

GRAZING CAPACITIES  
AND SELECTED FACTORS AFFECTING  
PUBLIC LAND USE



NEW MEXICO STATE UNIVERSITY  
AGRICULTURAL EXPERIMENT STATION RESEARCH REPORT 158

## Summary

Public agencies manage 55.2 percent of the land area in New Mexico. The four agencies which manage the major portion of this acreage engage in grazing management. Since the four major land management agencies 1) supervise grazing on more than 50 percent of the land of New Mexico, 2) use "grazing capacity" figures in managing the range lands, and 3) manage lands in every county of New Mexico except Los Alamos, the grazing capacities reported by these agencies can reasonably be representative of private lands as well as the publicly managed lands. Data were collected from these agencies and correlated with soil-resource groupings to establish grazing-capacities representation of the major land resource sub-areas of the state. The areas are very broad, but differences in grazing capacity between areas of the state are shown by these generalized grazing capacities. The map was prepared as a guide to assessors, appraisers, land-use planners, or others interested in making comparisons between areas of the state.

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# GRAZING CAPACITIES AND SELECTED FACTORS AFFECTING PUBLIC LAND USE

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The purpose of the study reported here was to develop information on the grazing capacities of the public grazing-land resources of New Mexico. In recent years, there has been considerable discussion about the values of New Mexico range lands. These values should be based on grazing capacity information. A long-term basis for the valuation is needed because forage changes drastically with changes in rainfall. Credit agencies estimate grazing capacity to determine loan rates. The tax laws in New Mexico require assessments of grazing land based on stock rates. The land management agencies use stocking rates or grazing capacities to determine the fees to be charged for the use of the lands by the ranch operator.

Since no statewide up-to-date and reasonably detailed grazing capacity map for New Mexico was available, it was decided to construct one using public land management agency data, which they use for leasing and management purposes, as the basic information source. The map permits a comparison between various areas of the state. This has value for general considerations of land values based on grazing capacities.

The management agencies review the grazing management or grazing capacities each time a piece of property under their jurisdiction undergoes a major change in condition, or whenever the lease arrangements are altered either by expiration of the lease or a change in the type of livestock to be grazed. However, the comparability between areas remains reasonably constant, because the changes in individual tracts within an area are usually quite small.

Ranchers and management agencies estimate the number of head which may be placed on the land. They use seasonal, annual, or a long-term basis for determining the stocking rate, depending on many factors, such as 1) weather, both seasonal and annual, 2) tenure of the land, 3) availability of cash or credit to stock the range, and 4) condition of the range—whether it is to be just maintained or is to be improved.

## Publicly Managed Lands of New Mexico

Public agencies manage 42,876,275 acres, or 55.2 percent of the 77,776,400 total land acres of New Mexico. The New Mexico State Land Department manages trust lands for the common schools, university units, special training schools, hospitals, and other state agencies. The Bureau of Land Management, United States Department of Interior, manages most of the federal lands which remained after the private lands and the state, Indian, and National Forest acreages had been withdrawn from the public domain. The Bureau of Indian Affairs, United States Department of Interior, manages Indian lands held in trust, plus some special-purpose lands held by the Bureau, mostly for schools and office areas. The Forest Service manages lands withdrawn for forests, watershed, wilderness, wild land, and national grassland areas. Minor acreages are administered by other agencies.

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The large acreages managed by the major agencies emphasize their importance in the total grazing land management in New Mexico (see table 1).

Table 1. Ownership and administration of land in New Mexico, 1966

Agency	Acrees	Percent of Total
<b>Federal Lands<sup>1</sup></b>		
BLM	13,613,566	17.5 <sup>2</sup>
Forst Service	9,099,126	11.7 <sup>2</sup>
Department of the Army	2,725,387	3.5
Other agencies	1,288,711	1.6
<b>Total Acreage of Federal Lands</b>	<b>26,726,786</b>	<b>34.3</b>
<b>Other Public Lands</b>		
Tribal lands managed by BIA	7,135,014 <sup>3</sup>	9.2 <sup>2</sup>
State trust lands	9,067,331 <sup>4</sup>	11.7 <sup>2</sup>
Total Managed by Public Agencies	42,929,131	55.2
Total Under Private Ownership	34,847,269	44.8
<b>Total Land Area of New Mexico</b>	<b>77,776,400</b>	<b>100.0</b>

<sup>1</sup>Public Land Statistics, 1967, United States Department of the Interior, Bureau of Land Management, table 9, pp. 14-27.

<sup>2</sup>Lands administered by four major land agencies included in this study total 38,914,937 acres or 50.03 percent of total state acreage.

<sup>3</sup>Bureau of Indian Affairs, letter, January, 1966

<sup>4</sup>State Land Department, memo, June, 1968

Each of these agencies establishes "grazing capacities" which they use as a guide in their management operations. The State Land Department is required by law to establish these capacities and use them as a basis for establishing leasing rates. The other three agencies are not so specifically instructed in establishing and using such capacities. All of the agencies use available technical soils and vegetative information in estimating the grazing capacity as they administer the lands under their jurisdiction. They also take into consideration the multiple-use conditions, such as timber, water, and game production, and recreational requirements for the lands in each area of the state.

The four major land management agencies supervise more than 50 percent of the land of New Mexico, use a "grazing capacity," and supervise land in every county of New Mexico, except Los Alamos. Grazing capacities in this report were derived from data reported by these agencies.

## Grazing Capacities of Public Lands in New Mexico

A grazing-capacity map of New Mexico range lands prepared from information obtained from the four major public land management agencies, is shown in figure 1. The map presents grazing capacities of public lands in New Mexico under average rainfall and management conditions.

Grazing capacity may be defined as the maximum stocking rate possible without damage to vegetation and related resources. That is, any particular range site or "land resource area" would be grazed at a rate which would permit the range, under average rainfall and management conditions, to improve or to maintain itself indefinitely in "good condition." These grazing capacities may be expressed either as the number of acres required to maintain one animal unit yearlong or as the number of animal units which are maintained yearlong on 640 acres of land. Both acres per animal unit yearlong and head per section yearlong may be determined by use of the legend on the map (figure 1).

Animal unit equivalents\* commonly expressed are:

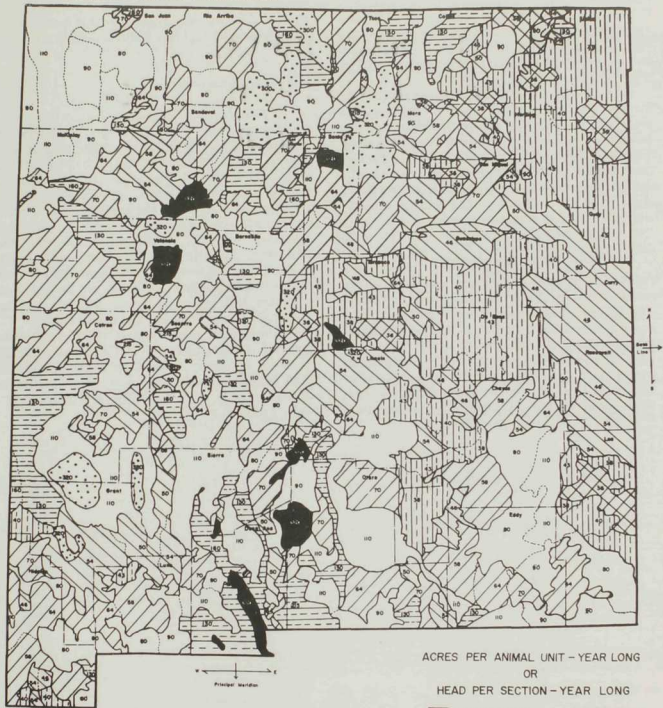
Class	Animal Unit
Cow	1.00
Weaned calf	.60
Yearling 12 to 17 months	.70
Yearling 17 to 22 months	.75
Two year old 22-32 months	.90
Bull	1.25
Horse	1.25
Mature ewe with lamb	.20
Weaned wether	.17
Ram	.20
Doe goat with kid	.17

### Procedure

Grazing capacities, where available, were taken for as many as three parcels of lands, from each agency's records for a township. These were the base grazing capacities being used by the agency for a particular parcel of land. However, a few average figures for larger tracts were used, particularly in a more densely forested area or in a special-use area. These averages were derived by calculating grazing capacity from the number of head permitted on a given land area.

\* Source—American Society of Range Management—A Glossary of Terms Used in Range Management—1964.

Fig. 1. Grazing capacities under average rainfall and management conditions based on reports by public land management agencies in New Mexico



PREPARED BY THE DEPARTMENT OF  
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 AGRICULTURAL EXPERIMENT STATION  
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ACRES PER ANIMAL UNIT - YEAR LONG  
 OR  
 HEAD PER SECTION - YEAR LONG

265 acres and over or 3 head or less	55 to 74 acres or 11.64 - 8.65 head
265 acres and over or 3 head or less (high elevations)	44 to 53 acres or 14.55 - 12.08 head
120 to 264 acres or 5.35 - 2.42 head	37 to 43 acres or 17.3 - 14.8 head
75 to 119 acres or 8.3 - 5.38 head	36 acres or less or 178 head or more

These grazing capacities were then placed on an overlay map and compared with the *Land Resources Area and Sub-Area for Range Site Classification Map*, which was prepared by the Soil Conservation Service, with revisions in 1961 and 1962 (figure 2). The general location of each area and the types of soil designation for each group and sub-group are shown on the land resources area map.

There was enough correlation between the mapped grazing capacities and the land resources areas and sub-areas that one grazing capacity could be established as representative for most sub-areas. This was true even when the grazing capacities came from more than one agency, as they generally did. In a few instances where wide discrepancies occurred between the recorded grazing capacity and other related data, a re-check was made with the management agencies to rectify these differences.

After the grazing capacity figures were established, a series of five meetings were held to review the data. These meetings were at Gallup, Albuquerque, Las Cruces, Roswell, and Las Vegas and were attended by ranchers, land management agency personnel, and county agents. Questions were raised in some instances, but most capacities were generally accepted as being representative of the areas. The data for the few questioned areas were again re-checked with the management

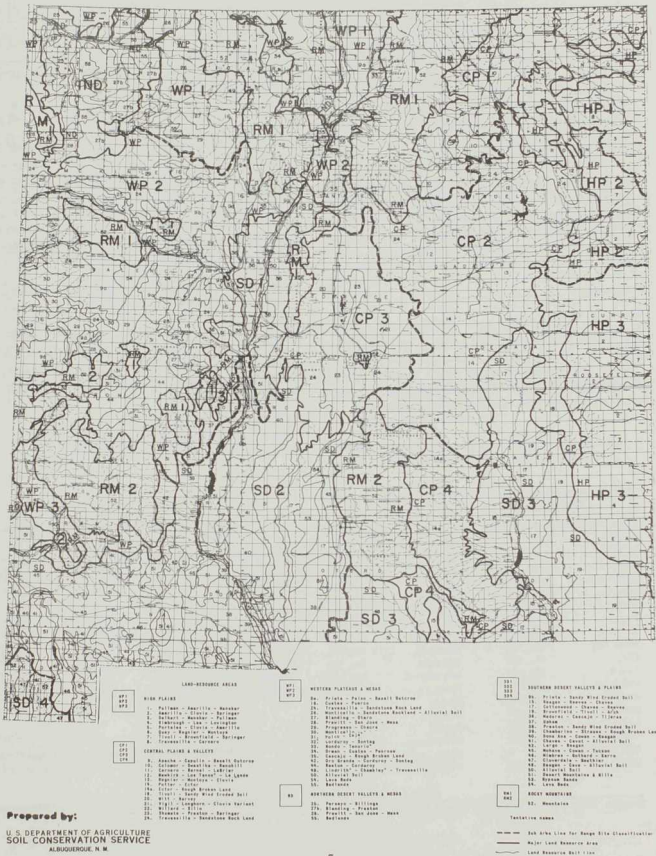
agencies, because the map is based on reported capacities from the agencies. It should be understood that the final map is a composite of reported capacities and does not represent the grazing capacity now being used for management on any piece of land by a particular agency.

#### Caution in Interpretation

These grazing capacities cannot be used directly as a basis for either tax assessment or valuation of real-estate. They will serve only as a general guide. Differences between areas of the state are definitely shown by these generalized grazing capacities. The areas are very broad, based on land resources areas. Minor changes in the grass and brush cover, timber, narrow arroyos, and meadows are not shown. Neither will the immediate or long-time effects of heavy over-grazing and non-use be shown clearly, since the grazing capacities are based on general land resources and vegetative types and not on the volume of forage production at any given time.

The grazing capacity map, together with the appendix information, provides a general guide to assessors, appraisers, and others as they go to the field to make detailed appraisals on specific tracts of land.

Fig. 2. Land resource areas and sub-areas for range classification of New Mexico



USE OF APPENDICES

*Appendix I.* Appendix I is in two sections. The first gives the total land areas of the state and the acreages managed by the four agencies by counties. The second gives a graphic picture of the location of the public land including National Wilderness, Primitive, and Grassland areas, all of which, except the Grassland areas, are located within the National Forests.

*Appendix II.* Appendix II presents elevation, temperature, precipitation, and detailed Weather Bureau data. These appendix materials are presented to assist the reader in analyzing the grazing capacity map, figure 1, and the land resources areas and sub-areas map, figure 2.

Appendix I

*A Total Land Area of New Mexico and Acreages by Management Units.* The land area of New Mexico is 77,776,400 acres and the inland water area is 99,840 acres, which makes a total of 77,876,240 acres. The federal government owns

34.3 percent of the state's land area. The State of New Mexico owns 11.7 percent. This brings the total of publicly owned land to 46 percent of the state's land area. In addition, the Bureau of Indian Affairs manages 7,135,014 acres of land which are held in trust for the Indians. This is nine percent of the state's total, thus the public land management agencies manage 55.2 percent of the total land area in New Mexico.

1. *State Trust Land.* The federal land grants to the State of New Mexico from statehood through June 30, 1966 were 12,794,659 acres. Since 1912, the state has sold land for grazing and other purposes. In 1966, the state owned 9,067,331 surface acres and 12,965,002.76 mineral acres. The state has not disposed of any mineral rights and, through land trades and purchases, has acquired a small additional acreage of rights above the total acreage granted to the state by the federal government. State land acreages for 30 of the 31 counties of New Mexico where the trust lands are located are shown in appendix table 1.

2. *National Forest.* National Forest lands, administered by the Forest Service, United States Department of Agriculture, are located in 20 counties of New Mexico, as shown in appendix table 2.

Table 1. State lands, New Mexico, total acreage by counties, 1966

County	Acre	County	Acre
Bernalillo	23,581	McKinley	165,617
Catron	531,655	Mora	75,355
Chaves	695,681	Otero	447,198
Colfax	228,837	Quay	220,510
Curry	54,628	Rio Arriba	82,633
De Baca	239,189	Roosevelt	184,817
Dona Ana	264,777	Sandoval	76,755
Eddy	471,883	San Juan	164,029
Grant	362,275	San Miguel	159,786
Guadalupe	170,761	Santa Fe	78,713
Harding	341,118	Sierra	359,659
Hidalgo	350,076	Socorro	597,053
Lea	865,380	Taos	76,714
Lincoln	287,081	Torrance	291,551
Los Alamos	0	Union	433,841
Luna	528,575	Valencia	237,603
Total		9,067,331	

Source: State Land Department, memo, June 21, 1968

Table 2. National forest acreage by counties, New Mexico, 1966

County	Acre <sup>1</sup>	County	Acre <sup>1</sup>
Bernalillo	77,811	Otero	544,129
Catron	2,210,370	Rio Arriba	1,386,956
Chaves	40,148	Sandoval	309,248
Colfax	7,635	San Miguel	321,644
Eddy	134,739	Santa Fe	187,698
Grant	844,384	Sierra	378,665
Hidalgo	77,222	Socorro	671,686
Lincoln	402,027	Taos	526,466
McKinley	178,726	Torrance	151,283
Mora	93,459	Valencia	270,663
Total		8,854,959	

<sup>1</sup>These county figures do not include the National Grassland areas or the Land Use (L. U.) areas administered by the National Forest Service.

Source: Unpublished data, Regional Forester, Albuquerque, New Mexico

3. *Bureau of Land Management Lands*. The Bureau of Land Management, Department of Interior, has jurisdiction of public lands in 31 counties in New Mexico, as shown in appendix table 3.

Table 3. Public lands under exclusive jurisdiction of Bureau of Land Management, 1966

County	Acres	County	Acres
Bernalillo	17,225	McKinley	351,760
Catron	581,435	Mora	7,561
Chaves	1,195,868	Otero	941,526
Colfax	261	Quay	7,600
Curry	391	Rio Arriba	555,238
De Baca	81,508	Roosevelt	16,397
Dona Ana	1,151,044	Sandoval	588,449
Eddy	1,420,300	San Juan	1,009,266
Grant	385,575	San Miguel	65,273
Guadalupe	117,488	Santa Fe	83,587
Harding	5	Sierra	822,175
Hidalgo	805,459	Socorro	949,396
Lea	466,952	Taos	207,112
Lincoln	563,368	Torrance	56,017
Los Alamos	0	Union	503
Luna	783,534	Valencia	381,293
		<b>Total</b>	<b>13,613,566</b>

Source: *Public Land Statistics 1967*, United States Department of the Interior, Bureau of Land Management, p. 17.

4. *Bureau of Indian Affairs Lands*. The Bureau of Indian Affairs, U.S. Department of Interior, administers tribal lands, lands owned by the individual Indians, and the Bureau of Indian Affairs lands in 12 counties of New Mexico (appendix table 4.)

Table 4. Land in state of New Mexico under jurisdiction of Bureau of Indian Affairs, June 30, 1966

County	Tribal	Individual	Govt.	Total
Bernalillo	216,290	5,970	266	222,527
McKinley	1,470,657	395,600	292,152	2,158,410
Otero	460,254	0	0	460,254
Rio Arriba	645,802	1,123	5	646,931
Sandoval	590,786	58,784	808	650,379
Santa Fe	79,431	0	117	79,548
San Juan	1,936,791	0	0	2,110,692
Socorro	36,257	20,414	8	56,679
Taos	62,280	0	7	62,287
Valencia	781,189	54,230	14,130	849,550
Torrance	16,300	0	0	16,300
Grant	0	0	48,680	48,680
<b>Total</b>	<b>6,296,037<sup>1</sup></b>	<b>536,121</b>	<b>356,173</b>	<b>7,362,237<sup>1</sup></b>

<sup>1</sup>Total includes some government-owned and some individually-owned acreage.

Source: Letter, Bureau of Indian Affairs, Albuquerque area office dated June 28, 1968

Fig. 1. National forests in New Mexico, 1964

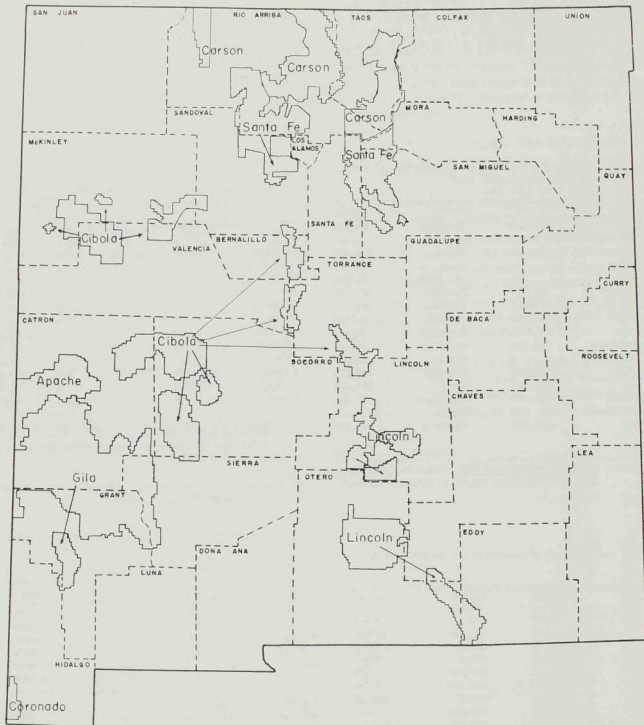


Fig. 2. National forest lands in the national wilderness preservation system in primitive areas and national grassland areas in New Mexico as of December 31, 1964

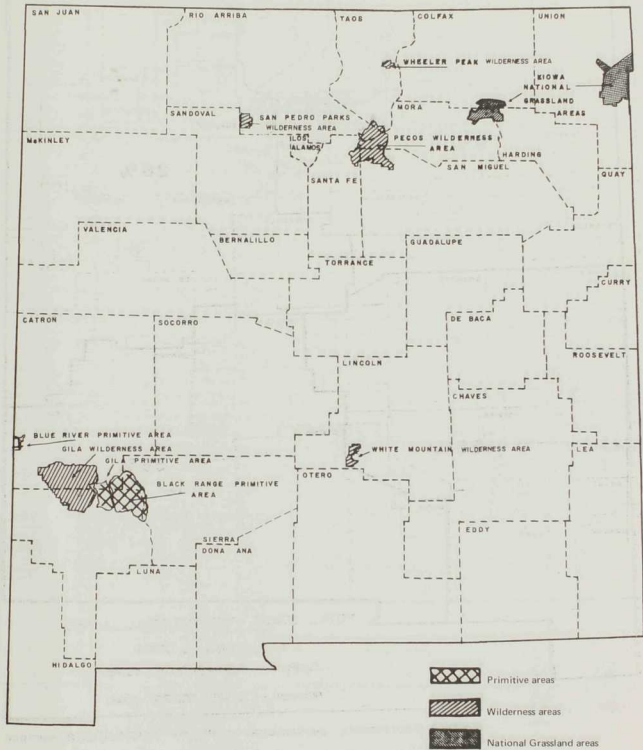
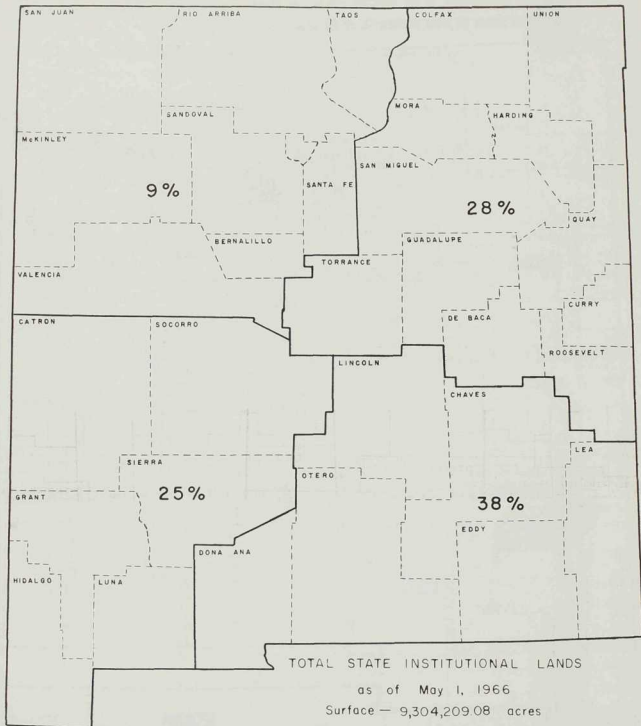


Fig. 3. Distribution of state institutional lands, by Crop Reporting District, as of May 1, 1966

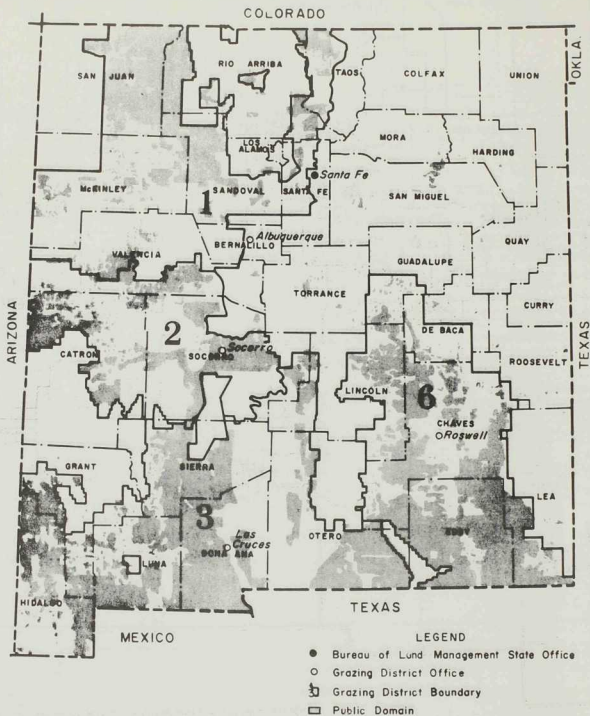


Approximate percentage of the 9,304,209.08 surface acres located in the four Crop Reporting Districts

SE — 38%	SW — 25%
NE — 28%	NW — 9%



Fig. 5. Bureau of Land Management districts in New Mexico



## Appendix II

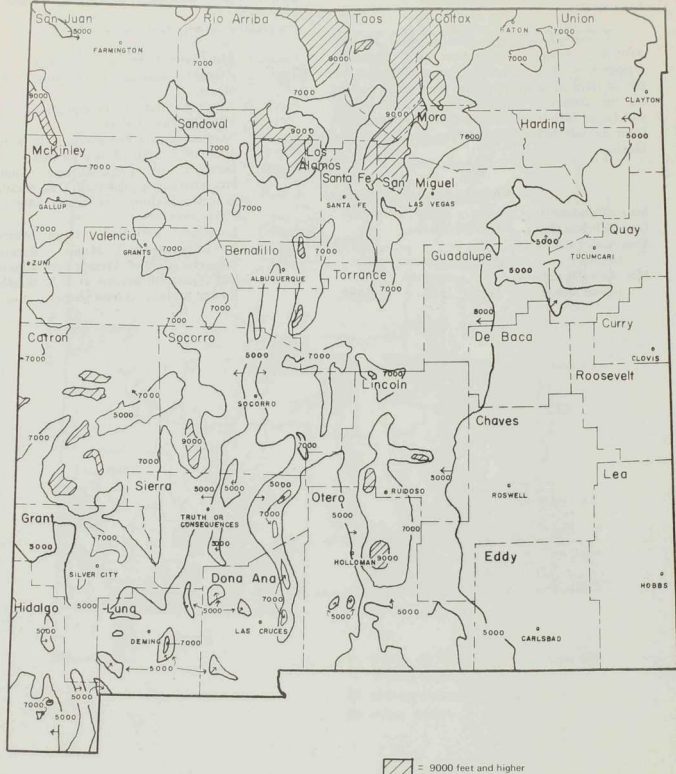
*Topographical and Climatological Factors Affecting Forage Production and Resource Management.* The amount of forage produced and the method used in managing these lands depend on the combined physical factors. These vary widely, as highlighted in the following tabulation from the selected weather station records for New Mexico:

	<i>Highest</i>	<i>Lowest</i>	<i>Difference</i>
Station Elevations (ft.)	8,250	3,120	5,130
Growing Season (days)	218	85	133
Mean Annual Temperature (degrees F.)	63.2	42.3	21.9
Mean Annual Precipitation (annual inches)	23.20	5.35	17.85

The following elevation and climatic information is presented to assist the reader in recognizing the reasons for the wide differences in the grazing capacity between areas of the state:

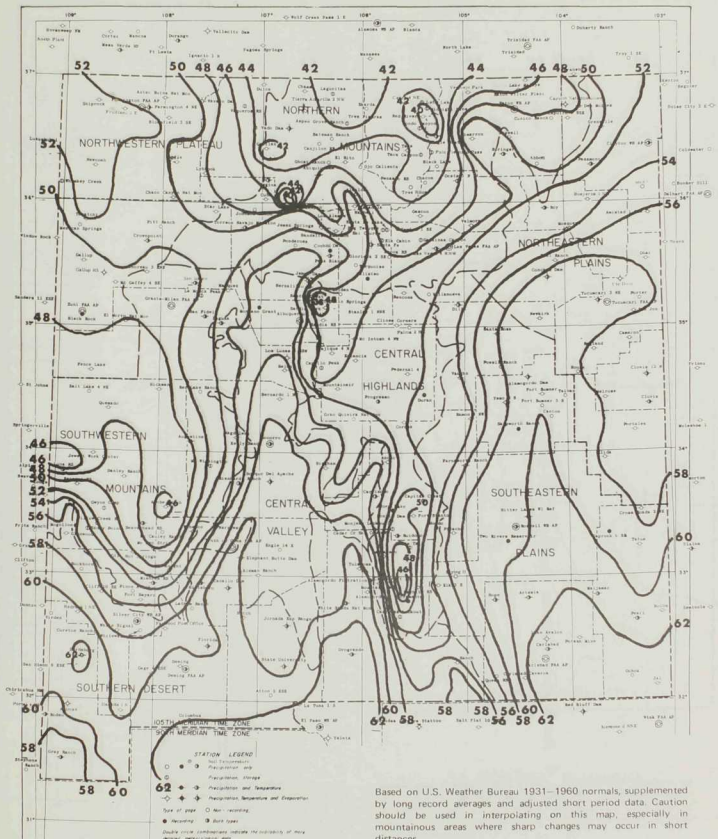
- Figure 1, Elevations (feet), New Mexico
- Figure 2, Average Annual Temperature, New Mexico
- Figure 3, Average Annual Precipitation, New Mexico, (1885-1965)
- Figure 4, Normal Annual Precipitation, in inches, 1931-1960, State of New Mexico
- Figure 5, Location of and Average Annual Precipitation at Selected U.S. Weather Bureau Stations in New Mexico, 1931-1960
- Table 1, Location, Elevation, Mean Annual Precipitation, Mean Annual Temperature, and Average Freeze Period and Years of Record at U.S. Weather Bureau Stations in New Mexico

Fig. 1. New Mexico elevations above 5000 feet



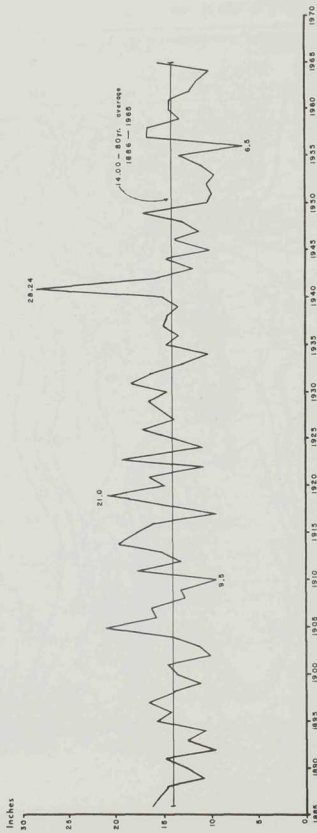
From: Weather Bureau, Albuquerque  
June, 1966

Fig. 2. Average annual temperature (°F), New Mexico



Based on U.S. Weather Bureau 1931-1960 normals, supplemented by long record averages and adjusted short period data. Caution should be used in interpolating on this map, especially in mountainous areas where sharp changes may occur in short distances.

Fig. 3. Average annual precipitation, New Mexico, 1886-1965



From: U.S. Weather Bureau Records  
Average of all New Mexico Stations

Fig. 4. Normal annual precipitation in inches, New Mexico, 1931-1960

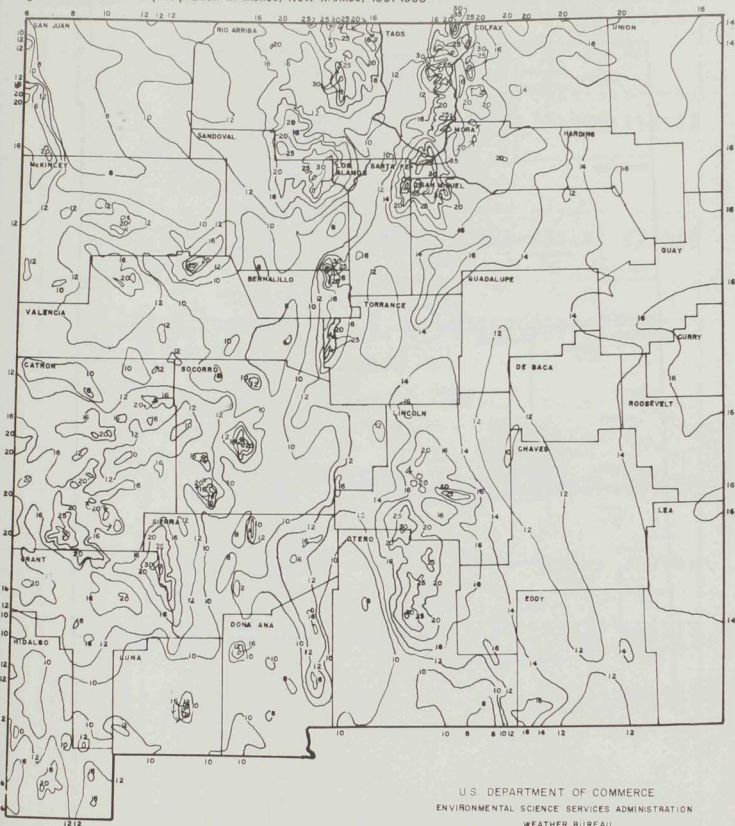


Fig. 5. Location of, and average annual precipitation at, selected U.S. Weather Bureau stations, New Mexico, 1931-1960

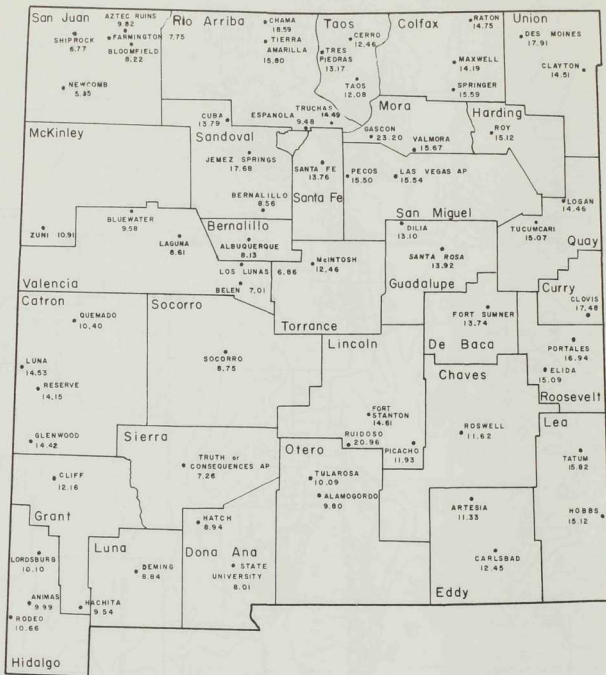


Table 1. Location, elevation, mean annual precipitation, mean annual temperature, and average freeze-free period and years of record at U.S. Weather Bureau stations in New Mexico<sup>1</sup>

Location <sup>2</sup>	Weather Bureau Station	Elevation feet	Precipitation		Temperature		Freeze-free Period		
			Years of Record	Mean annual inches	Years of Record	Mean annual degrees F	Average date of last 30 of the spring	Average date of first 30 or lower in the fall	Days number
Alamogordo		4,350	30	8.80	28	61.3	Apr. 7	Nov. 2	209
Albuquerque	AP	5,310	30	8.13	30	56.6	Apr. 8	Nov. 2	208
Animas		4,410	30	9.30	21	60.4	Apr. 24	Oct. 28	187
Artesia		3,375	30	11.31	30	60.9	Apr. 8	Nov. 2	208
Aztec Ruins National Monument		5,640	30	9.85	30	53.3	May 20	Oct. 13	147
Belen		4,800	15	7.01	14	59.6	Apr. 22	Oct. 17	178
Bernalillo	1 NNE	5,060	23	8.58	23	51.3	May 3	Oct. 10	160
Bloomfield		5,794	30	8.22	30	52.1	May 1	Oct. 19	171
Bluewater	3 WSW	6,800	27	9.58	29	47.9	June 3	Sept. 17	166
Carlsbad		3,120	30	12.15	30	63.2	Apr. 7	Nov. 5	212
Cerro		7,665	30	12.15	29	43.3	May 30	Sept. 23	118
Chama		7,800	30	18.59	23	42.5	June 9	Sept. 23	106
Clayton		4,969	30	14.51	30	53.1	Apr. 28	Oct. 15	170
Cliff	10 SE	4,800	17	12.16	13	56.7	May 11	Oct. 16	158
Clovis		4,280	30	17.48	30	57.9	Apr. 16	Oct. 26	193
Cuba		7,045	22	13.79	21	46.5	June 7	Sept. 20	105
Deming		4,332	30	8.81	30	60.5	Apr. 15	Oct. 29	197
Des Moines		6,622	30	17.91	30	49.2	May 14	Oct. 3	142
Dilla	1 SSE	5,140	19	13.10	15	51.7	May 1	Oct. 12	164
Elda		4,345	30	15.09	19	57.9	Apr. 18	Oct. 25	160
Espanola		5,595	20	9.49	20	51.2	May 12	Oct. 5	146
Farmington	4 NE	5,395	28	7.75	18	51.6	May 13	Oct. 9	149
Fort Stanton		6,230	28	14.01	27	52.3	May 7	Oct. 8	154
Fort Sumner		4,030	30	13.73	28	58.9	Apr. 15	Oct. 23	191
Gascon		8,250	7	23.29	7	44.6	June 12	Sept. 5	85
Glenwood		4,720	20	14.42	14	57.8	May 2	Oct. 28	179
Hachita		4,495	30	9.54	30	59.8	Apr. 20	Oct. 29	192
Hatch		4,042	29	8.94	29	60.1	Apr. 10	Oct. 25	198
Hobbs		3,615	26	15.12	26	61.2	Apr. 5	Nov. 9	218
Jemez Springs		6,055	30	17.69	30	51.8	May 2	Oct. 21	172
Laguna		5,800	28	8.61	27	53.7	May 2	Oct. 16	167
Las Vegas	AP	6,857	20	15.64	20	49.3	May 12	Oct. 8	149
Logan		3,830	27	14.46	27	58.5	Apr. 19	Oct. 21	185
Lordsburg		4,245	30	10.16	14	62.0	Apr. 3	Nov. 3	214
Los Lunas	3 SSW	4,840	25	6.86	25	54.6	May 3	Oct. 15	165
Luna	RS	7,050	30	14.53	27	45.8	June 12	Sept. 10	90

Table 1. Continued

Location <sup>2</sup>	Weather Bureau Stations		Precipitation		Temperature		Freeze-free Period	
	Elevation feet	Years of Record number	Mean annual inches	Years of record number	Mean annual degrees F	Average date of last 32° or lower in the spring	Average date of first 32° or lower in the fall	Days number
McIntosh	6,250	30	12.46	30	50.2	May 18	Sept. 28	133
Maxwell	5,909	17	14.19	14	48.7	May 14	Sept. 26	135
Newcomb	5,565	13	5.35	12	52.3	May 8	Oct. 12	157
Pecos	6,900	30	15.50	17	49.0	May 29	Oct. 6	130
Picacho	4,965	16	11.93	9	58.3	Apr. 23	Oct. 26	186
Portales	4,010	30	16.94	30	57.7	Apr. 21	Oct. 20	182
Quemado	6,879	30	10.40	25	48.1	June 4	Sept. 16	104
Raton	6,379	30	14.75	30	48.9	May 11	Sept. 30	142
Reserve	5,832	30	14.15	14	51.2	June 3	Sept. 30	119
Rodeo	4,118	28	10.66	24	61.4	Apr. 20	Oct. 30	193
Roswell	3,612	30	11.62	30	58.5	Apr. 11	Oct. 24	196
Roy	5,884	30	15.12	12	52.4	May 1	Oct. 13	165
Ruidoso	6,755	18	20.96	17	48.4	June 6	Sept. 15	101
Santa Fe	7,200	30	13.76	30	49.9	May 11	Oct. 13	155
Santa Rosa	4,620	30	13.92	30	57.8	Apr. 19	Oct. 24	188
Shiprock	4,972	28	6.77	26	53.3	May 2	Oct. 12	163
Socorro	4,617	30	8.75	30	58.4	Apr. 14	Oct. 28	197
Springer	5,857	30	15.59	30	50.8	May 10	Oct. 3	146
State University	3,881	30	8.01	30	60.0	Apr. 9	Oct. 28	202
Taos	6,965	30	12.08	30	47.1	May 25	Sept. 30	128
Tatum	4,100	28	15.82	27	58.8	Apr. 17	Oct. 24	190
Tierra Amarilla	7,766	20	15.80	19	44.1	June 14	Sept. 17	105
Tres Piedras	8,120	30	13.17	30	42.3	June 7	Sept. 10	95
Truchas	8,025	30	14.49	30	46.0	May 26	Sept. 23	120
Truth or Consequences	4,820	11	7.26	11	60.2	Apr. 3	Nov. 6	217
Tucumanari	4,096	30	15.07	30	58.2	Apr. 16	Oct. 25	192
Tularosa	4,460	29	10.09	27	61.7	Apr. 4	Nov. 1	211
Valmora	6,300	30	15.67	30	49.2	May 9	Oct. 2	146
Zuni	5,440	30	10.91	30	50.0	May 18	Oct. 14	147
Average	5,464		12.48		53.7	May 4	Oct. 13	162

<sup>1</sup>Period of record: Temperature and precipitation, 1931-60; freeze-free, 1940-62 (when available). Average number of years of record during 1931-60. Reviewed by Weather Bureau State Climatologist -- 1967.

<sup>2</sup>Figures and letters following the station name, such as 1 NWE, indicate distance in miles and direction from the post office. AP = airport, RS = ranger station

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