Navajo Service

Land Management Unit No. 8

- - - - -

MONUMENT VALLEY

- - - - -

Range Management Study

August
Twenty Sixth
19 36

Submitted:

D. G. Anderson
Junior Range Examiner

Approved:

- - - - - - - - - - - - - - - - -

D.F.A 8

RANGE MANAGEMENT STUDY

Land Management Unit No. 8

Monument Valley

I -- GENERAL DESCRIPTION

A -- Area:

The area of Unit Number 8 is 1,424,083 acres, including two demonstration areas, Kayenta D. A. -- 38,223 acres and Chilchinbito D. A. -- 16,586 acres. The proposed change in the boundary would include 27,192 acres, bringing the total area for the Unit to 1,451,275 acres. For management purposes, the area has been divided into eight units, along natural, topographic, or political boundaries.

B -- Boundaries

The boundaries of Unit Number 8 follow, for the most part, natural boundaries. The boundaries as established are as follows: Beginning at a point on the San Juan River, north of the northern point of No Man's Mesa, and extending in a southern direction along the east side of No Man's Mesa, and the western side of Copper Canyon and Skeleton Mesa to Laguna Canyon; thence south along the west rim of Laguna Canyon to Longhouse Valley; thence south along the west rim of Longhouse Valley and across Marsh Pass to where the Kayenta Coal Mine road climbs Black Mesa;

DFA 9

thence in a southeasterly direction to the 36°30' parallel; thence east along the 36°30' parallel to 110°00' 36°30'; thence in an easterly and southern direction to the south boundary of the Chilchinbito D.A.; thence along the rim of Black Mesa to a point approximately four miles west of Rough Rock Trading Post; thence in a northeasterly direction along the west rim of Carson Mesa to a point sixteen miles north of Yale Point; thence in an easterly and northerly direction to a point on the west rim of Chinlee Valley -- approximately six miles southwest of Rock Point Trading Post; thence north along said rim to the 36°45' parallel; thence north along the Chinlee Wash to the San Juan River; thence west along the San Juan River to the point of beginning.

One boundary change is proposed: As was noted in the foregoing description -- the boundary on top of Black Mesa falls on straight lines. This entails the following disadvantages:

(1) The boundary is difficult to locate -- interfering with management of both units 8 and 4.

(2) The terrain is rough, with steep broken hills and many valleys; the boundary, as set, would cut across natural stock driveways.

(3) The stock water in this area is found principally along the arroyas. The present boundary would divide water in such a way as to cause disputes. The change, as proposed, would follow tributaries of Blue Canyon, prominent ridges and the Pinon-Rough Rock

DFA 10

Road. In this way there would be a natural boundary.

The proposed boundary would be easily discerned and stock water along the boundary would be divided between the two units involved. The boundary between units Three and Four follows Blue Canyon; the boundary change of Unit Four, as proposed, would continue along tributaries of Blue Canyon. Such a boundary would seem more logical than an arbitrary line -- as it now exists.

The present usage of the area is mixed between unit Number Eight and Unit Number Four. The location of the boundary between Kayenta and Pinon chapters, which should follow the Western and Hopi jurisdiction boundaries, is not clearly understood by the Indians in this region. Because of the availability of firewood -- and snow for domestic water, this area is used in the winter more than it is in the summer. Consequently, all usage could not be determined. From all available information that could be obtained, any place the boundary as proposed in this vicinity would be agreeable to the Indians of the area. Many Mules Boy is the principal owner in this area and, like most of the Indians in this vicinity -- goes to Chapter meetings at both Kayenta and Pinion.

The boundary change would add an additional 27,192 surface acres to the area and 2,522 forage acres -- or 1,009 sheep units yearlong.

DFA 11

Final decision in the matter should not be made, however, until Unit Number Four is studied — which, it is hoped, will be accomplished when a larger percentage of the Indians using the area are where they can be contacted.

Besides following natural boundaries, the remainder of the boundary follows fairly well established political boundaries, with the exception of the area lying within the district immediately east of Chilchinbito Demonstration Area. The boundary of the district, as set, falls on a well-defined natural boundary. However, the old Rough Rock chapter boundary lays as far west as the Chilchinbito D. A., and the usage of this area is, as nearly as could be ascertained by the study, mostly Rough Rock Indians.

This area has been handled as a separate unit. Decision in making a boundary change here lies in the desireability of retaining old political boundaries and separating Indians of Rough Rock chapter from Unit Number Eight — or setting the boundary on a well-defined natural boundary, which would be easily discernable and prove a more permanent feature from a management standpoint.

As the boundary is, it is suitable from a management standpoint and no change is proposed by the Group.

DFA 12

C -- Elevation, Temperature and Rainfall:

The elevation of this unit varies from approximately 8,000 feet above sea level on the rim of Black Mesa to approximately 3,500 feet on the San Juan River at Pinto Farms. The major portion of the area lies between 4,500 and 6,500 feet.

The only available records on rainfall and temperature in this unit are at Kayenta. Kayenta records show a maximum temperature of 103° and a minimum of 18° F.

Rainfall records show a minimum annual precipitation of 4.63 inches, a maximum of 11.05 inches and an average of 8.43 inches.

D -- Vegetative Types:

Browse, grassland, woodland, waste, and barren are the principal vegetative types in the order of their importance according to acreage. The attached table summarizes the acreage according to size and carrying capacity. (See table I)

The principal vegetative species occurring in this district are as follows:

GRASSES

Galleta grass	(Hilaria jamesii)
Blue grama	(Boutelcua gracilis)
Spiny muhley	(Muhlenbergia pungens)

GRASSES: continued

Alkali sacton	(Sporobolus airoides)
Sand dropseed	(Sporobolus cryptandrus)

SHRUBS:

Blackbrush	(Coleogyne ramosissima)
Chamise	(Atriplex canescens)
Greasewood	(Sarcobatus vermiculatus)
Big Sage	(Artemisia tridentata)
Yellow bush	(Chrysothamnus greenii)
Rabbit bush	(Chrysothamnus)
Shadscale	(Atriplex confertifolia)
Cliff rose	(Cowenia stansburiana)
Mormon tea	(Ephedra trifurca)
Snakewood	(Gutierrezia)
Mt. Mahongany	(Cercocarpus Montanus)
Service berry	(Amalanchor)

WEEDS

Russian thistle	(Salsola pestifer)
Pingue	(Actinea floribunda)

DFA 14

CV-6417-201

TABLE I

DISTRIBUTION OF VEGETATIVE TYPES ACCORDING TO SUB-UNITS

Vegetative Types	1	4	5	6	7	8	9	C	Total
Sub-Unit 1	47,520	2,433	64,836		32,149	14,230	55,678	280	217,126
	4,838	215	2,880				1,392		9,325
	143,957		78,996		6,225	36,540		1,180	266,898
2	12,085		3,507						15,592
	2,595	7,339	1,843	3,470		90	82,230	7	97,574
3	210	825	179	145			3,627		4,986
	24,614		14,072		3,020	267	12,023	7	54,003
4	2,155		454				435		3,044
	38,262		136,689		38,358	30,154	9,140	22	252,675
5	3,367		5,766			305			9,438
	96,133		184,272		28,876	21,637	89,315	219	420,452
6	8,525		9,066				2,275		19,866
	36,099		11,288		953	80	12,165	10	60,596
7	3,507		965				227		4,699
Kayenta D. A.									38,225
									3,144
Chilchinbito D. A.									16,586
	08-9	11	05	3					1,710
Total	389,180	9,772	491,996	3,470	109,584	102,998	260,399	1,725	1,424,033
	34,978	1,040	22,617	145			8,261		72,104
	4,208	6,360	2,354			100	14,137	33	27,192
Unit 8	478	1,291	191				562		2,522
Total incl.	393,388	16,132	494,350	3,470	109,584	103,098	274,686	1,758	1,451,275
Prop. Charge	35,465	2,331	23,008	145			8,823		74,626

NN000321

TABLE 1 a

COMPILATION BY VEGETATIVE TYPES

Type	SA	Net FA	C.C. Syl	% of Area	% of C.C.
1 Grassland	393,388	35,465	14,186	28.1%	50.9%
4 Sagebrush	16,132	2,331	932	1.2%	3.3%
5 Browse	494,350	23,008	9,203	35.5%	33.0%
6 Coniferous	3,470	145	58	.2%	.2%
7 Waste	109,584	0	0	7.8%	0
8 Barren	103,098	0	0	7.4%	0
9 Woodland	274,686	8,823	3,529	19.7%	12.6%
Cultivated	1,758	0	0	.1%	0
Kayenta D.A.	38,223				
Chilchinbito	16,586				
TOTALS	1,396,466	69,772	27,909	100 %	100 %

D.F.A 16

E -- Poisonous Plants:

Poisonous plants in this district consist of: Death camas (Zygadenus), isicoma (Aplopappus), broadleaf - milkweed (Asclepias speciosa), pingue (Actinea floribunda), loco (Astragalus), larkspur (Delphinium menziesii), lupine (Lupinus) and whorled milkweed (Asclepias galoides).

Death camas is quite abundant in the area south of Laguna Creek and north of Black Mesa. Losses from this weed, however, are not an important factor.

The distribution of isocoma is over the entire district along arroya banks and in Chinle shale.

Broadleaf - milkweed is an important factor in livestock losses, especially in the region north of Comb Ridge. It is found primarily in rock outcrops, Distribution is over the entire area.

Pingue weed is found on Black Mesa, on the north slope and on Skeleton Mesa. Important losses from this weed have not been reported.

Locos are scattered throughout the district, but are not in such quantities as to cause a great deal of trouble.

Larkspur was only noted in the Kayenta D. A.

Lupines were noted on Black Mesa.

DFA 17

Whorled milkweed is limited to cultivated areas along the Laguna. This caused so much loss that traders refused to handle the hay produced. The Agronomy Branch is now working to eradicate this weed.

For the most part, poisonous plants do not cause a great livestock loss in this area.

II -- CLASS OF LIVESTOCK

The vegetation of this area is of such a quality as to be used by cattle as well as by sheep. However, because of the character of the soil it appeared to be better suited to cattle in the area north of Comb Ridge -- than sheep. There is a large percentage of the range which is in sandy soil and which has a none too dense vegetative cover. Due to the fact that livestock must travel long distances between feed and water, cattle would probably tramp out less vegetation than sheep. Unless sheep are properly herded, much vegetation is trampled out. At present, Indian methods of handling their herds are not conducive to natural range revegetation.

Cattle in this vicinity were in "good living condition", whereas sheep in the same location were in poor flesh.

Cattle tend to scatter out from water -- whereas sheep are herded; at present they are "close-herded." It is recommended that, wherever practical, cattle should replace sheep.

CV-6417-201 NN000324

III -- NUMBERS OF LIVESTOCK

The carrying capacity of the unit, exclusive of the demonstration areas and the proposed boundary change, is 26,900 sheep units yearlong. Including the change in boundary, the carrying capacity is 27,909 sheep units yearlong.

From the 1935 dipping records and cattle and horse counts, the numbers are as follows:

LIVESTOCK NUMBERS IN SHEEP UNITS

TABLE NO. II

	Dennehotso	Kayenta	Oljeto	Chilchinbito	Estimated Black Mesa & Rough Rock	TOTAL
Sheep	3,106	7,903	3,570	2,035	2,000	18,614
Goats	492	2,547	1,051	409		4,499
Cattle	188	577	258	6,200	90 X 4 =	4,700
Horses	577	629	399	178	68 X 5 =	9,255
Total Grown Livestock	7,235	15,903	7,648	3,582	2,700	37,068
Lambs	1,080	2,918	1,018	802		
Kids	276	1,111	374	208		
Calves	33	107	63	35		
Colts	69	197	59	27		

- - - - - - - - - - - - - - - - - - -

In the foregoing table, sheep and goat numbers were taken from the 1935 Dipping Records. Cattle and horse numbers were taken from the 1935 cattle and horse count. For the area on Black Mesa and the area east of Chilchinbito Demonstration Area around Rough Rock, estimates were made of present livestock numbers.

- - - - - - - - - - - - - - - -

TABLE NO. III

NUMBERS AND DISTRIBUTION OF PRESENT LIVESTOCK

SUB-UNIT	Human Population	Forage Acres	Carrying Cap.	Present L.S. Numbers	Present Stocking	Reduction
1. (Kayenta)	501	9,325	3,730	15,903	Plus 12,173	76.5%
2. (Dinnehotso)	672	15,592	6,237	7,235	Plus 998	13.8%
3. (Black Mesa)	59	4,968	1,994	1,700	Minus 294	Minus 17.3%
4. (Chilchinbito)	178	3,344	1,338	3,582	Plus 2,244	62.6%
5. (Monument)	35	9,439	3,775)	7,648	Minus 4,073	Minus 53.3%
6. (Oljeto)	163	19,866	7,946))			
7. (Rough Rock)		4,699	1,880	1,000	Minus 880	Minus 88.0%
TOTAL	1,608	67,250	26,900	37,068	Plus 10,168	Plus 27.4%
8. (Black Mesa)		2,522	1,009		1,009	Minus 100%
	1,608	69,772	27,919	37,068	Plus 9,159	Plus 24.6%

- - - - - - - - - - - - - -

DFA 20

Table III indicates an overstocking of the district to the extent of 27.1% -- not computing the proposed boundary change; and an overstocking of 24.6%, with the boundary change.

A reduction of [illegible],168 sheep units is required to bring the livestock number down to carrying capacity.

If horses were reduced to three per family, a reduction of 855 head or 4275 sheep units yearlong would occur. Then, by goat and unproductive stock reduction in other classes, only a small number of sheep would be required to bring the livestock numbers to present carrying capacity.

It is recommended that any reduction should take place in the following order: First -- horse numbers; second -- unproductive stock (cattle and sheep); third -- goats; fourth -- productive, but less desireable cattle and sheep. Decision in desireability of livestock should lie in type and breeding.

Goat reduction in this Unit is a question. Goats numbers should be reduced but the desireability of removing all goats is questionable. Goats are reported by traders and the Indians themselves to serve as a supply of milk for Navajo children as well as weak lambs.

However, a cross between a milk goat breed and the present goats would prove much more economical in milk production than the present breeds of goats. That is to say, more milk for each animal would be produced and at the same time no more forage would be consumed. The range is, however, not in condition

CV-6417-201 NN000327

to support highly bred milk goats.

Carrying capacity for the district was computed on a two and one-half forage acre requirement for sheep yearlong.

IV -- SEASONAL USE

Black Mesa is summer range and the remainder of the district is yearlong range.

Black Mesa, at the present time, is used almost entirely as winter range because of the availability of firewood and the presence of snow for domestic water use. However, the snow gets deep enough to cause heavy sheep losses in some years.

By changing from winter to summer usage, any loss from snow would be avoided and a concentration of livestock around cultivated areas in the summer time would be materially reduced.

Good water for domestic use is scarce on Black Mesa. However, reservoir and wells serve as a supply for those families which stay there the year round. Water for domestic use, although alkali, is scattered throughout this area.

V -- DISTRIBUTION OF LIVESTOCK

The severely over-grazed areas adjacent to cultivated areas, along the Laguna and near Chilchinbito, are reflected in Table III -- and show a poor distribution of livestock.

DFA

CV-6417-201 NN000328

There are many factors effecting the distribution of stock in this area: First, there are areas such as Kayenta, Longhouse Valley and Dinnehotso, that have had a generous supply of permanent water and have been inhabited for a long time; whereas, a large area North of Goulding's Trading Post and Oljeto, north to the San Juan River, has been Indian Reservation only since 1934. Much of this area is sparsely settled — to say the most. There is a consequent concentration of livestock along the Laguna and a relative scarcity in the north portion of the Unit.

Secondly, water development is quite important as far as distribution of the stock is concerned. A concentration of stock around old permanent watering places is present, while several water developments that have been made in past two years, have not shown their effect on the concentration of stock around permanent supplies. This is especially true of E.C.W. reservoirs and drilled wells which have not filled with water or are not complete at present.

There are 222 water supplies on the district, including 45 developed springs; 70 permanent, undeveloped springs; 41 temporary, undeveloped springs; 41 shallow wells; 10 drilled wells; one artesian well; 50 reservoirs; and six permanent streams. There is, on an average, water, either temporary or permanent, for every 6,537 acres and a permanent water supply for every 11,078 acres. If one grazes within a radius of three miles, then 18,000 acres can be covered from a single water supply.

CV-6417-201 NN000329

Maintenance work on water supply is the most important feature in the present water development. Further new developments should be made after more study is made of the effect of present, new developments and need of the range. At present there are 40 maintenance and development projects turned in for immediate work and 24 recommended for ultimate development.

Third, herding is an important factor in distribution. Proper herding of sheep, so as to graze the flocks where they can get the maximum use of the feed, with the least damage to the forage and still obtain a good distribution from water supplies, is essential to a successful management plan. Damage to the forage, as well as to sheep, results from close herding and trailing to and from water. Much could be done to enlighten the Indian as to the proper method of herding sheep.

Fourth, fencing, which is commonly used to get Distribution of livestock, has some merits -- but with sheep, if properly herded, little or no fencing is necessary. However, any areas which are to be excluded from livestock should be fenced.

Fifth, one reason for a concentration of livestock along saltbush flats, is the failure of the Indians to salt their sheep and depend upon chamise, greasewood, shadscale, and other salt bushes for a salt supply. Four traders in this area were contacted with regard to amounts of salt sold to Indians. They all agreed that practically

CV-6417-201 NN000330

no salt was sold to Indians. Mr. Kerley at Kayenta reports selling four blocks of salt in the past year.

Salting would tend to reduce -- or even eliminate the need of Indians to drive their sheep to salt bush flats at periodic intervals.

Some plan must be worked out by the Indians of Unit Number 8, to move some of the herds from concentration locations, such as Kayenta, to less concentrated areas, such as Aljeto and San Juan River. If such a course is not followed out, the herds in the concentrated areas are due for a much larger reduction than the average for the Unit. An adjustment in distribution is recommended as a possible method of eliminating such reduction.

VI -- RANGE REVEGETATION AND PLANTING

The economic feasibility, however, is limited by three very important factors: Absolute range control, availability of water, and species planted.

Absolute range control can only be obtained by fencing. If it is found too expensive to fence the entire area for two or three years, to permit the vegetation to start, then "strip fencing", across the area planted, might prove beneficial. For instance, if a spreading area is planted and it is too expensive to fence the entire area, fencing a strip across the area five to ten chains wide, and spacing the fences every half mile, would furnish a natural seed supply.

DFA 25

CV-6417-201 NN000331

Water, spreading through this area, would carry seeds farther down the drainage and stimulate natural revegetation.

Young plants are difficult enough to establish, but under the protection of fences, where they can be completely protected for a few years until they establish themselves, a larger survival and a more rapid revegetation can be expected.

The second large factor effecting the survival and establishment of vegetation is water. Especially in an area where the average annual rainfall is only 8.63 inches, water must be made available in order than an economically feasible survival of plants will result from planting operations. Water spreading areas are the answer to this question.

The third factor effecting range revegetation, is the species used in the operation. Blue grass would not grow in a sand dune. Recommended species for the water spreading areas in this unit are: Galleta grass, sacaton, blue stem (wheat grass), blue grama, chamiso, shadscale and winter-fat. Evidences of all these species are found in the immediate area of proposed water spreading areas.

An example of the effect resulting from lack of range control is well exhibited in Longhouse Valley. A large area was planted in this vicinity and provided with spreader structures. The carrying capacity is approximately 60 to 100 head of sheep yearlong. There was a natural stocking of

approximately 250 to 300 head of sheep, and as soon as the grasses planted began to show, an additional 500 head of sheep were introduced. With such a livestock population, revegetation can not give good results.

VII — ANIMAL HUSBANDRY PRACTICES:

1. Bucks

Bucks are, at present, run with the breeding herd during the entire year. Bucks should be separated from the ewes, except during the breeding season. This entails the use of buck pastures — or buck bands. Chilchinbito Demonstration Area is recommended for use as a buck pasture for the herds in the Unit south of Comb Ridge. Four hundred thrity-six bucks are needed to care for the sheep south of Comb Ridge.

Four Hundred Thirty bucks are needed for sub-units Five and Six. Because it would entail the building of such a large pasture to furnish 750 forage acres (the amount required to carry the bucks of this area) and because of the character of the soil and vegetation, it is recommended that a buck band be substituted for a buck pasture.

Breeding season for sheep should be from December 1, to January 15. The bucks in this Unit, at present, are not segregated from the breeding herd. Aprons are used to some extent, but such a practice is not entirely satisfactory.

2. Shearing

Bucks are sheared too early in the season. Bucks should be sheared about June 15 to July 1, in order that their fleece will not be too heavy to interfere with breeding in case

CV-6417-201 NN000333

of storms during breeding season.

As a whole, the sheep are sheared too early. Shearing on June 15th is recommended.

Education of the Indians in the proper method of shearing and tying fleeces could do much to increase the income from the wool. At the same time, traders could afford to pay more for wool that is properly tied, to encourage the Indians to practice proper methods of shearing and better wool production.

3. Breeding

In both sheep and cattle, breeding is a very important factor and one that should be given much consideration. It is understood that livestock cannot be bred ahead of the condition of the range, without serious livestock losses, but as the herds are now, there is a large number of culls and barren stock that could be removed without reducing the income to the Indian. Then, as the condition of the range improves, better sires can be used which would result in a decided improvement in the general type and breed of livestock. With such improvement of type and breed, one can expect an increase in income to the Indians.

Bulls in this Unit are especially deficient. Of the 69 bulls included in the 1935 cattle count in this area, all were native stock; none were improved. With the introduction of improved bulls, one could expect a vast improvement in type, breed and uniformity of cattle in this area.

CV-6417-201 NN000334

4. Corralling

Herds in this Unit are practically all corralled at night at the hogan or camp. "Bedding-out" is not practised. Corralling night after night in the same place, leads to the depletion of the range in the vicinity of the corral by continual and severe grazing; and a poor distribution of stock over the entire area. Such a practice is not only injurious to the range, but also to the sheep, for there is a tendency to corral the herd early in the evening and to not let the herd out of the corral until late in the morning.

The bedding-out systems should be practiced. Benefit to the range and live stock would be the result.

The practice of corralling at the hogans makes conditions suitable for transmittal of disease and parasites. Grub in the head, lice, scabies, and various other conditions may be attributed in a large part to bedding at one site for an extended period of time.

5. Herding

Herding methods, as practices, are very harmful to the range -- and to the sheep. Herds are usually cared for by the children of the family who are not properly instructed as to proper methods of herding and are not overly responsible. Close herding of sheep is universally practiced. Trailing to and from water is also prevalent. Damage to vegetation from both these practices results. Education of the Indians as to proper herding

CV-6417-201 NN000335

methods would do much to improve the conditions existing on the range.

6. Miscellaneous

A: Livestock Counts and Dipping Records

The accuracy of livestock counts and dipping records is questioned, due to the fact that each sub-unit is not provided with a dipping vat and people of several chapters use the same vat. Such an arrangement leads to inaccuracy in locating the range of a herd -- making a difference sometimes of a sub-unit or even unit from which a herd comes. Continued observation by the management in charge of a unit will reduce such errors.

Cattle and horse counts were obtained from the Indians and due to misunderstandings and other reasons, inaccuracies occurred. Roundups held at periodic intervals would, I believe, aid in reducing any inaccuracies. It is recommended that a general roundup be held at the time this plan is put into effect -- and at an interval of every two years thereafter.

VIII -- SUB-UNITS:

The Unit has been divided into eight sub-units for managerial purposes. A description of each follows.

NOTE: The boundary change as proposed, would materially effect the use of the sub-units south of Comb Ridge. The sub-units have been handled for either case and each usage worked out. Consequently, a double set of usage figures is presented with each sub-unit. In the following sub-unit description, the figures, exclusive of sub-unit 8, are as the boundary exists -- the figures inclusive of sub-unit 8 are computed with the proposed boundary change.

DFA. 30

A: SUB-UNIT ONE
(Kayenta)

217,126 Surface Acres

9,325 Forage Acres

3,730 Sheep Yearlong Carrying Capacity

78 horses yearlong

140 cattle October 15 to July 15

60 horses October 15 to July 15

3,183 sheep October 15 to July 15

The elevation of this sub-unit varies from nearly 6,000 feet at the crest of Black Mesa, to approximately 5,300 feet on Laguna Creek. Most of the area is approximately 5,700 feet above sea level.

Vegetation here is primarily browse and grassland, with a lesser portion of woodland, barren, and inaccessible types.

Topography over the sub-unit as a whole, is from hilly regions in the south, to level or rolling country along the Laguna and El Capitan.

Either class of stock can utilize the forage in this sub-unit.

The sub-unit can be considered yearlong range.

Distribution and numbers of stock are difficult questions in this area at the present time. Because of a concentration of population, the sub-unit is now overstocked 76%. A shift of population to less densely populated areas in the Unit must be brought about or there will have to be a severe reduction in livestock num-

bers in order that proper stocking is reached.

Herding and salting will do a great deal to get distribution of stock.

Water in this area includes:

10 developed springs

3 permanent, undeveloped springs

2 temporary undeveloped springs

4 shallow wells

2 drilled wells

3 temporary reservoirs

1 permanent stream

This makes a total of: ---

20 permanent and five temporary water supplies.

Further development in this sub-unit is not recommended for immediate work.

Poisonous plants in this area include:

Whorled milkweed, death camas, pingue weed loco and isocama.

Most important losses are in whorled milkweed, which is confined to the agricultural area near Kayenta. Death camas is quite abundant, but serious losses are not reported.

B: SUB-UNIT TWO
(Dinnehotso)

266,098 Surface acres
15,592 Forage Acres
6,237 Sheep Yearlong Carrying Capacity
(Exclusive of Sub-unit 8)

CV-6417-201 NN000338

131 Horses yearlong

4,046 Sheep yearlong

157 Horses -- October 15 to July 15

316 Cattle -- October 15 to July 15

(including sub-unit 8)

131 Horses yearlong

1,084 Sheep yearlong

157 Horses October 15 to July 15

3,993 Sheep October 15 to July 15

316 Cattle October 15 to July 15

Elevation in this sub-unit varies from approximately 6,000 feet on Comb Ridge to Approximately 4,000 on the Chin Lee Wash.

Topography is, for the most part, level or rolling hills and valleys with sandy, steep outcrops on the north side of the unit.

Either class of livestock can utilize the forage in this sub-unit. Distribution in this area is not proper at present. Due to the cultivated area and available water supplies, there is a present concentration of livestock around Dennehotso. At the same time there is only an over-stocking at present of the entire sub-unit, of 13% from available figures.

Several bands of sheep were dipped in 1935 at Kayenta. Some herds could not be segregated from the Kayenta records. Consequently the figure of 13% overstocked at present is not

DFA 33

absolutely accurate. The sub-unit is overstocked more than 15% or 998 sheep units.

Herding could do much to obtain proper distribution.

Water: Although a generous supply exists, it is not well distributed. A new reservoir development is proposed. At present, there are:

2 developed springs (permanent)
13 undeveloped springs "
14 shallow wells "
3 drilled wells "
1 artesian well "
9 reservoirs (temporary)
1 permanent stream.

There are nine temporary and 34 permanent water supplies.

Some concentration of livestock is due to a lack of some of the present new water developments not showing effect on distribution.

Poisonous plants of importance in this area are, whorled milkweed around Dennehotso and death camas scattered throughout the sub-unit. Losses are heavy in whorled milkweed.

C: SUB-UNIT THREE

(Black Mesa)

97,574 Surface Acres

4,986 Forage Acres

1,994 Sheep yearlong carrying capacity

294 Horses -- July 15 to October 15

616 Cattle -- July 15 to October 15

4,042 Sheep -- July 15 to October 15

DFA 34

Elevation of this sub-unit varies from 6,000 feet on the crest of the Black Mesa to approximately 7,000 feet at the lower portion of the sub-unit.

Topography of this sub-unit is very rough, broken, hilly country, with deep abrupt canyons in the northeastern portion of the sub-unit.

The unit is practically an entire woodland, with narrow browse valleys and a small amount of sagebrush flats.

Either class of livestock can utilize the vegetation in this area, but the foresters maintain that cattle will do less damage to the reproduction of woodland than will the sheep and goats.

This sub-unit is summer range; herds remain here yearlong and the present usage is primarily in the winter, but a shift to the lower sub-units in the winter is desired; also heavy losses from deep snow would be avoided.

Distribution and numbers of stock can be easily obtained by herding sheep and allowing cattle to use the northern part of the area.

The question of management of cattle on Black Mesa has arisen. The first reason for putting cattle in the area is because of less damage to tree reproduction than the equivalent in sheep and goats. Cattle management, if supervised by a white stockman, will not cause serious trouble. Trailing to and from

the area can be conducted, provided the Indians are informed in the proper methods of handling stock.

Another reason for using this area for cattle as much as possible is from the standpoint of poisonous plants. Poisonous plants in this area are pingue and lupine. Both these plants cause more loss from sheep than cattle.

Numberous springs along the canyons form the water supply of this area.

3 developed springs

22 undeveloped springs (permanent)

5 undeveloped springs (temporary)

5 reservoirs (temporary)

Where are 25 permanent and 10 temporary water supplies in this area.

Poisonous plants in this area are: pingue weed, lupine and loco. None cause severe losses.

D: SUB-UNIT FOUR

(Chilchinbito)

54,003 Surface Acres

3,344 Forage Acres

1,338 Sheep yearlong carrying capacity

(excluding sub-unit 8)

14 horses yearlong

566 sheep yearlong

56 cattle — October 15 to July 15

DFA 36

712 sheep -- October 15 to July 15

35 horses -- October 15 to July 15

(including sub-unit 8)

14 horses yearlings

56 cattle -- October 15 to July 15

1,292 sheep -- October 15 to July 15

35 horses -- October 15 to July 15

Elevation of this area is from approximately 5,800 feet to 7,000 feet above sea level.

Topography varies from level or rolling hills in the northern portion of the sub-unit, to rough, steep hills along the north slopes of Black Mesa.

Vegetation is primarily grassland, browse, and woodland, being primarily grassland.

At present, there is about a 66%, or 2214 sheep units, overstocking of the area. There must be a shift of population elsewhere, or a drastic cut of livestock will have to be obtained in order that carrying capacity is reached.

There is a concentration of stock near Chilchinbito Trading Post.

Domestic water is rather scarce, but further developments are recommended that will aid in caring for this situation.

At present there are:

1 developed spring (permanent)

8 undeveloped springs "

1 undeveloped spring (temporary)

1 drilled well (permanent)

6 shallow wells "

3 reservoirs (temporary)

A total of 16 permanent and four temporary water supplies are to be found in this sub-unit.

The most important poisonous plant is death camas, although heavy losses are not reported. Loco, isocoma and pingue are also present.

E: SUB-UNIT FIVE

(Monument Valley)

252,625 Surface Acres

9,433 Forage Acres

3,775 Sheep yearlong carrying capacity

140 Horses yearlong

157 Cattle yearlong

2,447 Sheep yearlong

The elevation of this area varies from approximately 4,000 feet at the San Juan River, to approximately 6,000 feet on Comb Ridge.

Topography varies from rolling hills in the north and western portions to steep, inaccessible bluffs and rock outcrops in the eastern and southern portions.

Vegetation is primarily browse and grass, with only a scattering of woodland -- and little or no sagebrush.

Proper class of stock in this sub-unit is a problem. Either class of livestock can utilize the forage, but the soil is of such a character that cattle will do less damage to vegetation by trampling, than will sheep.

Further poisonous plants in this area are broadleaf, milkweed and isocoma. Broadleaf milkweed effects sheep more than cattle, and isocoma effects both classes alike.

Distribution of stock is not proper at this time, but, provided water developments prove as successful as they should, distribution of either sheep or cattle can be obtained.

At the present time, the sub-unit is not stocked to carrying capacity, and affords a place for some shift in population from the more thickly concentrated population centers. From available figures on livestock numbers and the carrying capacity as compiled from the extensive grazing survey Sub-units Five and Six are understocked 4,073 sheep units.

Water supplies in the sub-unit are as follows:

12 developed springs (permanent)
9 undeveloped springs "
3 shallow wells "
11 reservoirs (temporary)
1 permanent stream

CV-6417-201 NN000345

There are 25 permanent and 11 temporary water supplies in this sub-unit.

Poisonous plants in this area are: broadleaf, milkweed in the northern part of the sub-unit and isocoma, scattered throughout.

F: SUB-UNIT SIX

(Oljeto)

420,452 Surface Acres

19,866 Forage Acres

7,946 Sheep yearlong carrying capacity

294 Horses yearlong

331 Cattle yearlong

5,152 Sheep yearlong

The elevation of this area varies from 3,500 feet on the San Juan to approximately 6,500 feet on Hoskaninni Mesa.

Topography varies from rolling hills to steep, high, inaccessible bluffs and mesas.

Vegetation is typical upper Sonoran vegetation, being primarily browse, especially black brush.

Class of stock is an important factor. Although the vegetation can be utilized by either cattle or sheep — sheep will do more damage to th vegetative cover than will cattle, by tramping.

Poisonous plants in this area are broadleaf milkweed and isocoma. Broadleaf milkweed effects sheep more than cattle and isocoma effects both classes alike.

CV-6417-201 NN000346

At present, the livestock numbers are not equal to the carrying capacity of the sub-unit. This will allow for some shift in population from more concentrated areas. Newly constructed and proposed immediate developments will make available more range than has been available in the past.

Water in this area is not abundant, but further development should be made consequent to further study over a period of time after the effects of present developments can be made.

There are, at present:

16	developed springs	(permanent)
9	undeveloped springs	(permanent)
7	shallow wells	(permanent)
1	drilled well	(permanent)
16	reservoirs	(temporary)
2	streams	(permanent)

There are two proposed, immediate developments. The most important poisonous plant in this area is broadleaf milkweed. Isocoma and loco are scattered throughout.

G: SUB-UNIT SEVEN

(Rough Rock)

60,596 Surface Acres

4,699 Forage Acres

1,880 Sheep yearlong carrying capacity

(excluding Sub-unit 8)

45 horses yearlong

1,218 sheep yearlong

DFA 41

78 cattle -- October 15 to July 15

180 sheep -- October 15 to July 15

18 horses -- October 15 to July 15

(Including Sub-unit 8)

25 horses yearlong

38 horses -- October 15 to July 15

78 cattle -- October 15 to July 15

1,838 sheep -- October 15 to July 15

Elevation of this sub-unit varies from approximately 5,500 feet to 6,500 feet above sea level.

Topography varies from level and rolling hills in the northern part of the sub-unit, to exceedingly steep, rough, broken hillsides in the southern portion.

Vegetation is grassland and browse, with woodland in the southern portion of the sub-unit.

Either sheep or cattle can utilize the forage in this sub-unit.

There is a concentration of livestock in this area about permanent water supplies, due to the failure of new developments to show their effects as yet. Two drilled wells in this area and three or four reservoirs are not as yet furnishing water for stock. When these begin to furnish water, their effects will be noticed on the distribution of livestock.

CV-6417-201 NN000348

The present livestock population was estimated at 1,000 sheep units. Due to the Rough Rock Dipping Vat being in this area, there will be a certain amount of inter-district movement of livestock, but only for a short period of time -- and only for the vicinity around the dipping vat.

The carrying capacity of the range in the immediate area of the Rough Rock Dipping Vat is approximately 150 sheep units yearlong. This area will be grazed during the time the Rough Rock Vat is in use. The rest of the Sub-unit, will be able to care for this temporary overstocking if scattered throughout the sub-unit because of such a low carrying capacity of the area and such a short period of time the area will be used.

Water supplies in this area are:

1 developed spring	(permanent)
2 undeveloped springs	"
7 shallow wells	"
2 drilled wells	"
4 reservoirs	(temporary)

There are 12 permanent and four temporary waters in this sub-unit.

The most abundant poisonous plant is death camas. Death losses from poisonous plants are not important in this area.

H : SUB-UNIT EIGHT

This sub-unit is the area that would be included in Land Management Unit Eight if the proposed boundary change is accepted.

CV-6417-201 NN000349

27,192 Surface Acres

2,532 Forage Acres

1,009 Sheep yearlong carrying capacity

3,936 Sheep -- July 15 to October 15

20 Horses -- July 15 to October 15

For description of the area, see Sub-unit Three.

I: BAYAHTA D. A.

30,223 Surface acres

3,144 Forage Acres

The area is stocked for demonstrational and educational data.

J: CHILCHINBITO D. A.

16,586 Surface Acres

1,710 Forage Acres

To be used as buck pasture for area south of Comb Ridge. Chilchinbito Demonstration Area will carry 630 bucks yearlong. The needs of herds south of Comb Ridge is 480 bucks. Chilchinbito D.A. is as suitable range for bucks as is to be found in the unit.

The area at present is not stocked.

DFA 44

TABLE IV

TABULAR RANGE
MANAGEMENT PLAN

Sub-unit	SA	FA	SYL	Season of Use
1. Kayenta	217,126	9,525	3,730	78 horses yearlong 140 cattle, October to July 15 60 horses October 15 to July 15 3,183 sheep October 15 to July 15
2. Dinnehotso	266,898	15,592	6,237	131 horses yearlong 1,884 sheep yearlong 316 cattle October 15, July 15 157 horses October 15, July 15 3,993 sheep October 15 to July 15
3. Black Mesa	97,574	4,986	1,994	294 horses July 15 to October 15. 616 cattle July 15 to Oct. 15. 4,042 sheep July 15 to Oct. 15
4. Chilchinbito	54,003	3,344	1,338	14 horses yearlong 56 cattle Oct. 15 to July 15. 1,292 sheep Oct. 15 to July 15. 35 horses Oct. 15 to July 15.
5. Monument	252,625	9,438	3,775	140 horses yearlong 157 cattle yearlong 2,447 sheep yearlong
6. Oljeto	420,452	19,866	7,946	294 horses yearlong 331 cattle yearlong 5,152 sheep yearlong
7. Rough Rock	60,596	4,699	1,880	25 horses yearlong 38 horses Oct. 15 to July 15. 78 cattle Oct. 15 to July 15. 1,838 sheep Oct. 15 to July 15.
8. Black Mesa	27,192	2,522	1,009	3,936 sheep July 15 to Oct. 15. 20 horses July 15 to Oct. 15.

CV-6417-201 NN000351