?" 1/ In other words, how many of what type of game and/or domestic animals will the given range, at the preferred use rate, furnish forage for?

It is possible, at least theoretically, to establish the physical production possibilities for a given range area at a given use rate--"range capacity." The numbers of different types or classes of animals that this range will support, will depend, to a large extent, upon the types and amounts of various plants found thereon. For instance, cattle and deer may use the same feed grounds, but this is not to say that they prefer the same types of plants for forage. 2/ In some instances, capacity or capability may be determined by density of brush or topography for specific animal types. Capacity may further depend upon the water available for animal use. This has been implicitly assumed adequate in the previous discussion of range where it might be a limiting factor. For

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1/ Odell Julander, "Utah's Big Game, Livestock, and Range Relationship Research Project," Journal of Range Management, Vol. 4, No. 5, September, 1951, pp. 330-350.

2/ Odell Julander and W. Leslie Robinette, "Deer and Cattle Relationships on Oak Creek Range in Utah," Journal of Forestry, Vol. 48, No. 6, pp. 410-415; and Arthur D. Smith, "Feeding Deer on Browse Species During Winter," Journal of Range Management, Vol. 2, No. 2, April, 1950, pp. 130-132.

simplicity, this assumption, now made explicit, will continue to be used although it can be, and is, a real problem in range utilization in particular areas.

The capabilities of the range for game or domestic animals will depend, too, upon what levels of timber or water production are desired for the given area. That is, the allocation of the range between separate products, as compared to the problem of allocating forage between competing animals. This, too, is a relationship of considerable economic importance, but will receive attention here in a somewhat "assumed to be established manner" except in the limiting case as explained below.

Using forage production as the principal determinant, theoretical production possibilities for two classes or types of animals on a given forage resource have been hypothesized. 1/ In the work cited, it was pointed out, as noted above, that due to the heterogeneity of plant composition and the preferences of different animals for different plants it was likely, within limits, that two or more types of animals could utilize the available forage more efficiently than a single type--if efficiency is measured by the amount of total product forthcoming. If only a single type or class of animals will use the given range it can be considered a limiting case of this model, where one or the other class of animals is produced. However, once these limits were passed, increases in numbers of one or both of the animal types would result in competition for the

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1/ John A. Hopkin, "Use of Economics in Making Decisions Relating to Range Use," Journal of Farm Economics, Vol. 38, No. 5, Dec., 1956, pp. 1594-1603.

available forage resource or a depleting change in its use rate. This fundamental relationship can conceivably be established for combinations of various domestic and/or game animals. The establishment of the marginal rate of substitution curve for the different combinations does not allow us, however, to say which combination should be produced. The above paper also pointed out that a "choice indicator," usually in the form of a properly applied price ratio of the two products, is the theoretically suggested tool for determining the optimum combination, a point that will be discussed in a later section. This model may be somewhat over-simplified for the problem at hand. While it is theoretically correct for the case of a given entrepreneur choosing between two products from a given combination of available resources, where all inputs and outputs are readily measurable in quantitative or money terms, some of these assumptions and conditions are not met in allocation of range resources.

Even under the assumption that accurate measures of range forage output can be made by the range technicians, this does not mean that they have been, or in all cases are, made. Therefore, problems remain in establishing the "range capacity," levels of output, estimating and controlling numbers of animals, establishing or estimating a price or value ratio, and deciding what conditions should prevail for having private or public ownership and control over both the range and wildlife resources to achieve the conservation desirable. It is in these problem areas that a delving attempt will be made.

Conceptually, the problem of allocating available range forage between livestock and wildlife is perhaps easier than establishing empirical evidence from field trials or practices. While range technicians are making progress in measuring forage output, this output must be associated with some level of stocking. Where there is indication that the present level of stocking is not giving the desired use rates for the range forage, the number of animals must be changed or controlled to achieve either the greater or lesser utilization which is desired.

While the above discussion has been largely centered on adjustments in range use, which have been considered for domestic and wildlife use in general, the problem of establishing capacity and substitution rates for local areas require continued attempts at solution. In a dynamic economy, where changes can be expected, any solution should perhaps be considered temporary until more current information becomes available. The numbers of wildlife required to satisfy a recreation-conscious population is unlikely to remain constant. Morris stated:

> With the steady increase of hunters, particularly of big game, there will be increasing demands for hunting opportunity. The sportsman interprets this to mean that more animals and more land will be needed. He fails to understand that the answer will be found mainly in good management of existing game populations. 1/

One would certainly agree that good management of existing herds is essential. Also, like the sportsman Morris speaks of, one can interpret the expanding of lands for wildlife use to be only a beginning. The

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1/ Melvin S. Morris, "Elk and Livestock Competition," Journal of Range Management, Vol. 9, No. 1, January, 1956, pp. 11-14.

increasing demand he mentions would also seem to support this view if he was thinking in economic terms. The limit of this expansion is presently not foreseeable.

The determination of rate of substitution between types of game animals for a given range also requires attention. It has apparently received less attention than the substition rate between domestic and wild animals. No particular literature was found on this subject. Cooney mentioned this problem in regard to the Northern Yellowstone and Sun River winter ranges. 1/ Experience and logic seem to indicate that especially on winter ranges where deer, elk, moose, or antelope compete for feed in nature only the stronger survive. The solution would appear to be in either increasing the amount of forage available, from sources used previously for other products where possible, or in establishing a choice between the two types of game animals and controlling their numbers to fit the range output capacity consistent with conservation goals.

Physical data from range and wildlife research will probably not be available in precise terms in the near future. Very useful approximations have been developing and it can be expected that this will continue. The more accurate these approximations become, the more nearly substitution and conservation use rates, can be established and put into use for a

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1/ Robert T. Cooney, "Elk Problems in Montana," Journal of Range Management, Vol. 5, No. 1, January, 1952, pp. 3-7.

given range. Assuming these approximations to be approaching sufficient accuracy, attention can be focused on the choice indicator.

Valuation and Policy Considerations for Wildlife

In the simplified model previously mentioned, optimum allocation of resources between two competing products could theoretically be determined by equating the ratio of their prices to their marginal rate of substitution. This assumes that these prices or revenues are in equivalent terms, usually money. In a competitive economy, prices are usually thought to be established at an equilibrium of supply and demand functions. These functions are difficult to establish even when products are easily converted to money terms. They are much more difficult to establish if products cannot be measured in money terms. By the given definition of wilflife, a most significant part of its value comes from some items not measured in monetary terms by the market mechanism. Such values are frequently called "intangible," but due to the implications of its meaning, a more desirable term is "extramarket." 1/

The food price of wildlife and domestic animals can be established in the market. Wildlife meat price could be approximated at public auctions which are held by the state game and fish commissions to dispose of illegally killed game that they have confiscated. This price would be influenced by the type of game animal and the condition of the carcass,

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1/ Ciriacy-Wantrup, Resource Conservation and Policies, op. cit., p. 85, also 239-41.

which in many cases is deplorable. The extramarket values are not so easily determined, yet attempts have been, and need to be, made for measuring or approximating it.

The extramarket value of wildlife, which is of prime importance here, can be considered in the somewhat nebulous and voluminous category of recreation. It may be further restricted to a little-organized, largely non-commercialized--as yet--outdoor recreation. Its very nature does not lend itself to specific definition and none is intended, for it may have a somewhat different meaning for each individual who engages in it. (Extramarket values may also accure to those who derive recreation from growing domestic livestock.)

It has been suggested that to define recreation two parts need to be considered; the activity, and the results of the activity. The former is the recreation; the latter, "re-creation." 1/ Recreation, like music, we sense most fully only during the activity. 2/ "Re-creation" is a source of release from mental and emotional strains. This release is important to the balance and sense of values for people beset by the pressures of everyday living. 3/ If this division is valid, it may add to defining

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1/ Samuel T. Dana, "Research Needs in Forest Re-creation," Proceedings Society of American Foresters Meeting, Memphis, Tennessee, 1956.

2/ J.V.K. Wagar, "Recreation and Wildlife Problems of the Central Rocky Mountains," Journal of Forestry, Vol. 52, No. 2, February, 1954, pp. 186-190.

3/ Richard E. McArdle, "Multiple Use--Multiple Benefits," Journal of Forestry, Vol. 51, No. 5, May, 195?, pp. 323-325.

benefits from recreation, but complicates, even further, any analytical approach at measurement. 1/ For purposes considered here, they will be considered as an aggregate of extramarket values.

The evaluation of the extramarket value, in the form of a marginal social revenue (demand) function, is an essential problem in resource allocation. It can be accomplished by analogy, indirect market criteria, and rates of substitution between extramarket and market goods. 2/ Such evaluations are still in embryonic stages. The attempts at evaluation that are available are largely those made by forest or fish and game departments. While these available reports do not constitute a demand function that is desired by professional economists, they do point to the magnitude of the social desire for recreation. Even these are found only for limited areas and are used here mainly to support the idea of a large and increasing demand for wildlife and recreation.

Some items that generally point to an increasing demand for recreation are: a rapidly expanding population, mounting national income, larger per capita disposable personal income, shorter work days and weeks, longer vacations, improved transportation facilities, earlier retirement, longer life, concentration of population in urban centers, and the need to find

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1/ For a comprehensive treatment of secondary benefits, see S. V. Ciriacy-Wantrup, "Benefit-Cost Analysis and Public Resource Development," Journal of Farm Economics, Vol. 37, No. 4, Nov., 1955, pp. 676-689.

2/ S. V. Ciriacy-Wantrup, Resource Conservation, Economics and Policy, op. cit., pp. 85-86 and Chapter 17.

relief from pressures and tensions of modern life. 1/ How much pressure these will apply will depend to a large extent upon the magnitude of the changes in each and the resulting aggregate change. From 1934 to 1951 the annual number of visitors to national forests increased from 14 to 30 million. 2/ Of these 30 million, 2 million were hunters and 4 million were fishermen. 3/ Taking in a longer period, another writer reported, " . . . that recreation use of national forests has grown from about 5 million man-days in 1921 to 35 million man-days in 1949, may mean only that people have eagerly taken the opportunity to enjoy forest recreation when it was made available to them and was within their reach in points of time and expense." 4/ Whether this tremendous rate of increase will continue will depend in a large part upon the factors indicated above.

The second feature of attempts to evaluate recreation was in terms of money expended in pursuing it. From a sampling census survey made in 1955, it was calculated that approximately $3 billion was spent on hunting and fishing ($324 million on big game, $119 million on waterfowl, $494 million on small game, and $1,914 million on fishing). 5/ It was

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1/ Dana, op. cit.

2/ Albert Arnst, "Recreational Facilities: A Potent Public Relations Force in Forestry," Journal of Forestry, Vol. 52, No. 11, Nov., 1954, pp. 910-913.

3/ McArdle, op. cit.

4/ John Sieker, "The Future of Forest Recreation," Journal of Forestry, Vol. 49, No. 7, July, 1951, p. 503.

5/ S. D. Crossley, "National Survey of Fishing and Hunting for 1955," U.S. Fish and Wildlife Circular 44, September, 1956.

further estimated that the typical hunter spent approximately $80 per year. He spent eight days hunting, which added to a total of 169 million days of recreation.

A study in the state of Washington determined that the licensed sportsmen spent $71 million annually which made an annual average of $152 per sportsman. This total was greater than the amount paid to farmers for anything but wheat; more than the returns to all drug stores or liquor stores. 1/ This apparently is an attempt to point out the magnitude of expenditure of hunting by comparing it to those of other industries. While no documented reports are immediately available for citation, many states in the mountain region list recreation among the top of the state enterprises in terms of total dollars of revenue received by the industry. Many of the dollars so expended are for services rendered; i.e., motels, meals, etc., and cannot validly be included as a part of the demand for hunting. They would be part of a gross return to a local area, however.

Economists are divided in opinion on the value of the above type of approach to evaluating the contribution to society's welfare made by hunting. Hopkin wrote, "Thus, it seems to me, expenditures that people make in pursuit of wildlife as compared with expenditures made for other goods and services, represent our soundest basis for comparing the contribution of each to society's happiness and welfare . . ." 2/ In contrast,

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1/ Robert F. Wallace, "An Evaluation of Wildlife Resources in the State of Washington," State College of Washington, Econ. and Bus. Studies, Bulletin No. 28, February, 1956, p. 63.

2/ Hopkin, op. cit., p. 1599.

Ciriacy-Wantrup explained, "One may have professional doubts about some of the procedures used, still these attempts should be encouraged . . . This does not suggest that all benefits of recreational resources could be evaluated. In connection with many such resources, however, market values can be used indirectly--for example, through analyzing data on fees, leases, and real estate transactions." 1/ It seems that both agree to a point. The latter appears willing, and rightly so, to point out that the demand for hunting privileges has become of sufficient magnitude that many are willing to pay for the privilege of hunting on private land rather than to compete with those who hunt on public or open private land. He does not intend to convey the idea that these people do not also incur the costs of transportation, food, lodging and sporting equipment. He further suggests:

> In other cases, measurement in terms of physical units of use--for example, man days--can be accomplished fairly easily. Values of additional units of use can be approached through questionnaires and the study of behavior in other experimental choice situations. Even such crude and partial measurement is more useful than disregarding these values altogether, or substituting for them some fantastic figure based on the expenditures of users for transportation, room and board, guns, fishing tackle, and similar items. 2/

While there is disagreement as to the value of particular measures, the need for measurement in approximating rational choices in resource allocation is emphasized by both.

1/ S. V. Ciriacy-Wantrup, "Benefit-Cost Analysis and Resource Development," op. cit., pp. 680-681.

2/ Ibid.

Application to County Income Generation

The previous sections have discussed the general nature of possibilities of conflicts in producing domestic and wild animals on the same range base. It would appear that in terms of gross county income, the relevant choice indicator would be the gross addition to income from either. If it can be assumed that returns from these uses have similar multiplier effects within the county, the choice would be made on the ratio of their gross additions to income. If the Hopkin model referred to (page 170) is adapted to this choice, the basis for chosing can be illustrated as shown in Figure 5. Here the physical product relationship is shown by the heavy line, P_2, P_2^*. It illustrates the total production for both classes of animals on a given range. That the approximate shape of the curve has not been determined is pointed out in the two previous sections. The shape of the curve illustrated indicates ranges of complementary and competitiveness.

Complementarity is indicated as domestic animal output is increased from 0 to P_1^*, while wildlife is increasing from P_2 to P_3. It is also indicated when wildlife production is increased from 0 to P_1 as domestic animal output is increased from P_2^* to P_3^*. In both cases, the output of the alternate is increased by the increase in the other (due to changes in forage from their different plant preferences).

The increased production of domestic animals beyond P_1^* can only come with a decrease in wildlife; that is, beyond this point, they are competitive. Likewise, when wildlife production is at P_1, it can only be increased by reducing domestic animal production below P_3^*.

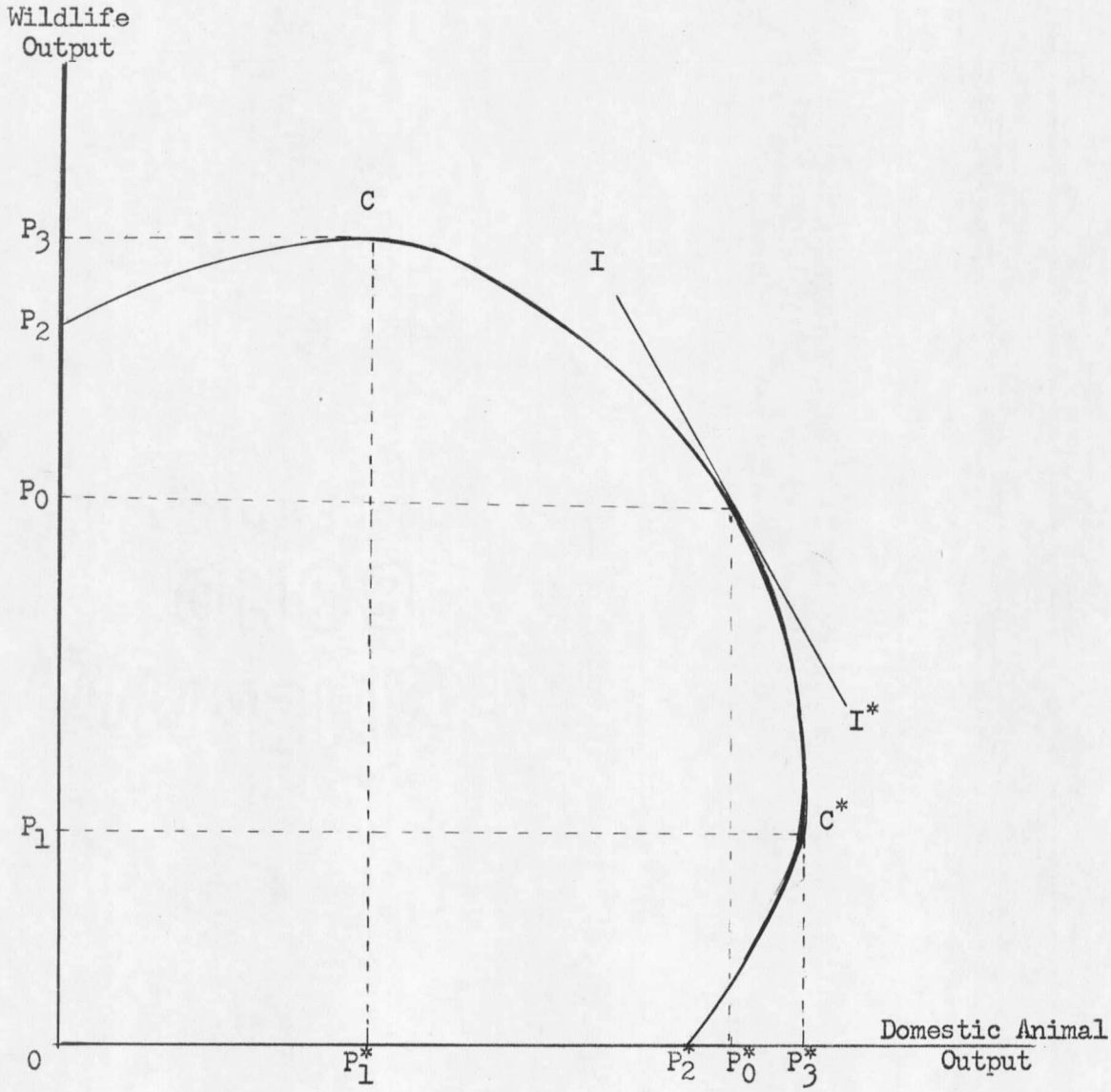

Figure 5. Possible competitive or complementary production relationships of domestic and wild animals on common range.

If it is assumed that production will be somewhere in the competitive range of $C-C^*$, a rational choice can be made by establishing the ratio of county income from wildlife (I) and county income from domestic animals (I^*), ($I-I^*$) and locating where it has the same slope as $P_2 - P_2^*$ in the $C-C^*$ area. This is illustrated at $P_0 - P_0^*$. If county income (in terms of gross additions to income from actual sportsmen's expenditures in the county) from wildlife were to increase in relation to that from domestic animals, a move to increase wildlife above P_0 should occur. If the opposite income relationships developed, levels below P_0 should be striven for.

Until such time as these physical and price-income relationships can be established, decisions will have to be based on less than indicated data requirements. Research in these areas is constantly being proposed and developed.

Enhancing Utilization of Recreation Pursuits On BLM Administered Lands

At present, there are no empirical data to establish the magnitude of any expected increase in county income from recreational pursuits (e.g., hunting) by blocking up BLM administered lands and advertising their production and whereabouts. It appears likely that such efforts, if they follow the general trend of advertising effectiveness, might increase the county income from hunting. This increase would have to be checked against the possible decrease in domestic animal income if we assume they are being produced anywhere in the competitive range illustrated in Figure 5.

Alternatively, if it is assumed that there currently is some unused increment of income that is not forthcoming because game are not being harvested, although they are physically produced, a waste (disconservation) is occurring. Successful efforts to reduce this waste would increase the total county income.

Ranchers in the Phillips County sample mentioned deer, antelope and birds as the main attractions for hunters. While the deer and the antelope tend to be competitive with domestic stock, birds would not be, or would at least be less competitive. Expansion in non-competitive game would also tend to increase the total county output.

No precise answers can be given as to the extent of possible increases until more adequate data on physical relations between the outputs are established, and means of measuring both market and extramarket value from various types of hunting are determined.

CHAPTER VIII

SUMMARY, CONCLUSIONS, AND SUGGESTIONS FOR FURTHER RESEARCH

Problems and Procedure

In a nation where basic ideologies and institutions are rooted in private ownership, complaints are often voiced that maintenance of large blocs of publicly administered lands within local government boundaries has a detrimental effect upon the magnitude and growth of incomes and production in these local areas. In order to attempt to answer these complaints, expository efforts were directed toward reviewing the background of when and how federal ownership, particularly of rangeland, developed; what effects the public ownership of this land has on firms utilizing it; how selected socio-economic measures of progress in a group of counties where greater percentage amounts of their area is public land compare with these measures in a group where lesser percentage amounts are public land; what effects transferring these lands into private hands might have; and how a change in utilization policy directed toward greater public recreation use of these multiple-use lands would affect the counties' output or income.

Background of Federal Land Ownership

Federal land ownership has gone through or is in one of four non-mutually exclusive phases or eras in terms of either time or purpose:

(1) acquisition,

(2) disposal,

(3) reservation, and

(4) management.

Acquisition began as a condition for the birth of the new nation near the close of the eighteenth century. Acquisition continued throughout much of the nineteenth century through purchase, annexation, and treaty. While these lands were being acquired, a program for transferring them out of federal ownership was also being pursued.

This program of moving lands out of federal into private or other public hands is called the disposal era. It began almost simultaneously with the acquisition era and has continued until the present, although at a greatly decelerated rate since the early years of the twentieth century. It has been argued by Peffer that this era has closed; that with the exception of some minor adjustments, public ownership will remain at approximately its present level. While this is generally assumed to be true by most writers in the field, the questions which prompted the undertaking of this study indicates that there are those who do not accept it as final.

It was during this disposal era, in the latter part of the nineteenth century, that policy makers became aware that laws and programs suitable for transferring lands into private hands in the eastern part of the nation would not be suitable for this purpose in the western part. Policymakers failed to recognize the magnitude of the difference of conditions in the two areas. The token efforts to develop suitable laws doomed to failure any orderly efforts to pass these western lands into private hands. This failure resulted in large areas being left in federal ownership, but essentailly under private control and utilization.

While public land was plentiful in relation to population, there appeared to be little concern for the nation to protect its land resource from abuse or reserve parts of it for the general welfare of the nation, now or in the future. As land became relatively more scarce, and abuses began to be apparent around the turn from the nineteenth to the twentieth century, a great number of prominent men from many fields began to push for greater public control and reservation.

The reservation period was ushered in as a part or result of a "conservation movement." It formally began with the setting aside of Yellowstone National Park, the first major reservation beyond the small amounts previously held for military or other specific and limited purposes. The setting aside of areas for other national parks, national forests, and monuments has continued until the present day.

Once lands were reserved, it became apparent that they would have to be used for the purpose or purposes for which they were set aside. To achieve these uses in an orderly fashion demanded that these lands be managed.

With the need for management established, a program to carry it out was begun. Since title of the lands was to remain with the people of the nation, leasing of renewable resources seemed a logical solution to move their use into private hands. This principle was first established with utilization of forest grazing lands. It has been modified and adapted to other resources including grazing on lands administered by the Bureau of Land Management.

Need for the Taylor Grazing Act and its Administration

During the general development of the background of present federal land ownership, a special problem was arising with respect to federally owned range lands. This developed out of the unsuited land transfer programs which were being pursued. Blocks of land, unsuited to transfer, were left in federal ownership. However, since the government was not intensively managing or controlling such land, it moved into the "control" of the ranchers and livestock men who could utilize it as part of their operation. Since this control had no legal sanction, it led to bitter, and often violent disputes, over its use. It also led to serious overuse of the range. Only when those who stood to gain from the use of the range could see that unless steps were taken there would be nothing left, was their political weight put behind management legislation. After a struggle of more than a quarter century, over what government department was to administer the grazing land management program, the Taylor Grazing Act was passed in 1934.

This act placed general administration of these grazing lands in the Grazing Service of the Department of Interior. It gave priority of use to those who had commensurate property and could prove prior use. It also set up advisory boards of stockmen to "assist" federal employees in administering the program. These boards were very powerful in keeping the lands to be administered in the previously established utilizers' hands, and setting a fee that was to cover only the administrative costs. That is, since they had been using the range free, they wanted to keep (and were successful in keeping) it as near this level as possible.

A struggle in 1948 over administrative policy and a possible transfer of these lands into private hands led to the formation of the Bureau of Land Management. This agency now administers 175.2 millions of the federal government's 354.6 million acres in the 48 contiguous United States. In the eleven western states, BLM administered land varies from a high of 47,360,737.6 acres in Nevada, or 67.4 percent of its total area, to a low of 368,732.0 acres in Washington or 0.86 percent of its total area. Of the total 752,947,840 acres in the eleven western states, the BLM administers 177,246,834.6 for a weighted average of 23.54 percent. In Montana, the BLM administers 8,343,634.8 acres or 8.95 percent of the total land area. This varies within Montana counties from a high of 40.8 percent in Prairie County to a low of 0.134 percent in Glacier County. From these percentages, it can be seen that the magnitude and distribution of the possible product or income from these lands in certain local areas can be of considerable significance to the level of economic activity in these local areas.

Development of Hypothesis and Corollaries

The concept of measuring the income or output of a given political or economic area is rooted in the attempts of eighteenth century economists to measure them for a nation. From these early attempts, national income and product accounts have developed to levels now used by the United States Department of Commerce and similar agencies in other nations. Although these methods have become relatively well developed on a national basis, their magnitude and costs have prevented extensive use in small,

local regions. A complete regional input-output model and its coefficients was beyond the scope of the research resources available here. Efforts were directed toward the more modest achievement of attempting to determine whether federal ownership of some of the range input in the agricultural sector might cause an increase or decrease in the sector's income and thus in the local region's income.

Since evidence indicated that stockmen had been politically successful in keeping fees as near administrative costs as possible, relevant economic rent theory led to the expectation that the difference between the fees set for the federal range, and its value productivity, would be capitalized into the fixed assets of the private firms using the land. Under a set of delineating assumptions, the first hypothesis was made: firms of comparable size less dependent upon federal lands would not be valued higher than those more dependent. As corollaries to this hypothesis, it was expected that:

(1) The nearer the fee is kept to zero the more nearly will the capital return to that factor stay with the ranch firm;

(2) In-lieu payments to local governments, under full value assessment, should approach zero as the factor cost approaches zero and vice-versa;

(3) Under Montana's current assessment practices, a windfall in decreased taxes could accrue to the users of these low fee lands in accordance with the amount of land used.

If the first hypothesis were verified, then the second and major hypothesis could be made: there are non-significant effects from federal ownership, as compared to private ownership, on the counties' output (income). The tests of the hypotheses were made from survey and secondary source data.

Data Sources and Analysis

Ranch Firm Valuation

Literature was reviewed in an effort to determine the amount of difference between the BLM fees and value productivity of the land, and for evidence indicating the amount of capitalization that can or does occur. While all the studies indicated that capitalization does occur, it is emphasized by an Arizona study wherein it was determined that owned land comprised only 0.4 percent of the total land in a sample of ranches, but the ranches sold for $350 per animal unit. Correspondence with the senior author of the Arizona Study indicated that land quality was approximately equal for owned and leased land. These data give support to the first hypothesis.

A sample of sixty-nine ranches in Phillips County were drawn on a stratified, random sample basis, by size and dependency, from a list of all ranches utilizing BLM administered lands in the county. These ranchers were interviewed with a prepared interview schedule to obtain data on costs, returns, land-base, and other selected items in order to obtain empirical data with which to supplement the secondary source data for testing the first hypothesis.

Basic to the test of the first hypothesis was a determination that there were significant differences in the amount of carrying capacity owned or leased from sources other than the BLM by the high and low percentage dependency groups.

Land-base data obtained from the interviews were supplemented with courthouse records of the productivity grade and classification of the acres in each ranch unit. From these data it was found that the greater amount of carrying capacity per AU owned or leased from non-BLM sources by the firms less than twenty percent dependent upon BLM was statistically greater than that for those over fifty percent dependent. This difference indicates that the low dependency ranches could be higher in value from a land-base standpoint.

In order to determine the value of the ranches in the two groups, a study of their reported returns per AU for the year prior to the interview was made. It was determined that the under twenty percent dependency group had weighted average gross cattle sales per AU of $71.97; the over fifty percent group had $74.57 on the same basis. Their combined weighted average gross cattle sales was $73.41 per AU. This was near the mid-range of reported returns of from $61.49 to $89.09 reported by recent studies of similar ranches. From this range of returns a gross of $84.80 per AU was assumed to be satisfactory for illustrative purposes.

The cost data for the livestock enterprise from the sample data was not separable from those for the small grain enterprises; thus, it was necessary to utilize cost data from secondary sources. These sources indicated that there could be operating costs of $66.84 per AU. This figure subtracted from the gross gave us $17.96 per AU to be capitalized into a value per AU. Using the standard perpetual annuity capitalization formula, a hypothetical value of $359.20 per AU was computed to be used

in the expository analysis. (Other values were computed to show a range of possible ranch values the data could suggest.) With indicated returns similar for the below twenty percent dependent group of ranches and the above fifty percent group, it appears that their earnings would give them similar values. This analysis also gives support to the first hypothesis.

Utilizing the hypothetical AU value of $359.20 it was possible to construct a set of values for ranch firms facing a variety of percentage dependencies on BLM administered lands and fee levels. (It should clearly be understood that other sets could have been developed by selecting a different value per AU but the indicated relationships would still exist.) This analysis supported our corralaries in that it showed how changes in ranch values, attributed to owned or to BLM land, could arise from changes in percent dependency or fee levels.

The second hypothesis is supported to the extent low fees permitted the value of the public land to be capitalized into the private ranch holdings and thus the capital earnings of the federal land accrue to the private firms using it.

Aggregate County Data

Another approach to testing the second and major hypothesis was made by utilizing selected socio-economic data from secondary sources. Using the case study comparison method, two groups of counties were selected. The first, or study, group has a range from 13.0 to 40.8 and average 24.3 percent of their land under BLM administration; the second, or control, group has a range from .422 to 14.3 and average 4.2 percent;

a difference in average of 20.1 percent. Under the assumption that if there were significant effects on the counties' socio-economic activities from the heavier concentration of the BLM administered lands, it should be reflected in some differences in the selected phenomena for the two groups, a series of comparisons were made.

Both groups of counties lost population from 1930-60. The percentage losses by both groups were similar in that variations within groups exceeded the 3.5 percent difference between groups. The study group had a statistically significant lower population density per square mile than did the control group in 1930. By 1960, both groups had declined by 0.4 person per square mile. Percentage decline in population density was larger in the study group, but this was because the margin of habitability would be expected to be lower where federal lands are concentrated. Loss of population appears to have been common to both groups.

Both groups had predominantly rural farm populations in 1930; by 1960 neither had. In both years, the percent of the population classified as rural-farm was greater in the study group. The percentage decline was not significantly different for the two groups. Both groups gained in urban population during the 1930-1960 period, but not so fast as the state as a whole or the nation.

Farm numbers have declined rapidly in the state, nation, and both groups of counties. The percentage decline was not significantly greater in the study group. Associated with the larger decline in percentage of farms was a relatively larger increase in size of farms in the study group.

Both groups showed percentage farm size increases greater than the nation or the state as a whole. Since these comparisons are made on numbers of acres, it is well to keep in mind the type of land under consideration.

There was less farm tenancy in the study group in 1930, and again in 1959, than there was in the control group, the state, or the nation for the same years.

The number of farms with irrigated land increased in the study group from 1930 to 1959 while it was declining in the control group. The percent of farms with irrigated land were similar for both groups in both 1930 and 1959; it increased during the same period for both groups.

The study group received a greater percent of its farm income from livestock sales than from crop sales when compared to the control group. Values of farm products sold per farm have risen in both groups from 1930 to 1959. The value per farm was higher in the study group in 1959, but variation indicated a non-significant difference.

Farm indebtedness, as reflected in average percent of farms mortgaged, is not significantly smaller in the study group than in the control group or the state as a whole.

Farm-operator level-of-living indexes in 1950 show a lower level for the study group as compared to the control group on superficial comparison. When the emphasis on electrical use is removed, the difference disappears. By 1959, when electricity had spread into these less populous areas, the indexes for the study and control groups were a comparable 119.7 and 120.0, both above the nation's 100.

Comparison of per capita income figures for the two groups showed non-significantly larger incomes in the study group. In 1951 per capita income levels in both groups were larger than the state or nation's levels. By 1956, the study group's level was between the state and the nation while the control group's was lower than either. The larger percent of families with annual incomes over $10,000 or under $3000 was not significantly greater in the study group as compared to the control group. It could not be concluded from this comparison that higher levels of federal land ownership had an adverse effect on income.

Retail trade establishments declined by 26.4 percent in the study group and 4.8 percent in the control group. The number of wholesale firms declined in both groups. The increase dollar volume of business at both the retail and wholesale level was greater in the control group than in the study group. Per capita bank deposits were also greater in the control group. These increases were traceable to recently discovered patterns of shopping and trading and appeared not to be correlated directly with federal land ownership.

Employment has been more agriculturally oriented in the study group than the control group or the state as a whole. This reflects the patterns of development of trades and services.

The general lack of correlation between higher federal land ownership and the phenomena considered tends to support the major hypothesis that there are non-significant effects on the counties' incomes from the federal ownership.

Transfer of BLM Administered Lands to Private Ownership

While transferring present BLM administered lands into private hands is generally assumed to be unlikely, it is not a closed issue. The most recent attempt, in 1948, to effect such a transfer met a sound defeat at the hands of the conservationists. The arguments of both sides were emotionally and value-judgment oriented.

If such a transfer is to occur, it appears most likely that it would place the lands currently under lease into the hands of those leasing it. Analysis indicates that if such a proposal were to be carried out at prices approximating the capitalized productive value of the land, it would affect adversely the capital structure of the firms using it. In some cases, the adversity could be sufficiently serious actually to destroy the firm or require it to be heavily subsidized.

Expansion of Recreation Use by Promotion

Insufficient data are available to determine how blocking up, identifying, and advertising BLM administered lands would affect the incomes of local areas. Physical and economic data are needed to establish the nature of the competition, if any, for forage between wildlife and domestic animals. A conceptual economic framework specifying the types of data needed and their use was developed. The use of the framework will await the development of the data specified.

Policy Implications

What level of fees to charge for the privilege of grazing privately owned livestock on public range lands has been a matter of

discussion and controversy. Suggestions have been made that fee levels on public land should be increased to the value productivity of the land. 1/ On the other hand, ranchers have presented strong opposition to the fee raises which have occurred since the passage of the Taylor Grazing Act. Each side has used a different set of goals and underlying assumptions. Since basic assumptions and goals are different for the opposing sides in the struggle, changes in fee levels will continue to be controversial.

With the available evidence supporting the hypothesis that renting federal lands at or near the administrative cost has a negligible effect on the economic activity of local areas in which these lands are located, it appears that any suggestions for raising fees above this level should give consideration to possible adverse effects on these local economies. Under this low fee basing plan the public has been able to retain title and control of the land while allowing the returns from it to remain in private hands.

If fees should be raised to where they are equated with the public land's value productivity, the return to capital would flow out of the local area. 2/ From the known distribution of public land the question could then be asked as to why the nation should choose to take a capital payment from some local regions and not from others. If the public

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1/ For example see Calef, op. cit., p. 272-274 and Roberts, op. cit., p. 729.

2/ Roberts, op. cit., argues that a capital payment to the user could be made. While this is possible, it doesn't insure that it will remain in the local area.

continues to charge low fees, the question of how to justify the present distribution of grazing permits remains unsolved.

It is generally agreed that current federal range fees are below those charged on private grazing land. Clawson argues that other users also pay less than the value productivity for their use. 1/ He seems to disregard the possibility that private grazing on public land may be the only use which has a direct monetary return. Other uses, for example hunting, rarely pay a land fee for use of the public land. Neither do they have a direct monetary return to the user.

If one recalls that in some areas hunters do pay land fees to hunt on private land, he can agree with Clawson that grazing is not the only use of public land with less than a fair market fee. Clawson further contends that "one may well argue for reasonable charges for all uses of public lands, to be paid by all users . . . " 2/ Although reasonable fees--if reasonable means full value--may create equitable charges between and among users, they could be detrimental to the local economies through causing a capital payment to flow out of them as explained above. 3/

1/ Marion Clawson, Land For Americans, Chicago: Rand McNally and Co., 1963, p. 117.

2/ Ibid.

3/ If fees are kept at administrative level, any improvements on the range to increase carrying capacity of domestic animals might well be borne by those benefitted.

Needed Research

In addition to the suggestions made in Chapter VII for evaluating wildlife in a local economy, alternative methods for testing the hypotheses could be tried. For example:

(1) A broad study of sales values of ranches using varying percentages of BLM lands could be undertaken from a study of real estate transactions;

(2) An analysis of changes in taxes from the change in assessment and classification procedures in Montana could be made by drawing a sample of ranches utilizing over fifty percent of BLM land in the counties used for comparative purposes.

(3) A set of counties with wider differences in percentage of land under BLM administration could be selected for comparative purposes.

All of these could be broadened to cover other states where BLM administered lands are prevalent and assessing procedures would permit.

The need for regional input-output analysis was indicated in Chapter III. Only with the development of such a model could a complete statistical analysis be made.

It has been implied that greater recreation use would develop under public ownership. The growth of recreation on private lands may indicate a trend toward greater multiple-use of lands in private hands. If this is so, a check of additions to local incomes under these conditions may be in order.

Federal ownership of other than grazing lands is also prevalent in certain areas. Methods for analyzing their effects need to be developed and tested. These range over lands producing valuable minerals to those providing largely scenic granduer. Institutional barriers to their rates of development under public or private ownership need to be explored.

The possible effects on certain local economies where BLM district management units are located have been ignored. These effects could be explored. The rate of development of range resources, for water, revegetation, and other production improvements, under public or private ownership have also been ignored. These, too, can conceivably have significant effects on output in certain time periods.

APPENDIX

APPENDIX TABLE I. POPULATION OF SELECTED MONTANA COUNTIES 1920 to 1960, WITH PERCENTAGE CHANGES 1920-60 AND 1930-60.

County	1920	1930	1940	1950	1960	1960 as % of 1920	1960 as % of 1930
Study Group							
Beaverhead	7,369	6,654	6,943	6,671	7,194	97.6	108.1
Blaine	9,057	9,006	9,566	8,516	8,091	89.3	89.8
Carbon	15,279	12,571	11,865	10,241	8,317	54.4	66.2
Carter	3,972	4,136	3,280	2,798	2,493	62.8	60.3
Fergus	28,344	16,531	14,040	14,015	14,018	----	84.8
Garfield	5,368	4,252	2,641	2,172	1,981	36.9	46.6
McCone	4,747	4,790	3,798	3,258	3,321	70.0	69.3
Petroleum	----	2,045	1,083	1,026	894	----	43.7
Phillips	9,311	8,208	7,892	6,334	6,029	64.8	73.5
Powder River	3,357	3,909	3,159	2,693	2,485	74.0	63.5
Prairie	3,684	3,941	2,410	2,377	2,318	62.9	58.8
Valley	11,542	11,181	15,181	11,353	17,080	----	152.8
Control Group							
Custer	12,194	11,242	10,422	12,661	13,227	108.5	117.7
Daniels	----	5,553	4,563	3,946	3,755	----	67.6
Dawson	9,239	9,881	9,092	8,618	12,314	133.2	124.6

APPENDIX TABLE I (CONTINUED). POPULATION OF SELECTED MONTANA COUNTIES, 1920-1960, WITH PERCENTAGE CHANGES, 1920-60 AND 1930-60.

County	1920	1930	1940	1950	1960	1960 as % of 1920	1960 as % of 1930
Fallon	4,548	4,568	3,719	3,660	3,997	87.9	87.5
Golden Valley	---	2,126	1,607	1,337	1,203	---	56.6
Judith Basin	---	5,238	3,655	3,200	3,085	---	58.9
Madison	7,495	6,323	7,292	5,998	5,211	69.5	82.4
Musselshell	12,030	7,242	5,717	5,408	4,888	---	67.5
Richland	8,989	9,633	10,209	10,366	10,504	116.9	109.0
Roosevelt	10,347	10,672	9,806	9,580	11,731	113.4	109.9
Rosebud	8,002	7,347	6,477	6,570	6,187	77.3	84.2
Sheridan	13,847	9,869	7,814	6,674	6,458	---	65.4
Stillwater	7,630	6,253	5,694	5,416	5,526	72.4	88.4
Sweetgrass	4,926	3,944	3,719	3,621	3,290	---	83.4
Treasure	1,990	1,661	1,499	1,402	1,345	67.6	81.0
Wheatland	5,619	3,751	3,286	3,187	3,026	53.9	80.7
Wibaux	3,113	2,767	2,161	1,907	1,098	35.1	39.7
Montana[a]	548,889	537,606	559,456	591,024	674,767	122.9	125.5
United States[b]	105,710,620	122,775,046	131,669,275	150,697,361	178,464,236	168.8	145.6

a/ The Montana Almanac, 1959-60 Ed., Missoula: Montana State University Press, 1960, p.5

b/ U. S., Bureau of the Census, Statistical Abstract of the United States, 1961, Washington, D. C. 1961, p. 5.

APPENDIX TABLE II. POPULATION PER SQUARE MILE FOR SELECTED MONTANA COUNTIES 1930-1960.

County	1920[a]	1930[b]	1940[c]	1950[d]	1960[e]
Study Group					
Beaverhead	1.3	1.2	1.2	1.2	1.3
Blaine	2.1	2.1	2.2	2.0	1.9
Carbon	7.4	6.1	5.7	4.9	4.0
Carter	1.2	1.2	1.0	0.8	0.8
Fergus	4.0	3.8	3.3	3.3	3.3
Garfield	1.1	0.9	0.6	0.5	0.4
McCone	1.8	1.8	1.4	1.3	1.3
Petroleum	---	1.2	0.7	0.6	0.5
Phillips	1.8	1.6	1.5	1.2	1.2
Powder River	1.0	1.2	1.0	0.8	0.8
Prairie	2.1	2.3	1.4	1.4	1.3
Valley	2.1	2.2	3.0	2.3	3.4
Control Group					
Custer	3.3	3.0	2.8	3.4	3.5
Daniels	---	3.8	3.2	2.7	2.6
Dawson	3.9	4.2	3.7	3.9	5.2
Fallon	2.8	2.8	2.3	2.2	2.4

APPENDIX TABLE II (CONTINUED). POPULATION PER SQUARE MILE FOR SELECTED MONTANA COUNTIES, 1930-1960.

County	1920	1930	1940	1950	1960
Golden Valley	---	1.7	1.4	1.1	1.0
Judith Basin	---	2.8	1.9	1.7	1.6
Madison	2.1	1.7	2.1	1.7	1.5
Musselshell	4.1	4.0	3.0	2.9	2.6
Richland	4.3	4.6	4.9	5.0	5.1
Roosevelt	4.4	4.5	4.1	4.0	4.9
Rosebud	1.6	1.5	1.3	1.3	1.2
Sheridan	5.2	5.9	4.6	3.9	3.8
Stillwater	4.3	3.5	3.2	3.0	3.1
Sweetgrass	2.5	2.1	2.0	2.0	1.8
Treasure	2.1	1.7	1.5	1.4	1.4
Wheatland	4.0	2.7	2.3	2.2	2.1
Wibaux	3.5	3.1	2.4	2.1	1.9
Montana	3.8	3.7	3.8	4.1	4.6

APPENDIX TABLE II (CONTINUED). POPULATION PER SQUARE MILE FOR SELECTED MONTANA COUNTIES, 1930-1960.

County	1920	1930	1940	1950	1960
United States[f]	35.6	41.2	44.2	50.7	60.0

a/ U. S., Bureau of the Census, Fourteenth Census of the United States, 1920, Volume I, Population, Washington, D. C.: pp. 115-116.

b/ U. S., Bureau of the Census, Fifteenth Census of the United States, 1930, Volume I, Population, Washington, D. C.: pp. 634-635.

c/ U. S., Bureau of the Census, Sixteenth Census of the United States, 1940, Volume I, Population, Washington, D. C.: p. 617.

d/ U. S., Bureau of the Census, 1950 Census of Population, Volume I, Washington, D. C., pp.26-28.

e/ U. S., Bureau of the Census, 1960 Census of Population, Volume I, Washington, D. C., pp. 11-28.

f/ U. S., Bureau of the Census, Statistical Abstract of the United States, 1961, Washington, D. C.: 1961.

APPENDIX TABLE III(a). DISTRIBUTION OF POPULATION--RURAL NON-FARM FOR SELECTED MONTANA COUNTIES 1930-1960.

County	1930 a/		1940 b/	1950 c/	1960 d/	
	Number	Percent	Number	Number	Number	Percent
Study Group						
Beaverhead	3,755	56.4	1,528	1,477	1,737	24.1
Blaine	3,463	38.5	4,766	5,065	5,451	67.4
Carbon	3,684	29.3	3,550	3,087	5,432	65.3
Carter	655	15.8	829	1,082	1,049	42.1
Fergus	2,983	18.0	2,739	2,732	1,820	20.1
Garfield	475	11.2	830	821	762	38.5
McCone	740	15.4	1,097	1,183	1,268	38.2
Petroleum	568	27.8	502	511	404	45.2
Phillips	2,576	31.4	4,203	3,735	3,775	62.6
Powder River	325	8.3	642	810	920	37.0
Prairie	1,414	35.9	1,430	1,571	1,454	62.7
Valley	4,243	37.9	7,030	3,940	7,539	44.1
Control Group						
Custer	1,167	10.4	922	1,494	1,815	13.7
Daniels	1,776	32.0	1,945	2,337	2,538	67.6
Dawson	750	7.6	720	1,344	3,177	25.8
Fallon	1,674	36.6	1,748	1,487	1,794	69.9

APPENDIX TABLE III(a) (CONTINUED). DISTRIBUTION OF POPULATION--RURAL NON-FARM FOR SELECTED MONTANA COUNTIES, 1930-1960.

County	1930		1940	1950	1960	
	Number	Percent			Number	Percent
Golden Valley	557	26.2	607	595	579	48.1
Judith Basin	1,909	36.4	1,419	1,313	1,580	51.2
Madison	2,849	45.1	3,854	3,326	3,299	63.3
Musselshell	2,518	34.8	1,774	1,525	1,264	25.9
Richland	3,384	35.1	1,695	2,054	1,935	27.9
Roosevelt	5,054	47.4	5,620	4,331	5,693	48.5
Rosebud	2,988	40.7	3,712	4,142	4,628	74.8
Sheridan	3,159	32.0	3,552	3,738	3,667	56.8
Stillwater	2,122	33.9	2,347	2,748	3,505	63.4
Sweetgrass	1,479	35.5	1,685	1,946	1,910	58.1
Treasure	395	23.8	514	573	581	43.2
Wheatland	2,375	63.3	2,278	2,394	2,609	86.2
Wibaux	682	24.6	700	769	854	50.3
Montana	152,608	28.4	172,214	197,051	230,712	34.2
United States	23,662,710		27,029,385	31,181,000	40,597,000	

a/ U. S., Bureau of the Census, Fifteenth Census of the United States, 1930, Population, Volume III, Part II, Washington, D. C.: 1931, pp. 22-25.

b/ U. S., Bureau of the Census, County Data Book, Washington, D. C., 1947, pp. 236-247.

c/ U. S., Bureau of the Census, County and City Data Book, 1952, Washington, D. C., pp. 258-266.

d/ U. S., Bureau of the Census, Census of Population, 1960, Montana (DC-1, 28C), Washington, D. C., pp. 84-85, 160-164 and 167-171.

APPENDIX TABLE III(b). DISTRIBUTION OF POPULATION--RURAL FARM FOR SELECTED MONTANA COUNTIES 1930-1960.

County	1930		1940	1950	1960	
	Number	Percent	Number	Number	Number	Percent
Study Group						
Beaverhead	2,899	43.6	2,401	1,926	1,767	24.6
Blaine	5,543	61.5	4,800	3,451	2,640	32.6
Carbon	5,861	46.6	5,365	4,424	2,885	34.7
Carter	3,481	84.2	2,451	1,716	1,444	57.9
Fergus	8,190	49.5	5,427	4,710	3,790	21.0
Garfield	3,777	88.8	1,811	1,351	1,219	61.5
McCone	4,050	84.6	2,701	2,075	2,053	61.8
Petroleum	1,477	72.2	581	515	490	54.8
Phillips	5,632	68.6	3,689	2,599	2,252	37.4
Powder River	3,584	91.7	2,517	1,883	1,565	63.0
Prairie	2,527	69.1	980	806	864	37.3
Valley	6,938	62.1	4,352	3,592	3,143	18.4
Control Group						
Custer	2,900	25.8	2,187	1,924	1,747	13.2
Daniels	3,777	68.0	2,618	1,609	1,217	32.4
Dawson	4,502	45.6	3,374	2,494	2,079	16.9
Fallon	2,895	63.4	1,971	463	1,203	30.1

APPENDIX TABLE III(b) (CONTINUED). DISTRIBUTION OF POPULATION--RURAL FARM FOR SELECTED MONTANA COUNTIES, 1930-1960.

County	1930 Number	1930 Percent	1940 Number	1950 Number	1960 Number	1960 Percent
Golden Valley	1,569	73.8	1,000	742	624	51.9
Judith Basin	3,329	63.6	2,236	1,887	1,505	48.8
Madison	3,474	59.9	3,440	2,672	1,912	36.7
Musselshell	2,147	29.6	1,299	1,027	782	16.0
Richland	6,249	64.9	5,536	4,325	3,005	28.6
Roosevelt	5,618	52.6	4,186	2,692	2,453	20.9
Rosebud	4,359	59.3	2,765	2,428	1,559	25.2
Sheridan	6,710	68.0	4,262	2,936	2,791	43.2
Stillwater	4,131	66.1	3,347	2,668	2,021	36.6
Sweetgrass	2,465	62.5	2,034	1,675	1,380	41.9
Treasure	1,266	76.2	985	829	764	56.8
Wheatland	1,376	36.7	1,008	793	417	13.8
Wibaux	2,085	75.4	1,461	1,138	844	49.7
Montana	203,962	37.9	175,707	135,939	105,598	15.6
United States	30,157,518		30,216,188	23,048,000	13,445,000	

APPENDIX TABLE III(c). DISTRIBUTION OF POPULATION--URBAN FOR SELECTED MONTANA COUNTIES 1930-1960.

County	1930		1940	1950		1960	
	Number	Percent	Number	Number	Percent	Number	Percent
Study Group							
Beaverhead	---	---	3,014	3,268	49.0	3,690	51.3
Blaine	---	---	---	---	---	---	---
Carbon	3,026	24.1	2,950	2,730	26.7	---	---
Carter	---	---	---	---	---	---	---
Fergus	5,358	32.4	5,874	6,573	46.9	7,408	52.8
Garfield	---	---	---	---	---	---	---
McCone	---	---	---	---	---	---	---
Petroleum	---	---	---	---	---	---	---
Phillips	---	---	---	---	---	---	---
Powder River	---	---	---	---	---	---	---
Prairie	---	---	---	---	---	---	---
Valley	---	---	3,799	3,821	33.7	6,398	37.5
Control Group							
Custer	7,175	63.8	7,313	9,243	73.0	9,665	73.1
Daniels	---	---	---	---	---	---	---
Dawson	4,629	46.8	---	5,254	57.8	7,058	57.3
Fallon	---	---	---	2,173	68.0	---	---

APPENDIX TABLE III(c) (CONTINUED). DISTRIBUTION OF POPULATION--URBAN FOR SELECTED MONTANA COUNTIES, 1930-1960.

County	1930		1940	1950		1960	
	Number	Percent		Number	Percent	Number	Percent
Golden Valley	---	---	---	---	---	---	---
Judith Basin	---	---	---	---	---	---	---
Madison	---	---	---	---	---	---	---
Musselshell	2,577	35.6	2,644	2,856	52.8	2,842	58.1
Richland	---	---	2,978	3,987	38.5	4,564	43.5
Roosevelt	---	---	---	2,557	26.7	3,585	30.6
Rosebud	---	---	---	---	---	---	---
Sheridan	---	---	---	---	---	---	---
Stillwater	---	---	---	---	---	---	---
Sweetgrass	---	---	---	---	---	---	---
Treasure	---	---	---	---	---	---	---
Wheatland	---	---	---	---	---	---	---
Wibaux	---	---	---	---	---	---	---
Montana	181,036	33.7	211,535	258,034	43.7	338,457	50.2

APPENDIX TABLE III (c) (CONTINUED). DISTRIBUTION OF POPULATION--URBAN FOR SELECTED MONTANA COUNTIES, 1930-1960.

	1930 Number	1940	1950 Number	1960 Number
United States	68,954,823	74,423,702	96,468,000	125,283,000

a/ U.S., Bureau of the Census, Fifteenth Census of the United States, 1930, Population, Volume III, Part II, Washington, D.C., 1931, pp. 22-25.
b/ U.S., Bureau of the Census, County Data Book, Washington, D.C., 1947, pp. 236-247.
c/ U.S., Bureau of the Census, County and City Data Book, 1952, Washington, D.C., pp. 258-266.
d/ U.S., Bureau of the Census, Census of Population, 1960, Montana (DC-1, 28c), Washington, D.C., pp. 84-85, 160-164 and 167-171.

APPENDIX TABLE IV NUMBER OF FARMS IN SELECTED MONTANA COUNTIES 1920-1959.

County	1920 a/	1930 b/	1935 b/	1940 c/	1945 d/	1950 e/	1954 f/	1959 g/
Study Group								
Beaverhead	642	581	551	457	407	370	340	294
Blaine	1,761	1,288	1,401	1,078	917	808	734	685
Carbon	1,353	1,170	1,216	1,074	979	998	896	812
Carter	855	848	909	637	519	442	432	364
Fergus	4,226	2,073	1,999	1,486	1,356	1,203	1,070	975
Garfield	1,530	1,077	1,062	587	455	382	367	316
McCone	1,284	1,041	946	754	683	675	610	587
Petroleum	---	363	373	180	161	160	142	124
Phillips	1,914	1,476	1,522	1,046	925	803	711	659
Powder River	833	896	945	688	509	472	424	376
Prairie	673	559	539	257	254	257	258	240
Valley	2,169	1,833	1,706	1,297	1,271	1,167	1,098	936
Control Group								
Custer	941	715	750	496	518	506	453	406
Daniels	---	906	904	804	675	588	609	515
Dawson	1,195	1,018	1,017	834	792	758	687	634
Fallon	758	650	694	510	414	414	384	322

APPENDIX TABLE IV (CONTINUED). NUMBER OF FARMS IN SELECTED MONTANA COUNTIES, 1920-1959.

County	1920	1930	1935	1940	1945	1950	1954	1959
Golden Valley	---	387	384	268	244	225	197	168
Judith Basin	---	776	742	599	528	490	489	418
Madison	901	748	783	655	699	630	509	454
Musselshell	1,604	525	453	314	318	309	259	245
Richland	1,577	1,341	1,506	1,218	1,099	1,057	1,004	874
Roosevelt	1,215	1,276	1,416	1,043	849	814	860	724
Rosebud	1,136	940	1,080	690	719	550	481	386
Sheridan	2,408	1,492	1,496	1,238	1,113	981	965	807
Stillwater	1,370	962	947	796	722	647	643	533
Sweetgrass	863	532	535	463	426	384	366	305
Treasure	330	266	256	203	182	163	150	138
Wheatland	688	324	297	229	218	192	201	174
Wibaux	530	469	468	373	337	304	290	242
Montana	57,677	47,495	50,564	41,823	37,747	35,085	33,061	28,959

APPENDIX TABLE IV (CONTINUED). NUMBER OF FARMS IN SELECTED MONTANA COUNTIES, 1920-1959.

	1920	1930	1935	1940	1945	1950	1954	1959
United States	6,448,343	6,388,698	6,812,350	6,096,799	5,859,169	5,382,162	4,782,416	3,703,894

a/ U. S., Bureau of the Census, Fifteenth Census of the United States, Agriculture, Volume II, Part 3, Washington, D. C.: 1932, pp. 30-33 and 118-130.

b/ U. S., Bureau of the Census, Sixteenth Census of the United States, Agriculture, Volume II, Part 3, Washington, D. C.: 1942, pp. 16-20.

c/ U. S., Bureau of the Census, County Data Book, 1947, Washington, D. C.: 1947, pp. 5 and 236-247.

d/ U. S., Bureau of the Census, City and County Data Book, 1949, Washington, D. C.: 1949, pp. 18 and 208-211.

e/ U. S., Bureau of the Census, City and County Data Book, 1952, Washington, D. C.: 1952, pp. 8 and 258-273.

f/ U. S., Bureau of the Census, City and County Data Book, 1956, Washington, D. C.: 1956, pp. 8 and 178-185.

g/ U. S., Bureau of the Census, City and County Data Book, 1962, Washington, D. C.: 1962, pp. 12 and 217-223.

APPENDIX TABLE V. THE SIZE OF FARMS IN SELECTED MONTANA COUNTIES 1920-1959.

County	1920 a/	1930 b/	1935 b/	1940 b/	1945 c/	1950 c/	1954 d/	1959 d/
Study Group	Acres	Acres	Acres	Acres	Acres	Acres	Acres	Acres
Beaverhead	992.2	1909.1	2340.6	2832.6	3087.2	3956.3	3980.8	6102.2
Blaine	658.2	954.3	1372.6	1510.8	2321.1	2202.3	3088.9	3242.9
Carbon	329.9	396.2	420.5	543.1	725.4	653.6	728.4	838.8
Carter	652.0	1296.3	1387.3	1998.2	3363.8	3720.6	3481.2	3882.8
Fergus	609.1	807.0	939.3	1156.5	1503.1	1693.5	1964.6	2247.5
Garfield	571.3	1095.0	1180.1	1511.2	4166.5	5236.6	5940.9	6836.9
McCone	520.8	824.9	920.8	1342.8	2045.9	2066.0	2322.1	2384.4
Petroleum	---	1033.5	1341.5	1489.8	3161.9	3353.7	5208.8	5401.3
Phillips	566.7	1026.5	1073.6	1311.6	1815.3	2219.8	2499.1	3040.5
Powder River	716.8	1351.4	1454.8	1958.0	2853.2	3380.6	3883.1	4459.5
Prairie	815.7	1291.9	1278.0	1510.6	2322.8	2574.2	2563.4	3131.6
Valley	519.5	837.7	907.8	966.3	1298.0	1326.9	1621.6	2449.9
Control Group								
Custer	1059.7	1911.3	2109.5	2634.0	4312.5	4768.4	5643.7	5947.5
Daniels	---	711.7	711.2	870.6	1196.0	1364.2	1385.7	1610.5
Dawson	625.9	1042.4	960.4	1130.6	1606.1	1853.5	1992.2	2183.0
Fallon	760.9	1140.6	1099.4	1510.8	2261.3	2458.1	2424.4	2901.5

APPENDIX TABLE V (CONTINUED). THE SIZE OF FARMS IN SELECTED MONTANA COUNTIES, 1920-1959.

County	1920	1930	1935	1940	1945	1950	1954	1959
Golden Valley	---	1322.2	1623.2	2283.0	2959.7	3072.1	3338.4	4526.5
Judith Basin	---	1021.5	1058.5	1377.4	1646.3	1755.8	1810.6	2050.4
Madison	626.5	894.5	1206.0	1237.3	1446.3	1753.6	2341.8	2656.8
Musselshell	623.1	1268.5	1536.1	2305.8	3407.4	3206.1	4321.3	4505.8
Richland	515.0	675.4	583.0	740.2	1032.8	1152.8	1239.0	1396.7
Roosevelt	554.7	621.3	597.7	768.7	1022.2	1263.5	1468.1	1792.7
Rosebud	1415.7	1634.0	1390.5	2412.1	4101.2	5555.8	6103.0	7194.5
Sheridan	480.0	599.6	567.2	705.3	904.9	1048.3	1091.5	1274.9
Stillwater	482.5	897.0	924.8	1015.6	1289.0	1392.8	1378.3	1690.5
Sweetgrass	747.5	1346.6	1818.1	2258.3	2613.8	2226.9	2250.4	2863.6
Treasure	718.6	1146.0	1341.8	1476.4	2427.1	2965.2	3877.4	4115.7
Wheatland	857.3	2529.1	2791.1	3582.5	4092.1	4425.2	4370.4	5135.9
Wibaux	634.3	803.7	837.7	980.0	1438.0	1582.3	1815.9	2091.4
Montana	608.1	940.3	939.6	110.7	1557.4	1688.7	1859.3	2212.8
United States	148.2	156.9	154.8	174.0	194.8	215.3	242.2	303.0

a/ U. S., Bureau of the Census, Fifteenth Census of the United States, Agriculture, Volume II, Part 3, Washington, D. C.: 1932, pp. 118-122.

b/ U. S., Bureau of the Census, Sixteenth Census of the United States, Agriculture, Volume I, Part 6, Washington, D.C.: pp. 16-20.

c/ U. S., Bureau of the Census, Census of Agriculture, 1950, Vol. I, Part 27, Wash., D.C. 40-44.

d/ U. S., Bureau of the Census, Census of Agriculture, 1959, Vol. I, Pr.38, Wash., D.C. 118-122.

APPENDIX TABLE VI. VALUE OF LAND AND BUILDING PER FARM FOR SELECTED MONTANA COUNTIES 1930-1959.

County	1930 a/	1935 a/	1940 a/	1945 b/	1950 b/	1954 c/	1959 c/
	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)	(Dollars)
Study Group							
Beaverhead	22,714	20,015	20,185	27,560	65,535	89,540	143,657
Blaine	9,485	7,869	8,372	12,815	27,022	41,954	67,722
Carbon	10,668	7,279	7,725	12,434	20,181	28,124	42,281
Carter	6,939	5,909	5,363	13,227	29,295	45,150	75,646
Fergus	13,066	8,242	9,507	15,782	33,600	54,289	86,042
Garfield	6,449	5,306	2,823	10,474	24,532	45,725	88,802
McCone	8,654	6,524	4,709	13,001	21,966	41,216	66,168
Petroleum	8,406	5,910	4,683	11,278	30,527	67,394	85,192
Phillips	7,452	5,882	6,292	9,741	24,252	34,581	54,987
Powder River	9,184	6,463	5,033	13,784	30,571	45,092	84,932
Prairie	10,650	7,798	6,838	13,382	26,264	34,782	63,305
Valley	9,926	6,995	6,571	11,200	23,073	36,592	58,329
Control Group							
Custer	9,683	7,791	9,053	15,144	43,806	51,591	79,180
Daniels	11,339	7,559	6,640	12,702	24,464	38,803	62,597
Dawson	10,696	7,239	4,975	10,717	20,404	32,035	53,889
Fallon	10,952	6,519	6,810	12,105	25,643	36,913	64,432

APPENDIX TABLE VI (CONTINUED). VALUE OF LAND AND BUILDING PER FARM FOR SELECTED MONTANA COUNTIES, 1930-1959.

County	1930	1935	1940	1945	1950	1954	1959
Golden Valley	7,290	4,083	5,735	13,196	29,104	44,452	93,245
Judith Basin	19,280	9,465	10,461	19,255	46,054	71,964	99,046
Madison	14,688	12,264	12,264	16,112	37,075	54,990	75,628
Musselshell	6,788	4,918	5,268	11,637	24,017	45,672	61,549
Richland	8,917	5,113	5,921	11,696	19,520	26,849	48,379
Roosevelt	9,316	6,037	6,309	11,794	23,443	41,990	75,203
Rosebud	9,332	6,085	10,185	15,112	37,935	54,107	88,885
Sheridan	9,219	5,543	5,745	13,003	21,443	36,124	58,054
Stillwater	11,107	5,952	8,071	12,609	27,510	37,177	67,145
Sweetgrass	13,887	11,961	12,415	16,654	31,736	47,227	78,507
Treasure	9,859	6,877	6,551	12,895	30,248	39,195	63,739
Wheatland	19,211	10,307	13,406	24,582	42,679	63,667	113,963
Wibaux	11,067	5,770	5,772	12,989	23,503	35,020	52,902
Montana	11,109	7,433	8,373	13,720	27,660	43,195	71,206
United States	7,614	4,823	5,518	7,917	13,983	20,405	34,826

a/ U. S., Bureau of the Census, Sixteenth Census of the United States, Agriculture, Vol. I, Part 6, Washington, D. C.: 1942, pp. 16-20.

b/ U. S., Bureau of the Census, Census of Agriculture, 1950, Vol. I, Part 27, Washington, D. C.: 1952, pp. 40-44.

c/ U. S., Bureau of the Census, Census of Agriculture, 1959, Vol. I, Part 38, Washington, D. C.: 1961, pp. 118-122.

APPENDIX TABLE VII. PER CENT OF FARMS OPERATED BY TENANTS IN SELECTED MONTANA COUNTIES 1930-1959.

County	1930 a/ (Percent)	1940 a/ (Percent)	1945 b/ (Percent)	1950 c/ (Percent)	1954 d/ (Percent)	1959 d/ (Percent)
Study Group						
Beaverhead	14.1	18.2	13.0	8.4	4.1	7.2
Blaine	22.7	21.7	12.6	11.5	13.5	10.8
Carbon	30.4	33.3	30.7	23.0	19.9	17.9
Carter	17.0	17.0	10.6	7.2	6.7	7.2
Fergus	33.1	33.4	16.5	17.0	14.3	18.7
Garfield	12.7	17.7	6.2	7.1	8.7	8.2
McCone	15.8	30.1	8.5	13.0	15.2	18.7
Petroleum	23.7	23.3	9.9	11.9	12.7	9.5
Phillips	14.0	24.7	12.4	9.5	8.6	10.8
Powder River	10.1	18.9	7.3	10.0	9.2	13.5
Prairie	23.9	28.8	17.3	15.6	12.0	11.3
Valley	15.4	24.1	11.6	12.2	13.2	13.5
Control Group						
Custer	21.9	31.7	25.1	10.3	12.6	17.6
Daniels	21.1	42.8	15.6	22.1	21.5	22.7
Dawson	28.3	43.0	21.5	14.2	13.2	12.2
Fallon	31.5	42.2	15.0	16.4	18.5	14.6

APPENDIX TABLE VII (CONTINUED). PERCENT OF FARMS OPERATED BY TENANTS IN SELECTED MONTANA COUNTIES, 1930-1959

County	1930	1940	1945	1950	1954	1959
	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)	(Percent)
Golden Valley	32.0	22.4	10.2	10.7	11.2	6.5
Judith Basin	34.0	39.2	18.0	13.5	15.5	16.1
Madison	20.2	28.1	21.7	17.1	10.8	8.8
Musselshell	32.2	26.1	10.7	6.5	4.6	10.5
Richland	27.4	31.4	18.9	19.7	20.5	17.3
Roosevelt	21.9	25.1	9.1	12.4	17.6	15.9
Rosebud	22.1	26.5	14.2	17.6	18.1	14.9
Sheridan	25.1	39.7	17.1	18.2	20.8	18.9
Stillwater	29.0	30.4	21.7	17.9	17.7	12.3
Sweetgrass	27.4	29.2	23.7	15.9	15.6	18.0
Treasure	28.6	37.4	25.3	16.6	18.1	23.0
Wheatland	33.0	26.2	15.6	12.0	13.4	8.5
Wibaux	33.0	42.4	18.7	17.4	17.9	12.8
Montana	24.5	27.8	16.6	14.7	14.6	13.6
United States	42.4	38.7	31.7	26.8	24.0	19.8

a/ U. S., Bureau of the Census, Sixteenth Census of the United States, Agriculture, Vol. I, Part 6, Washington, D. C.: 1942, pp. 21-25.

b/ U. S., Bureau of the Census, County and City Data Book, 1949, Washington, D. C.: 1949, pp. 204-210.

c/ U. S., Bureau of the Census, County and City Data Book, 1956, Washington, D. C.: 1952, pp. 239-245.

APPENDIX TABLE VIII NUMBER OF IRRIGATED FARMS AND IRRIGATED FARMS AS A PER CENT OF ALL FARMS IN SELECTED MONTANA COUNTIES, 1945-1959.

County	1945 a/		1950 a/		1954 b/		1959 b/	
Study Group	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Beaverhead	371	91.1	338	91.4	317	93.2	277	94.2
Blaine	416	45.4	367	45.4	415	51.9	351	51.2
Carbon	712	72.7	787	78.9	730	81.5	680	83.7
Carter	1	.2	20	4.5	27	6.2	76	20.9
Fergus	70	5.2	103	8.6	119	11.1	132	13.5
Garfield	16	3.5	29	7.6	43	11.7	53	16.8
McCone	3	.4	28	4.1	40	6.6	52	8.9
Petroleum	56	34.8	69	43.1	63	44.4	63	50.8
Phillips	304	32.9	287	35.7	277	39.0	265	40.2
Powder River	23	4.5	47	10.0	28	6.6	57	15.2
Prairie	9	3.5	40	15.6	74	28.7	79	32.9
Valley	199	15.7	282	24.2	238	21.7	256	27.4
Control Group								
Custer	203	39.2	254	50.2	234	51.6	219	53.9
Daniels	---	---	5	.9	8	1.3	16	3.1
Dawson	87	11.0	108	14.2	90	13.1	91	14.4
Fallon	1	.2	7	1.7	18	4.7	11	3.4

APPENDIX TABLE VIII (CONTINUED). NUMBER OF IRRIGATED FARMS AND IRRIGATED FARMS AS A PERCENT OF ALL FARMS IN SELECTED MONTANA COUNTIES, 1945-1959.

County	1945		1950		1954		1959	
	Number	Percent	Number	Percent	Number	Percent	Number	Percent
Golden Valley	38	15.6	45	20.0	59	29.9	59	35.1
Judith Basin	10	1.9	50	10.2	72	14.7	63	15.1
Madison	508	72.7	542	86.0	464	91.2	422	93.0
Musselshell	25	7.9	56	18.1	69	26.6	63	25.7
Richland	346	31.5	375	35.5	348	34.7	335	38.3
Roosevelt	4	.5	20	2.5	52	6.0	38	5.2
Rosebud	184	25.6	173	31.5	201	41.8	168	43.5
Sheridan	1	.1	2	.2	27	2.8	15	1.9
Stillwater	341	47.2	314	48.5	314	48.8	278	52.2
Sweetgrass	268	62.9	263	68.5	265	72.4	214	70.2
Treasure	114	62.6	97	59.5	108	72.5	85	61.6
Wheatland	84	38.5	83	43.2	109	54.2	95	54.6
Wibaux	---	---	2	.7	6	2.1	7	2.9
Montana	12,997		13,457	38.4	13,114	39.7	11,935	41.2

a/ U. S., Bureau of the Census, Census of Agriculture, 1950, Vol. I, Part 27, Washington, D. C.: 1952, pp. 46-47.

b/ U. S., Bureau of the Census, Census of Agriculture, 1959, Vol. I, Part 38, Washington, D. C.: 1961, pp. 123-127.

APPENDIX TABLE IX. IRRIGATED CROP LAND HARVESTED IN SELECTED MONTANA COUNTIES 1940-1959.

County	Total Crop Land Harvested 1940 a/	Total Crop Land Harvested 1949 b/	Irrigated Cropland Harvested 1949 b/	Irrigated as Per cent of all cropland 1949 b/	1954 c/	1959 c/
Study Group	Acres	Acres	Acres	Percent	Acres	Acres
Beaverhead	186,797	185,401	181,841	98.1	185,710	191,476
Blaine	36,487	169,619	40,125	23.7	46,796	44,401
Carbon	66,057	109,668	64,993	59.3	62,296	61,454
Carter	88	70,680	1,328	1.9	1,699	9,287
Fergus	14,393	343,254	10,190	3.0	11,245	11,885
Garfield	168	48,384	961	2.0	2,510	3,186
McCone	966	230,570	2,131	0.9	1,916	3,454
Petroleum	3,665	23,630	7,470	31.6	11,185	11,248
Phillips	31,225	134,254	27,387	20.4	44,360	37,281
Powder River	724	78,310	4,384	5.6	2,828	7,047
Prairie	581	66,810	4,358	6.5	8,064	8,205
Valley	14,871	322,133	30,231	9.4	26,928	30,551
Control Group						
Custer	11,729	60,773	21,962	36.1	23,949	22,410
Daniels	---	260,528	829	0.3	858	630
Dawson	1,657	220,967	10,810	4.9	11,283	10,816

APPENDIX TABLE IX (CONTINUED). IRRIGATED CROP LAND HARVESTED IN SELECTED MONTANA COUNTIES, 1940-1959.

County	Total Crop Land Harvested 1940	Total Crop Land Harvested 1949	Irrigated Cropland Harvested 1949	Irrigated as Per cent of all cropland 1949	1954	1959
	Acres	Acres	Acres	Percent	Acres	Acres
Fallon	---	175,998	375	0.2	1,023	690
Golden Valley	3,748	36,157	3,370	9.3	4,716	5,817
Judith Basin	6,989	170,083	5,904	3.5	8,939	6,262
Madison	66,507	101,418	77,542	76.5	83,565	79,388
Musselshell	2,231	40,683	4,052	10.0	6,904	6,169
Richland	28,807	271,711	32,314	11.9	32,202	34,289
Roosevelt	294	322,262	1,722	0.5	5,928	2,609
Rosebud	15,713	73,387	17,950	24.4	23,577	20,860
Sheridan	437	333,382	115	0.0	1,898	731
Stillwater	23,038	110,655	21,672	19.6	23,326	22,590
Sweetgrass	30,706	52,352	26,048	49.8	30,492	27,978
Treasure	7,958	26,750	10,132	37.9	16,053	14,146
Wheatland	19,432	44,199	22,133	50.1	27,516	26,202
Wibaux	79	97,183	10	0.0	130	156
Montana	1,359,126	7,576,173	1,366,851	18.0	1,480,061	1,456,852

APPENDIX TABLE IX (CONTINUED). IRRIGATED CROP LAND HARVESTED IN SELECTED MONTANA COUNTIES, 1940-1959.

	Total Crop Land Harvested		Irrigated Cropland Harvested	Irrigated as Per cent of all cropland		
	1940	1949	1949	1949	1954	1959
	Acres	Acres	Acres	Percent	Acres	Acres
United States	19,883,014	344,398,550	28,353,907	8.2	34,584,226	---

a/ U. S., Bureau of the Census, Sixteenth Census of the United States, Agriculture, Vol. I, Part 6, Washington, D. C.: 1942, pp. 16-20.

b/ U. S., Bureau of the Census, Census of Agriculture, 1950, Vol. I, Part 27, Washington, D. C.: 1952, pp. 40-47.

c/ U. S., Bureau of the Census, Census of Agriculture, 1959, Vol. I, Part 38, Washington, D. C.: 1961, pp. 118-122.

APPENDIX TABLE X. VALUE OF FARM PRODUCTS SOLD PER FARM FOR SELECTED MONTANA COUNTIES, 1930-1959.a/

County	1930 b/	1940 c/	1944 d/	1949 d/	1954 e/	1959 e/
Study Group	Dollars	Dollars	Dollars	Dollars	Dollars	Dollars
Beaverhead	9,230	6,864	13,994	26,766	24,547	41,016
Blaine	3,058	2,665	7,007	9,551	12,595	14,763
Carbon	3,121	2,174	5,044	6,421	6,679	9,521
Carter	2,326	1,743	4,755	9,525	10,745	14,683
Fergus	2,775	2,078	6,672	11,484	12,604	14,266
Garfield	1,934	801	5,878	8,728	12,285	15,935
McCone	1,680	1,289	5,984	6,612	9,232	7,490
Petroleum	2,428	1,533	5,097	11,117	14,209	17,984
Phillips	2,040	1,870	5,179	6,158	11,651	11,985
Powder River	2,906	1,578	5,600	11,609	10,619	15,835
Prairie	2,467	1,747	7,459	8,791	9,329	17,934
Valley	1,839	1,846	6,625	5,941	8,386	8,722
Control Group						
Custer	3,025	2,181	6,950	10,288	14,308	17,726
Daniels	1,561	1,869	10,408	5,010	9,324	9,922
Dawson	2,451	1,288	5,994	6,010	7,453	8,348
Fallon	2,997	1,694	5,273	7,282	8,210	11,744

APPENDIX TABLE X (CONTINUED). VALUE OF FARM PRODUCTS SOLD PER FARM FOR SELECTED MONTANA COUNTIES, 1930-1959.

County	1930	1940	1944	1949	1954	1959
Golden Valley	2,136	2,164	5,015	8,484	8,168	16,136
Judith Basin	3,337	2,898	8,090	13,567	13,252	5,620
Madison	4,539	3,357	5,711	9,504	10,541	16,175
Musselshell	1,795	1,736	3,958	8,488	10,039	12,866
Richland	2,678	2,477	6,520	7,525	8,139	10,425
Roosevelt	2,269	1,682	7,489	6,939	8,282	10,384
Rosebud	3,092	2,548	5,953	11,369	13,381	20,520
Sheridan	2,218	1,429	8,175	4,955	6,901	9,688
Stillwater	3,006	2,311	4,808	7,639	8,157	13,790
Sweetgrass	3,856	3,298	6,059	9,299	9,138	12,382
Treasure	3,012	2,547	5,032	12,429	11,868	20,725
Wheatland	5,335	4,127	8,122	15,318	12,472	21,816
Wibaux	2,675	1,920	8,992	6,305	7,826	9,024
Montana	2,916	2,010	5,900	7,954	10,301	13,103

a/Values per farm are computed by dividing the total value given in the Census by the number of farms for 1930, 1940, 1945, and 1949. Sources given are for total values; number of farms are listed in Appendix Table IV.

b/U. S., Bureau of the Census, Fifteenth Census of the United States, 1930, Agriculture, Vol. II, Part 3, Washington, D. C.: 1932, pp. 12-17.

c/U. S., Bureau of the Census, County Data Book, 1947, Washington D. C.: 1947, pp. 239-245.

d/U. S., Bureau of the Census, Census of Agriculture, 1950, Vol. I, Part 27, Washington, D. C.: pp. 103-107.

e/U. S., Bureau of the Census, Census of Agriculture, 1959, Vol. I, Pr. 38, Wash., D.C. 141-145

APPENDIX TABLE XI VALUE OF FARM PRODUCTS SOLD WITH PERCENT FROM LIVESTOCK OR CROPS, FOR SELECTED MONTANA COUNTIES 1940-1945.

County	1940 Total a/	1940 Percent from Livestock a/	1940 Percent from Crops a/	1945 Total b/	1945 Percent from Livestock c/	1945 Percent from Crops c/
Study Group	Dollars			Dollars		
Beaverhead	3,137,000	82.9	11.7	5,695,470	87.9	7.5
Blaine	2,873,000	48.4	45.1	6,425,569	55.6	40.0
Carbon	2,335,000	38.7	50.8	4,937,731	57.8	34.7
Carter	1,110,000	87.4	4.2	2,467,755	87.5	6.6
Fergus	3,088,000	31.3	60.4	9,047,272	43.1	52.0
Garfield	470,000	79.6	10.3	2,674,356	63.7	30.6
McCone	972,000	37.2	52.1	4,087,355	29.6	65.6
Petroleum	276,000	71.5	18.2	820,661	79.0	15.4
Phillips	1,956,000	39.3	51.0	4,790,462	46.7	47.7
Powder River	1,086,000	79.0	11.0	2,850,462	73.2	20.7
Prairie	449,000	55.9	36.0	1,894,577	44.6	50.7
Valley	2,394,000	28.6	62.2	8,420,465	25.1	70.3
Control Group						
Custer	1,082,000	66.1	26.4	3,600,052	77.1	18.2
Daniels	1,503,000	9.9	83.7	7,025,705	13.0	84.8
Dawson	1,074,000	36.4	52.4	4,747,390	28.6	66.9

APPENDIX TABLE XI. VALUE OF FARM PRODUCTS SOLD WITH PERCENT FROM LIVESTOCK OR CROPS, FOR SELECTED MONTANA COUNTIES, 1940-1945 (CONTINUED).

County	1940 Total a/	1940 Percent from Livestock a/	1940 Percent from Crops a/	1945 Total b/	1945 Percent from Livestock c/	1945 Percent from Crops c/
	Dollars			Dollars		
Fallon	864,000	33.0	57.5	2,183,210	46.2	48.0
Golden Valley	580,000	65.4	25.7	1,223,566	70.9	22.1
Judith Basin	1,736,000	41.5	52.4	4,651,168	44.1	51.6
Madison	2,199,000	70.8	20.6	3,991,715	78.9	15.5
Musselshell	545,000	63.9	23.1	1,258,608	77.0	14.9
Richland	3,017,000	36.2	57.9	7,166,003	48.2	47.4
Roosevelt	1,754,000	14.9	77.8	6,358,276	16.3	80.9
Rosebud	1,758,000	61.6	31.6	4,280,181	69.6	26.4
Sheridan	1,769,000	12.7	78.5	9,098,553	12.6	84.4
Stillwater	1,840,000	48.7	42.5	3,471,365	56.3	35.8
Sweetgrass	1,527,000	83.0	10.2	2,581,219	85.8	8.0
Treasure	517,000	34.5	57.0	915,755	56.2	39.3
Wheatland	945,000	86.4	7.5	1,770,702	85.9	9.5
Wibaux	716,000	24.2	68.5	2,131,190	35.2	59.5

APPENDIX TABLE XI (CONTINUED). VALUE OF FARM PRODUCTS SOLD WITH PERCENT FROM LIVESTOCK OR CROPS, FOR SELECTED MONTANA COUNTIES, 1940-1945.

	1940			1945		
	Total a/	Percent from Livestock a/	Percent from Crops a/	Total b/	Percent from Livestock c/	Percent from Crops c/
	Dollars			Dollars		
Montana	84,076,381	48.7	43.0	91,458,000	47.8	47.0

a/ U. S., Bureau of the Census, County Data Book, 1947, Washington, D. C.: 1947, pp. 239-245.
b/ U. S., Bureau of the Census, Census of Agriculture, 1950, Vol. I, Part 27, Washington, D. C.: 1952, pp. 103-107.
c/ U. S., Bureau of the Census, County and City Data Book, 1949, Washington, D. C.: 1949, pp. 204-210.

APPENDIX TABLE XII NUMBER OF RETAIL TRADE ESTABLISHMENTS WITH VOLUME OF SALES FOR SELECTED MONTANA COUNTIES, 1939-1958.

County	1939 a/ No. Estab.	1939 a/ Dollars of Sales (000)	1948 b/ No. Estab.	1948 b/ Dollars of Sales (000)	1954 c/ No. Estab.	1954 c/ Dollars of Sales (000)	1958 c/ No. Estab.	1958 c/ Dollars of Sales (000)
Study Group								
Beaverhead	153	3,559	114	9,141	119	9,896	109	11,005
Blaine	148	3,583	117	6,919	124	9,300	99	8,799
Carbon	184	2,632	181	6,893	153	7,000	143	6,621
Carter	43	395	41	1,465	36	1,716	35	1,652
Fergus	229	5,131	194	15,011	216	18,045	193	17,294
Garfield	37	349	27	1,335	22	1,262	17	894
McCone	38	475	33	1,877	39	3,078	34	2,585
Petroleum	19	218	15	557	11	311	13	---
Phillips	114	2,415	97	5,911	106	9,070	102	7,866
Powder River	28	427	25	1,084	21	1,279	26	1,511
Prairie	40	622	33	1,919	34	2,281	35	2,433
Valley	276	6,243	158	11,043	162	17,137	157	17,214
Control Group								
Custer	138	4,539	136	17,552	159	17,668	178	20,579
Daniels	81	1,325	68	4,319	59	6,046	78	4,897
Dawson	122	2,965	116	10,929	122	14,700	136	15,389

APPENDIX TABLE XII (CONTINUED). NUMBER OF RETAIL TRADE ESTABLISHMENTS WITH VOLUME OF SALES FOR SELECTED MONTANA COUNTIES, 1939-1958.

County	1939 a/ No. Estab.	1939 a/ Dollars of Sales	1948 b/ No. Estab.	1948 b/ Dollars of Sales	1954 c/ No. Estab.	1954 c/ Dollars of Sales	1958 c/ No. Estab.	1958 c/ Dollars of Sales
Fallon	60	1,042	60	4,161	46	4,125	67	4,748
Golden Valley	26	199	21	501	21	1,183	20	858
Judith Basin	63	915	50	2,632	46	2,319	45	2,512
Madison	120	1,631	96	3,421	106	4,553	91	4,190
Musselshell	104	1,882	77	4,785	80	5,367	73	5,524
Richland	125	3,181	129	11,707	130	12,909	144	15,728
Roosevelt	157	3,298	163	12,184	192	18,868	159	14,724
Rosebud	108	1,896	91	4,878	93	5,134	74	5,629
Sheridan	105	1,613	114	6,817	110	9,021	95	7,156
Stillwater	95	1,529	94	4,236	92	4,774	84	5,444
Sweetgrass	54	1,109	60	3,777	52	3,508	59	4,046
Treasure	27	373	22	1,200	25	1,090	12	1,184
Wheatland	72	1,354	64	3,427	59	4,351	67	4,237
Wibaux	30	355	27	1,371	20	1,825	34	1,675
Montana	8,481	222,008	7,841	600,187	8,223	778,097	8,261	862,577

a/ U. S., Bureau of the Census, County Data Book, 1947, Washington, D. C.: 1947, pp. 240-246.
b/ U. S., Bureau of the Census, County and City Data Book, 1956, Wash., D. C.: 1956, p. 181.
c/ U. S., Bureau of the Census, County and City Data Book, 1962, Wash., D. C.: 1962, p. 228.

APPENDIX TABLE XIII. NUMBER OF WHOLESALE FIRMS AND DOLLAR VOLUME OF BUSINESS FOR SELECTED MONTANA COUNTIES 1939-1958.

County	1939 a/ No. of Firms	Dollars of Sales (000)	1948 b/ No. of Firms	Dollars of Sales (000)	1958 c/ No. of Firms	Dollars of Sales (000)
Study Group						
Beaverhead	12	521	8	1,018	15	2,606
Blaine	19	594	24	2,650	18	4,859
Carbon	32	1,389	28	2,305	24	2,846
Carter	2	(1)	1	(1)	3	385
Fergus	76	4,675	65	14,871	56	19,515
Garfield	1	(1)	1	(1)	3	(1)
McCone	10	196	8	2,413	9	2,308
Petroleum	3	56	3	(1)	3	(1)
Phillips	24	750	23	3,629	18	2,738
Powder River	2	(1)	3	(1)	3	287
Prairie	8	177	9	1,837	8	1,412
Valley	48	2,698	42	12,334	41	15,651
Control Group						
Custer	24	1,959	28	17,105	26	16,638
Daniels	22	610	21	7,282	17	3,528
Dawson	27	1,303	24	11,802	39	18,729

APPENDIX TABLE XIII (CONTINUED). NUMBER OF WHOLESALE FIRMS AND DOLLAR VOLUME OF BUSINESS FOR SELECTED MONTANA COUNTIES, 1939-1958.

County	1939 No. of Firms	1939 Dollars of Sales (000)	1948 No. of Firms	1948 Dollars of Sales (000)	1958 No. of Firms	1958 Dollars of Sales (000)
Fallon	14	439	12	4,553	11	3,781
Golden Valley	4	136	4	(1)	3	265
Judith Basin	28	936	21	2,665	23	3,435
Madison	10	254	7	486	10	1,410
Musselshell	9	595	10	1,641	13	2,512
Richland	22	1,177	28	21,204	22	13,600
Roosevelt	35	1,223	36	14,356	35	12,347
Rosebud	16	657	9	1,168	6	1,177
Sheridan	39	844	29	7,013	27	3,548
Stillwater	26	799	15	2,056	12	1,860
Sweetgrass	9	222	7	839	6	753
Treasure	5	203	2	(1)	3	494
Wheatland	8	245	11	636	8	756
Wibaux	10	237	5	(1)	5	1,137

APPENDIX TABLE XIII (CONTINUED). NUMBER OF WHOLESALE FIRMS AND DOLLAR VOLUME OF BUSINESS FOR SELECTED MONTANA COUNTIES, 1939-1958.

	1939		1948		1958	
	No. of Firms	Dollars of Sales (000)	No. of Firms	Dollars of Sales (000)	No. of Firms	Dollars of Sales (000)
Montana	1,336	130,548	1,333	587,330	1,606	762,943

a/ U. S., Bureau of the Census, County Data Book, 1947, Washington, D. C.: 1947, pp. 240-246.
b/ U. S., Bureau of the Census, County and City Data Book, 1949, Washington, D. C.: 1949, pp. 200-206.
c/ U. S., Bureau of the Census, County and City Data Book, 1962, Washington, D. C.: 1962, p. 229.

APPENDIX TABLE XIV. NUMBER OF MANUFACTURING FIRMS AND VOLUME OF BUSINESS FOR SELECTED MONTANA COUNTIES 1939-1958.

County	1939 a/ No. of Firms	Dollars of Sales (000)	1947 b/ No. of Firms	Dollars of Sales (000)	1958 c/ No. of Firms	Dollars of Sales (000)
Study Group						
Beaverhead	5	41	5	79	4	104
Blaine	8	(1)	7	(1)	4	(1)
Carbon	13	105	10	150	10	85
Carter	1	(1)	2	(1)	3	15
Fergus	13	800	11	2,074	19	2,191
Garfield	1	(1)	1	(1)	1	(1)
McCone	--	--	--	--	1	(1)
Petroleum	2	(1)	--	--	--	--
Phillips	4	28	3	86	2	(1)
Powder River	2	(1)	--	--	2	(1)
Prairie	1	(1)	1	(1)	1	(1)
Valley	10	261	5	132	6	293
Custer	13	202	12	400	9	1,070
Daniels	5	37	2	(1)	2	(1)
Dawson	5	76	6	152	10	853
Fallon	2	(1)	1	(1)	4	119

APPENDIX TABLE XIV (CONTINUED). NUMBER OF MANUFACTURING FIRMS AND VOLUME OF BUSINESS FOR SELECTED MONTANA COUNTIES, 1939-1958.

County	1939 No. of Firms	Dollars of Sales (000)	1947 No. of Firms	Dollars of Sales (000)	1958 No. of Firms	Dollars of Sales (000)
Golden Valley	--	--	--	--	--	--
Judith Basin	2	(1)	1	(1)	3	64
Madison	5	20	3	48	3	(1)
Musselshell	4	42	2	(1)	4	151
Richland	8	(1)	6	1,456	11	3,762
Roosevelt	8	46	4	73	8	218
Rosebud	3	(1)	2	(1)	6	187
Sheridan	3	27	4	77	4	137
Stillwater	5	32	3	46	7	235
Sweetgrass	3	(1)	3	(1)	5	104
Treasure	--	--	--	--	--	--
Wheatland	4	(1)	4	(1)	2	(1)
Wibaux	--	--	--	--	1	(1)
Montana	585	39,790	652	92,258	925	196,915

a/ U. S., Bureau of the Census, County Data Book, 1947, Washington, D. C.: 1947, pp. 240-247.

b/ U. S., Bureau of the Census, County and City Data Book, 1949, Washington, D. C.: 1949, pp. 202-208.

c/ U. S., Bureau of the Census, County and City Data Book, 1962, Washington, D. C.: 1962, p. 227.

APPENDIX TABLE XV. VALUE OF BANK DEPOSITS FOR SELECTED MONTANA COUNTIES 1944-1960.

County	1944[a] Total	1944[a] Time	1950[b] Total	1950[b] Time	1956[c] Total	1956[c] Time	1960[d] Total	1960[d] Time
Study Group	Dollars	(000)	Dollars	(000)	Dollars	(000)	Dollars	(000)
Beaverhead	6,100	2,089	10,013	3,429	9,804	3,543	11,734	5,620
Blaine	4,283	585	6,026	691	6,643	648	6,670	1,410
Carbon	4,127	1,307	5,824	2,063	6,842	2,618	8,990	3,982
Carter	678	242	1,264	455	1,487	563	1,760	698
Fergus	8,230	647	15,395	1,450	16,647	3,548	18,674	6,190
Garfield	--	--	--	--	--	--	532	62
McCone	1,312	193	1,961	172	2,313	81	2,356	383
Petroleum	--	--	--	--	--	--	--	--
Phillips	3,150	462	4,422	777	6,071	1,452	6,522	2,029
Powder River	1,279	259	2,169	533	2,383	725	3,035	1,038
Prairie	1,725	401	2,658	778	2,958	839	3,272	1,180
Valley	5,134	101	8,248	121	9,893	329	15,078	4,200
Control Group								
Custer	6,487	1,191	13,341	3,505	17,077	4,948	19,108	7,561
Daniels	3,749	513	3,838	602	4,438	627	3,813	875
Dawson	6,398	1,602	7,818	2,258	11,347	3,573	13,155	5,437
Fallon	2,150	517	3,686	982	4,651	1,652	6,574	2,770

APPENDIX TABLE XV (CONTINUED). VALUE OF BANK DEPOSITS FOR SELECTED MONTANA COUNTIES, 1944-1960.

County	1944 Total	1944 Time	1950 Total	1950 Time	1956 Total	1956 Time	1960 Total	1960 Time
	Dollars	(000)	Dollars	(000)	Dollars	(000)	Dollars	(000)
Golden Valley	--	--	--	--	--	--	--	--
Judith Basin	1,788	165	3,165	358	3,409	679	3,412	874
Madison	1,283	194	2,050	349	2,196	503	2,967	863
Musselshell	1,645	45	2,872	276	3,299	592	4,006	1,194
Richland	5,109	550	7,525	901	10,537	2,152	11,084	2,616
Roosevelt	6,687	919	10,542	1,484	13,493	2,193	14,542	4,803
Rosebud	1,483	196	2,610	317	3,852	542	4,397	1,143
Sheridan	4,464	226	6,400	525	6,998	960	7,806	2,676
Stillwater	2,032	283	3,112	501	3,696	706	4,404	1,447
Sweetgrass	2,348	787	3,487	826	3,224	894	3,986	1,413
Treasure	796	40	1,265	27	1,626	304	1,887	518
Wheatland	1,827	422	3,698	617	3,258	691	3,388	1,001
Wibaux	1,251	234	1,886	441	2,114	793	2,504	991
Montana	305,669	61,808	483,224	97,069	676,186	145,745	764,940	240,752

a/ U. S., Bureau of the Census, County Data Book, 1947, Washington, D. C.: 1947, pp. 241-247.
b/ U. S., Bureau of the Census, County and City Data Book, 1949, Washington, D. C.: 1949, pp. 201-207.
c/ U. S., Bureau of the Census, County and City Data Book, 1956, Washington, D. C.: 1956, p. 165.
d/ U. S., Bureau of the Census, County and City Data Book, 1962, Washington, D. C.: 1962, p. 226.

APPENDIX TABLE XVI NUMBER AND PERCENT EMPLOYED IN AGRICULTURE IN SELECTED MONTANA COUNTIES 1930-1960. a/

County	1930 b/ Percent in Agric.	No.	1940 c/ Percent in Agric.	Next Highest Percent	No.	1950 d/ Percent in Agric.	No.	1960 e/ Percent in Agric.
Study Group								
Beaverhead	52.4	1,259	47.1	7.2	1,145	40.8	1,053	36.2
Blaine	65.8	1,661	57.5	6.4	1,543	53.3	1,115	43.3
Carbon	48.0	1,933	55.7	6.6	1,676	48.1	945	32.1
Carter	82.8	861	75.1	5.3	710	66.7	617	63.1
Fergus	49.8	2,082	42.8	7.7	2,047	36.7	1,466	29.7
Garfield	83.0	675	74.9	7.1	593	67.5	490	62.6
McCone	81.1	869	74.1	6.1	949	72.8	631	54.1
Petroleum	67.9	235	60.7	7.5	287	61.5	222	60.5
Phillips	68.3	1,417	55.0	6.8	1,157	50.9	921	40.4
Powder River	86.7	898	78.1	5.7	801	69.1	564	61.8
Prairie	55.2	369	55.1	7.3	393	47.3	380	43.5
Valley	61.3	1,560	34.1	6.8	1,616	38.8	936	19.4
Control Group								
Custer	29.1	773	23.1	15.1	851	17.0	585	13.0
Daniels	42.0	909	62.7	6.1	811	38.4	580	45.1
Dawson	41.4	1,092	39.1	15.7	981	28.8	745	17.9

APPENDIX TABLE XVI (CONTINUED). NUMBER AND PERCENT EMPLOYED IN AGRICULTURE IN SELECTED MONTANA COUNTIES, 1930-1960.

County	1930 Percent in Agric.	No.	1940 Percent in Agric.	Next Highest Percent	No.	1950 Percent in Agric.	No.	1960 Percent in Agric.
Fallon	60.7	687	59.8	7.9	654	52.2	420	31.4
Golden Valley	68.1	380	68.2	--	338	63.4	197	50.7
Judith Basin	59.4	869	65.6	--	742	63.1	422	39.6
Madison	60.1	1,252	47.7	20.1	1,264	53.1	973	46.9
Musselshell	28.8	453	24.7	33.0	459	23.6	310	18.6
Richland	63.9	1,787	57.6	6.9	1,467	41.0	986	29.7
Roosevelt	58.8	1,224	47.7	8.3	1,279	39.6	1,102	31.8
Rosebud	59.2	1,037	50.0	7.4	925	41.8	685	32.3
Sheridan	66.5	1,365	60.7	7.2	1,320	57.1	967	46.9
Stillwater	66.4	1,186	60.9	6.7	1,089	54.3	691	35.1
Sweetgrass	64.5	850	63.1	5.6	746	49.9	484	40.1
Treasure	71.2	310	62.2	4.8	307	59.4	196	46.4
Wheatland	45.8	518	43.4	15.4	377	29.8	349	30.1
Wibaux	68.5	494	71.5	6.5	417	61.1	292	48.7

APPENDIX TABLE XVI (CONTINUED). NUMBER AND PERCENT EMPLOYED IN AGRICULTURE IN SELECTED MONTANA COUNTIES, 1930-1960.

County	1930 Percent in Agric.	No.	1940 Percent in Agric.	Next Highest Percent	No.	1950 Percent in Agric.	No.	1960 Percent in Agric.
Montana	36.8	59,083	31.8	--	54,105	24.8	39,479	17.1

a/Percentages computed from source data.

b/U. S., Bureau of the Census, Fifteenth Census of the United States, 1930, Population, Vol. III, Part 2, Washington, D. C.: 1932, pp. 34-37.

c/U. S., Bureau of the Census, County Data Book, 1947, Washington, D.C.: 1947, pp. 237-243.

d/U. S., Bureau of the Census, County and City Data Book, 1952, Washington, D. C.: 1952, pp. 262-268.

e/U. S., Bureau of the Census, County and City Data Book, 1962, Washington, D. C.: 1962, p. 224.

APPENDIX TABLE XVII. NUMBER EMPLOYED IN VARIOUS INDUSTRIES IN SELECTED MONTANA COUNTIES, 1930-1960.

County	Agriculture 1930[a]	1940[b]	1950[d]	1960[e]	Forest and Fisheries 1930[a]	1940[c]	1950[b]	1960	Mining 1930[a]	1940[b]	1950[d]	1960[g]
Study Group												
Beaverhead	1,740	1,259	1,145	1,053	14	14	26	37	102	195	63	83
Blaine	2,254	1,661	1,543	1,115	1	3	2	0	32	21	16	4
Carbon	2,186	1,933	1,676	945	38	8	6	9	927	285	175	41
Carter	1,343	861	710	617	1	1	1	4	4	3	12	4
Fergus	3,174	2,082	2,047	1,466	5	6	7	0	109	128	96	73
Garfield	1,411	675	593	490	0	0	0	0	1	2	19	4
McCone	1,379	869	949	631	0	0	0	0	5	8	3	4
Petroleum	676	235	287	222	0	0	0	0	49	30	34	---
Phillips	2,235	1,417	1,157	921	5	0	2	3	54	177	37	---
Powder River	1,365	898	801	564	5	2	4	0	1	5	6	9
Prairie	900	369	393	380	0	0	0	0	2	1	2	12
Valley	2,628	1,560	1,616	963	0	0	0	0	9	5	5	4
Control Group												
Custer	1,434	773	851	585	9	6	2	3	13	17	35	57
Daniels	1,260	909	811	580	0	0	0	0	7	11	--	12
Dawson	1,594	1,092	981	745	2	0	3	0	34	2	26	231
Fallon	1,011	687	654	420	0	0	0	0	24	7	2	109

APPENDIX TABLE XVII. NUMBER EMPLOYED IN VARIOUS INDUSTRIES IN SELECTED MONTANA COUNTIES, 1930-1960, (CONTINUED).

County	Agriculture 1930	1940	1950	1960	Forest and Fisheries 1930	1940	1950	1960	Mining 1930	1940	1950	1960
Golden Valley	528	380	338	197	0	0	0	0	1	6	2	--
Judith Basin	1,283	869	742	422	3	1	3	4	266	30	10	4
Madison	1,624	1,252	1,264	973	16	8	13	29	226	532	134	84
Musselshell	768	453	459	310	5	0	0	0	844	606	577	289
Richland	2,210	1,787	1,467	986	0	0	1	0	48	28	7	19
Roosevelt	2,246	1,224	1,279	1,102	2	1	1	0	12	15	7	58
Rosebud	1,672	1,037	925	685	3	1	3	8	140	70	108	10
Sheridan	2,282	1,365	1,320	967	1	0	0	0	31	37	12	25
Stillwater	1,508	1,186	1,089	691	4	4	3	4	23	15	37	187
Sweetgrass	1,092	850	746	484	4	7	6	8	13	11	20	8
Treasure	403	310	307	196	0	0	0	0	2	0	0	--
Wheatland	674	518	377	349	3	1	3	0	4	1	4	--
Wibaux	722	494	417	292	0	0	0	0	5	5	0	--
Montana	79,678	59,083	54,105	39,479	2,978	695	0	0	18,655	13,526	9,342	

APPENDIX TABLE XVII (CONTINUED). NUMBER EMPLOYED IN VARIOUS INDUSTRIES IN SELECTED MONTANA COUNTIES, 1930-1960.

County	Construction			Manufacturing			Transportation		
	1940[b]	1950[a]	1960[e]	1940[b]	1950[f]	1960[c]	1940[b]	1950[d]	1960[g]
Study Group									
Beaverhead	84	147	151	45	53	60	122	168	117
Blaine	96	131	197	91	81	86	54	106	95
Carbon	81	171	205	53	73	113	67	117	130
Carter	56	17	28	6	19	11	3	8	15
Fergus	168	353	370	272	294	239	206	285	136
Garfield	21	20	31	3	5	8	3	13	8
McCone	42	48	106	5	3	49	7	15	6
Petroleum	8	13	15	3	6	14	10	11	2
Phillips	87	82	132	30	38	14	88	71	92
Powder River	26	50	28	6	28	8	6	16	25
Prairie	18	64	55	5	7	4	39	58	49
Valley	736	533	914	104	54	114	212	273	207
Control Group									
Custer	204	504	329	82	138	162	549	762	355
Daniels	24	43	31	19	13	23	31	48	37
Dawson	109	219	284	38	70	91	461	628	643

APPENDIX TABLE XVII (CONTINUED). NUMBER EMPLOYED IN VARIOUS INDUSTRIES IN SELECTED MONTANA COUNTIES, 1930-1960.

County	Construction			Manufacturing			Transportation		
	1940	1950	1960	1940	1950	1960	1940	1950	1960
Fallon	22	53	122	4	15	32	27	30	34
Golden Valley	9	20	21	3	2	0	22	41	30
Judith Basin	17	37	57	12	8	25	37	50	35
Madison	88	143	75	32	63	15	38	52	38
Musselshell	43	64	73	40	33	34	76	92	60
Richland	117	301	184	133	149	245	60	79	66
Roosevelt	115	199	221	42	62	142	94	196	112
Rosebud	84	109	69	31	31	62	128	279	182
Sheridan	39	92	84	19	33	24	49	62	49
Stillwater	55	95	93	25	35	86	74	92	101
Sweetgrass	38	87	65	27	24	29	20	71	54
Treasure	22	33	31	2	4	6	21	20	10
Wheatland	43	59	44	42	59	26	193	313	197
Wibaux	7	30	26	2	4	15	7	12	0
Montana	8,838		14,911	13,747	18,515	23,439	11,366	17,308	

APPENDIX TABLE XVII (CONTINUED). NUMBER EMPLOYED IN VARIOUS INDUSTRIES IN SELECTED MONTANA COUNTIES, 1930-1960.

a/ U. S., Bureau of the Census, Fifteenth Census of the United States, 1930, Population, Vol. III, Part 2, Washington, D. C.: 1932, pp. 34-37.

b/ U. S., Bureau of the Census, County Data Book, 1947, Washington, D. C.: 1947, pp. 237-243.

c/ U. S., Bureau of the Census, Sixteenth Census of the United States, 1940, Population, Vol. II, Part 4, Washington, D. C.: 1942, pp. 517-523.

d/ U. S., Bureau of the Census, County and City Data Book, 1952, Washington, D. C.: 1952, pp. 260-268.

e/ U. S., Bureau of the Census, County and City Data Book, 1962, Washington, D. C.: 1962, p. 224.

f/ U. S., Bureau of the Census, Census of Population, 1950, Vol. II, Part 26 (P-B26), Washington, D. C.: 1952, pp. 63-69.

g/ U. S., Bureau of the Census, Census of Population, 1960, Vol. I, Part 28 [PC(1)28C], Washington, D. C.: 1961, pp. 146-150. The figures listed are the sum of those listed under: railroad and railway express, trucking service and warehousing, and other transportation.

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