

UNITED STATES DEPARTMENT OF AGRICULTURE
SOIL CONSERVATION SERVICE
NAVAJO DISTRICT.

RANGE MANAGEMENT PLAN
STEAMBOAT DEMONSTRATION AREA

FOREWORD:

The Steamboat Canyon Demonstration Area is located in the south central portion of the Navajo Indian Reservation, approximately twenty miles west of Ganado, Arizona, and twenty-five miles east of Keams Canyon, Arizona. The main road between these two points passes by the southwest portion of the area. This is a new road and in order not to have an isolated plot to the south of the road, a small portion of the fence was moved.

This Area embraces a total of 24,526 surface acres. It is roughly triangular in shape with the apex to the north.

The agreement between "The Soil Erosion Service" and the inhabitants of that area known as the Steamboat Cooperative Area, as represented by their Chapter Officers, providing for setting aside the area, was signed on April 25, 1935. A copy of the agreement is appended.

The fencing was completed by November, 1935. The stock was not removed at this time due to water conditions to the east of the area. Stock was removed about the 15th of August 1936.

The intensive grazing survey was made during the months of August and September 1935. Necessary maps and compilations

were completed during the following months.

Average annual precipitation for the area is close to 10.5 inches, the greater part of which occurs during the months of July, August and September, the growing season is about 133 days or from the middle of May to the first of October. Estimated average annual temperature is 48.4° with a mean daily fluctuation of 32°. Prevailing winds are from the southwest.

Eight families live on the demonstration area for the entire year and have used the area for grazing fairly consistently. Four families live within the area for part of the year and also have hogans off the area, but their stock were grazed for a period on the area. Seven families live off the area but graze their stock on the area for part of the year. It was impossible, however, to find the exact population date and range users as of May 22, 1936. Many horses and some sheep were not determined for owners.

In the past the area has been used by horses, cattle, burros, goats, and sheep. The greatest concentration of stock has been during the winter and spring months, but many used it for the entire year.

There are several pastures within the area which the Indians are to be allowed to keep with the understanding that they will use them as the S.G.S. directs. These pastures are to be used by horses only, no sheep are to be grazed in them. In

connection with these pastures, it will be necessary for someone, either the S.C.S. or the Indians, to construct good fences around the pastures if stray stock are to be kept from running out at will over the rest of the area.

At the present time the future stocking of the area is expected to be with sheep only, these to be breeding ewes all run in one band.

Description of the Area

1. Topography, Elevation, and Drainages

The general elevation of this area is from around 5000 feet to about 6500 feet on the rim of Balakai Mesa, which forms the natural boundary of the area on much of the west side and on all of the north side. The precipitous slopes of this mesa are visible from all points of the area; and this slope, together with its extensions to the southwest and southeast, are the chief topographical features of the area. In most places this amounts to sheer mesa or canyon walls bounding the gently sloping valley below.

These walls stand out in bold relief and, due to their meandering, they are encountered within the area as well as along the edge. Eagle Crag, once a part of this general mesa and an important land mark in this section of the country, stands in the center of the main valley about a mile and a half from the south entrance. The only part of the area which is rough enough to impede the movements of livestock is that part of the area which lies just under the rim of the Mesa. The smaller rimmed mesas practically all

have trails up and down them at sufficiently frequent intervals for the easy movement of stock. Practically all of the country which is rough at all is in a state of severe vegetative depletion and advanced erosion.

The main valley of canyon, fairly smooth and gently sloping, is from one-fourth to one mile wide. It extends from north to south through the area and is called by the Indians just "Main Canyon" or "Tsai-thia-Kai-de-has-kan" Wash. This is the Indian name for "Eagle Crag". There are three important tributaries leading eastward and four leading westward from the main valley to the steep mesa escarpment.

The big canyon coming in from the southeast corner of the area is called Tsai-ni-to (water in the middle of a rock) Canyon after Tsai-ni-to Spring. The canyon coming down by the S.C.S. Camp is called Toh-thia-kai-hasen (Old White Water) after the old tanks in the Morrison formation in the upper part of this canyon. These two canyons open into broad flats, corresponding in topography to the main canyon.

The area is moderately to very excessively drained. Originating in the steep mesa escarpment and foot slopes, in various parts of the area, all drainage leads to the main canyon, thence southward into the Pueblo Colorado and into the Little Colorado River.

There is a tendency for the gullies and arroyos to deposit their load in the form of an alluvial fan, at the base of the foot

slopes or in the bottom of the main valley. This material consists of various grades of sand, coarse gravel and even fair-sized boulders.

The various geologic formations exposed in the steep portions of the area may be briefly described as to name and location as follows: At the foot of the mesa escarpment in the eastern and central portion of the area, there is a relatively thin stratum of white Morrison sandstone. The Dakota formation, consisting of light brown and dark blue or blackish-gray shale, lies immediately over the Morrison. Beginning at the northeast corner of the area and extending west and south along the steep slope of Balakai Mesa, there is an exposure of a thick layer of Mancos shale. This material has had an important influence over the soils of the western and central portions of the area. The upper portion of Balakai Mesa is capped with a relatively thin layer of Mesa Verde formation, a light brown sandstone. In the extreme southeast and southwest portions there is an exposure of a thin layer of Tertiary formation, which is a reddish brown and light gray sandy material.

2. Soils

Residual soils derived from the decomposition of local parent material occupy the top of the mesas in the southwestern and eastern portions and on foothills in the central section of the area. These soils are generally shallow having been exposed to extensive sheet and gully erosion.

The alluvial soils are of several types and can be found scattered throughout the broad valleys of the area. Taking the area as a whole the soil is mostly rather fine in texture, some of the valley soils being quite heavy and sticky. Along the south boundary there is quite an area, both east and west of the main drainage, of tertiary sands, practically all of the rest of the area is fairly heavy. All of the soils in the valleys and on the low hills is highly alkaline in character as would be expected from their derivation.

Severe sheet erosion which has occurred on the steep slopes might be considered as normal, but this has extended to lesser slopes due to over-grazing. This can be noted in one or two local places north of Eagle Crag where sheep have been bedded for long continued periods.

A serious erosion problem is also evident on some of the long alluvial slopes as well as on most of the heavier foot slopes. Gully erosion is observed to be in a progressive or advanced stage which is indicated by the number, frequency, and depth of the gullies and arroyos which traverse these alluvial slopes. The main drainage is cut very deep for a good part of its length and is crossable with a car or wagon at only about three places within the area, but it can be crossed with sheep at fairly frequent intervals.

3. Water

The area as a whole is rather poorly watered. There is a large stock water reservoir built by EOM in the south central part

of the area which will supply water from the rainy season until late spring or early summer, but it cannot be reached from the upper part of Tsai-ni-to drainage. There are some small Indian tanks north of this reservoir which are called Toh-thia-kai-hasen (Old White Water). These tanks will supply water for a short time if a considerable amount of maintenance work is done on them. However, they are so situated that they will be subjected to rather heavy silting.

There are two small seeps in the south wall of Tsai-ni-to Canyon, both of which have been used by the Indians to some extent but principally for water for domestic use. Both of these seeps might be considerably improved by development work, but it is not believed that either would furnish enough water to amount to anything. Two or three "charcos" are planned for this country.

About one and one-quarter miles north of the ECW reservoir there is a drilled well in the main drainage of the area which is said to be a good stock water supply. However, this well has been out of order nearly all of the time since the range survey was made and just how much water it will supply is not known. Also, more storage will have to be supplied if it is to water the area band. Steps have been taken to secure the necessary repairs and additional storage at this well.

Near the northeast corner of the area is a small natural lake bed which it is expected to use as a tank location but construction cannot be done until the spring of 1937.

There are four fair to excellent springs up under the Rim

on the north boundary of the area, two (Klin-bi-to and Toho-ya-to) in the main canyon, one east (ECW spring), and one west (Shanto). However, these springs are practically inaccessible from the area with a band of sheep of any size and have therefore been fenced to the outside. It would be possible to pipe water down from Shanto springs to where it would be available in the area, but the cost would be higher than is warranted.

During the spring of 1936 a well was drilled just outside of the west boundary approximately seven-eighths mile north of the southwest corner, and a water trough was placed within the area. There is plenty of storage at this well but an additional water trough will have to be built in order to water the band.

Several "charcos" for temporary water supply have been planned and as rapidly as they are constructed they will be located on the map.

4. Forage

Little of the area is inaccessible to livestock and that is the rough steep areas lying directly under the rims of the mesas, or 5.4% of the total area. Very little of the area is barren, 0.6% of the total surface acres. About half of the total cultivated area is in open fields, the rest is included in the pastures. These pastures will be kept by the Indians, but will be subject to range management carrying capacity estimates; 0.4% is actually in cultivation. Very little more of the land would be suitable for agricultural purposes due to the alkalinity of some soils, and to

highly washable soils in other places. 33% of the area is in pinon-juniper in rather open stands and generally in poor condition; 34.2% is in browse; 5.5% of the area is sage brush. A small field is in weed type due to an abandoned farm; 20.3% is in grassland. Table I gives for each management unit and for the total area the surface acreage and proportions made up by each major forage type.

The valleys are browse types, with greasewood, shadscale, chamise, winter fat, blue stem, and blue grama being the most important species.

The open grasslands lie on higher ground and on slopes. Galleta, blue grama, and chamise are the most important species.

Woodland types are located on the hills, mesas, and steeper slopes of the area, representing the next to the largest type in area but is fairly low in carrying capacity.

Sagebrush types are found on the higher slopes and mesas in small patches.

5. Poisonous Plants

Loco can be found scattered throughout the entire area, but in no locality is it of sufficiently frequent occurrence to cause trouble unless the range should continue to be over-graze. Of course, loco did not show up to a large extent at the time when the survey was made and a spring inspection might show much more loco than is thought to be present, also there may be a big yearly fluctuation in occurrence, but no trouble is expected from this plant.

A small amount of death camas is present, but again, this plant would not show up to any great extent when the survey was made.

Whorled milkweed occurs in a few isolated spots but in small amounts. The Indians say they have had no trouble from poisonous plants in this area. Greasewood flats should probably be avoided when they are wet.

Seasonal occurrences of poisonous plants should be noted and if in sufficient quantities these areas should be avoided.

6. Rodents

Mice, kangaroo rats, and a trace of prairie dogs are present in this area. There is no immediate danger, thus no extensive control will be necessary except in localized sections where planting or agricultural developments are in progress. Very few rabbits were noted on the area.

7. Predators

The only predators to be found on the area are coyotes and perhaps an occasional bob cat. Since coyotes are reported very numerous, some losses will undoubtedly be suffered from this source unless control work is undertaken.

8. Pests

Heavy infestations of army worms occur during the summer months, but there seems to be no remedy for this condition.

9. General Condition

Potentially this area is of high carrying capacity but due

to long continued over-grazing the forage cover has reached a serious stage of depletion. On much of the area where blue stem was formerly abundant it is now almost totally destroyed. Much of the browse, especially chamise, has been killed out and many years of conservative use will be necessary to restore the browse stand to a satisfactory condition. The blue grama sod has been badly broken up on most of the types where it occurs and the volume production is very low. Near permanent water the ground surface is almost barren of perennial vegetation and the Agronomy Division has resorted to considerable seeding in an attempt to restore some cover; but it is doubtful whether this has done any good so far.

Back at extreme distances from water, the grass cover is as yet in fair condition, but the browse species are badly depleted.

From the time of completion of the area fence until the stock were excluded the concentration of stock was exceptionally heavy. Due to this fact and also there was only about six weeks of growing weather after the stock were excluded, practically no vegetative recovery was made in 1936.

Value of the Land

The chief value of this area is grazing, with watershed protection next in line. Firewood should not be cut to any great extent, except only insofar as a sanitation cut is recommended. Farming practices are of no great concern nor very extensive in nature, but their importance should not be lost sight of entirely.

Range Management Objectives

1. To restore and maintain a vegetative cover of high forage value that will control erosion, conserve the moisture supply, and build up the fertility of the soil.
2. To up-build a permanent, stable, and economic livestock industry by utilizing the forage crop to the fullest possible extent consistent with forage production and the protection of related resources.
3. To demonstrate to the Indians how the above can be obtained.
4. To secure information on the range management problems which will be applicable to the surrounding territory and similar areas. Namely, these will be: forage acre requirement, palatability, utilization, vegetational changes, etc.

General Policy

1. In restocking the area, sheep of the Indians of the vicinity will be used, preference being given to the Indians living on the area and users of the range before the area was fenced.
2. A cooperative agreement with each Indian contributing sheep to the area will be entered into. A sample copy is appended to this plan.
3. The Range Management Division of the Navajo District will have complete control over all livestock activities on this area; namely, lambing, bucking, shearing, docking, etc.
4. The Navajo District will hire herders, team, wagon, etc.

Plan of Action

1. Class of Stock

The range is suitable for all classes of livestock; but since sheep are the class of stock of most importance to the Indians, the area will be stocked with a band of breeding ewes.

Two or three horses will be necessary at all times for the handling of the sheep camp.

2. Numbers of Stock

The intensive grazing survey of 1935 shows that the carrying capacity of the open range is 942 sheep units yearlong. Also, about 38 sheep units can be carried in the various pastures ranging in carrying capacity from less than a sheep unit yearlong to ten sheep units. Stock will be grazed in these pastures only to the extent of their carrying capacities.

A forage acre requirement of three was used, but this should not be accepted as final, as further studies will be necessary before actual figures can be obtained.

If there is any marked change in density or composition of vegetation, a check survey should be made and numbers adjusted to meet the new figures.

Due to the heavy concentration of stock which existed between the completion of the fence and the exclusion of all stock, the very poor condition of the vegetation, and a lack of water, it was decided to stock the area with about 50% of the carrying capacity until after the 1937 growing season. Therefore, on November 1, 1936, 445 ewes, 12 bucks, and 3 horses were placed in the area. At the end of the 1937 growing season the stocking will be increased to the carrying capacity.

3. Season of Use

Table II shows the carrying capacity of the area by units. Table III is the management schedule showing the numbers of stock and the dates of movement.

The band will be moved into Unit 2 on the flats close to water a short time before lambing and will remain until the two "medias" can be put back together. (See Lambing) Water will be needed every day for the ewes and lambs. The herd will be moved into Unit 1 on the 16th of July and will remain until the last of September. Some of this unit will have to be used when and where water can be obtained. For that matter, a like statement can be applied to the entire area.

The band will be grazed in Unit 3 from October 1 to January 10. There is no permanent water in this Unit; and it will have to be used while there is a temporary water available in tanks and charcos from summer rains and when snow can be used for water.

The lambs will be out and removed from the area when weaned in late October and November.

Bucks will be put with the ewes about December 10. All of Unit 2 will not have been utilized when first grazed; the band will, therefore, re-enter about January 11 and remain till February 16. The bucks will be removed from the band on January 15.

The band will be moved into Unit 1 on February 16 and remain till April 14.

It will remain strictly up to the Range Foreman to see that the total number of herd days use for each unit is adhered to as closely as possible.

This management schedule should not be accepted as the absolutely final working plan but should be improved on and changed to fully meet the actual demands in the field as more information is secured.

When the development of temporary waters, which is now under way, is completed, a new management schedule will be prepared which will allow for a deferred and rotation system of use for the various units. With the stock water at present available on this area, a satisfactory deferred and rotation system is not possible.

4. Distribution

This applies to the methods of routing, herding, watering, bedding, salting, and handling in such a way as to secure even utilization of forage over the entire unit with the minimum of trampling.

Securing of water will be a problem in this respect and a very good rule advanced by R.V. Boyle in the Range Management Policy Statement of 1935 should be more thought of and adhered to.

This rule is: "Never use range adjacent to permanent water as long as there is temporary water available elsewhere on the unit unless by rare coincidence there has been an abundance of temporary water and forage is better at permanent water".

Open herding should be the practice. The sheep will be grazed to and from water - not-driven.

Corrals will not be used except for working the band. Bedding out will be the practice. They will not be bedded down at water, nor will they be allowed to shade up around water at midday.

Weather and other conditions permitting, sheep should be allowed to start grazing as early in the morning as they want to do so. When the weather is very warm, they will want to shade up during the heat of the day, but must not be brought back to camp.

They should be allowed to graze in the evening until they are naturally inclined to bed down.

Camp should be moved every three to five days. Three-night bedding should be the rule and the same bed ground should never be used for more than a week. Whenever short moves are necessary, the new bed ground should be out of sight of the old one; otherwise the sheep will be difficult to hold on the new bed ground. Salting on the new bed ground will help to hold the sheep.

Sheep should not be taken out of their way to "salt bush". When they are not getting the right amount of salt from vegetation and water, stock salt should be supplied to them as the Range Foreman directs.

The Range Foreman will spend sufficient time with the herder at the outset to train him in proper methods of herding and will inspect the area frequently enough to insure compliance with the requirements.

5. Lambing (Outline submitted by G.N. King, Range Foreman)

The band will be moved on to the lambing range ten days or so before the actual dropping period starts. Dropping should start about May 5 and be completed by June 15.

Since there will be only approximately nine hundred ewes in this band, it will not be split but held as one band. Each period of dropping will be cared for separately and the more lambs dropped in one place, the longer the ewes should remain without being molested. For example, if fifty lambs are dropped the first

night the band should be allowed to move off slowly the following morning, leaving the ewes with lambs on the bad ground. These ewes should not be molested for at least a couple of hours, they will soon begin to move off of their own accord. They should all be pointed in one direction and left alone as much as possible. If there are predatory animals to contend with, temporary corrals must be used for protection at night; but if there are no predators, it is best not to use corrals for ewes with young lambs. They should just be bunched loosely, a fire built, and then left alone. The main band will be held up for a couple of hours at noon for the noon dropping and the same procedure will be followed for this bunch as for the night's dropping. At night the main band will return to camp.

The above procedure will be continued until about 250 ewes have lambed, then the camp will be moved to a new location, leaving the 250 ewes and lambs to be gradually thrown together into one band. After this band has been together for about ten days, the lambs should be docked and castrated but not marked for ownership. In no case should a ewe be run after and caught to determine ownership until the youngest lamb in the band is at least one month old. After the lambs have entirely recovered from the docking operation, two bands of 250 ewes each will be put together into one bunch which is called a "media", or one-half band of ewes and lambs. After they have been in the "media" for ten days or so, the lambs will be marked or branded for ownership.

When the lambs have recovered from the branding operation, the two "medias" will be thrown together into a band of ewes and lambs.

The lambing period will last about two months, May and June; and during this time, extra help will be needed. It will also be necessary to hire an extra team and wagon and possibly a saddle horse due to the fact that more than one camp will have to be maintained.

Ewes with young lambs should be handled as little as possible; and, above all, they should not be driven. Since they must have water every day, it will probably be necessary to use a truck with portable water tank and troughs to supply the band until the lambs are old enough to go to water. This is due to the rather long distances to water over most of this area.

6. Management of Bucks

Bucks will be segregated from the ewes at all times except during the breeding period. They will be put with the ewes December 10 and remain till January 15.

Three bucks for every hundred ewes seem to be adequate, so for the nine hundred head of ewes twenty-seven bucks will be required.

If a community buck herd in Land Management Unit #17 is formed and operated, then the area bucks can be handled in a less costly way. Also, a few more head of ewes could be added to the band. Until this buck herd can be formed, there will have to be a separate herder for these few bucks, complicating the management

of the handling on the area.

7. Supplemental Feeding

Since the sheep are to be completely under the control of the SCS, it is proper that the SCS assume the responsibility and expense of supplemental feeding when necessary on account of deep snows, extreme drought, poor sheep, cripples, etc. It will probably be to advantage if supplemental feeding is supplied the bucks during conditioning and during the breeding season.

The Range Foreman will be responsible for the determination of the amount of feed needed, the purchase, storage, and the feeding.

8. Field Days

The Range Foreman, assisted by the District Supervisor, will arrange to have a Field Day once or twice a year, at which time the neighboring Indians can observe what is being done on the area. At these meetings, the important phases of range management and animal husbandry should be demonstrated and explained.

9. Inspection, Reports, and Record.

The Range Foreman should visit the area at fifteen-day intervals when possible, but should never be away for more than a month. He will be responsible for the keeping of accurate records of actual use by units. Forms will be furnished for these records. A complete count and classification will be made as often as is necessary to keep accurate account of the numbers and classes

of stock. Between counts the records can be kept up to date by adding or subtracting known gains or losses. The herder should keep his own record of those changes and the Range Foreman will bring the tabulated record up to date once a month, at which time the monthly record will be turned over to the member of the Range Management staff who is in charge of range management on the demonstration areas.

The member of the Range Management staff who is in charge of Range Management on the demonstration areas should make inspections every three months, more often if possible. At these times he will make permanent notes of degree of utilization (a general statement).

In March of each year he will make a detailed survey or examination, by units, of the area and report to the Chief of Range Management in writing: (1) Degree of Utilization, (2) Condition of Livestock, (3) General Condition of Range, (4) Recommended Changes in Management Plan, if necessary.

The Chief of Range Management should visit the area twice a year, more often if possible. He should make an inspection at the close of the grazing year in March and should also observe conditions at the end of the growing season in September and October.

The Chief of Range Management or his assistant will, on July 1 of each year, make a detailed written report of progress, conclusions, etc., and will when necessary change this plan.

The annual report should contain all pertinent facts such as annual precipitation and departure from normal, amount of snow, amount of spring moisture, date on which summer rains started, etc., numbers of lambs dropped and numbers raised, all death losses, causes of death, amounts of supplemental feeding, amount of salt used, itemized statement of all costs of operation, prices received by Indians for lambs and wool from the area, type and quality of sheep grazed on the area, number of cooperators, results of field days, rodent and predator control results, added improvements (water, fencing, etc), relative proficiency of herders, etc. This report should also contain data on the actual use records for the preceding grazing year and the principal results and conclusions reached in any studies which may be under way.

A copy of this plan should be carried by the Range Foreman at all times. The original plan and one extra copy will be kept in the Navajo District files. Additional copies will be furnished to (1) District Supervisor's files, (2) Chief of Range Management, (3) Regional Office files, (4) Range Management staff member in charge of range management on the demonstration areas.

APPROVED:

s/d W.G. McGinnies
W.G. McGinnies
Acting District Manager

s/d T.L. Haggie
T.L. Haggie
Chief of Range Management

s/d Warren V. Turner
Warren V. Turner
Associate Range Examiner

Ward T. Kindred
Junior Range Examiner

February 1, 1937

STREAMBOAT DEMONSTRATION AREA
Major Forage Types by Units

Type No.	1		2		3		4-12 (inc.)		Totals	
	Acres	% of Area	Acres	% of Area	Acres	% of Area	Acres	% of Area	Acres	% of Area
1	1,539.4	18.5	1,749.2	26.9	1,353.8	15.2	320.4	39.2	4,962.8	20.2
3	1.6	.1			27.7			3.4	29.3	.1
4	507.7	6.1	586.3	9.0	244.0	2.8			1,338.0	5.5
5D	2,436.7	29.3	2,152.7	33.1	3,671.4	41.3	258.6	31.6	8,519.4	34.8
7	141.5	1.7	297.7	4.6	396.5	10.1			1,335.7	5.4
8	117.1	1.4			42.3	.5			159.4	.6
9	3,560.2	42.8	1,716.7	26.4	2,645.9	19.8	159.5	19.5	8,082.3	33.0
Cultivation	19.5	.2			27.6	.3	59.9	6.3	99.0	.4
Totals	8,723.7		6,502.6		8,981.5		818.1		24,525.9	
Percent of Area		33.9%		26.5%		36.2%		3.4%		100.0

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STEAMBOAT DEMONSTRATION AREA
Forage Acre Requirement -3

TABLE II.

Management Unit	Cultivated and Waste		Usable S.A.	Net P.A.	Range		
	Cult. S.A.	Waste S.A.			C.C. S.Y.L.	C.C. Sheep Da.	C.C. Herd Da.
1	19.5	258.6	8,045.6	1,035.0	345	125,925	134
2		297.7	6,204.8	1,000.3	333	121,545	129
3	27.6	1,404.1	7,449.8	793.0	264	96,360	102
Totals	47.1	1,960.4	21,700.2	2,828.3	942	343,830	365

NN003230

TABLE III

CISAMBOAT DEMONSTRATION AREA
Management Schedule

Unit	Dates of Use	Class - Stock	No. Stock	Herd Days Use
2	April 15 to July 15, Spring. Lambing and until two lambing bands can be put back together.	Ewes	900	92
		Bucks	27	92
		Horses	3	92
1	July 16 to September 30. Summer.	Ewes	900	77
		Bucks	27	77
		Horses	3	77
3	October 1 to January 10. Fall and early winter. Bucks with herd December 10.	Ewes	900	102
		Bucks	27	102
		Horses	3	102
2	January 11 to February 16. Mid-winter and late winter. Bucks out January 15.	Ewes	900	57
		Bucks	27	57
		Horses	3	57
1	February 16 to April 14. Late winter, early spring.	Ewes	900	57
		Bucks	27	57
		Horses	3	57

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STEAMBOAT COOPERATIVE AREA AGREEMENT
April 25, 1935

PARTIES:

The Soil Erosion Service and the inhabitants of that area known as the Steamboat Cooperative Area, as represented by their undersigned Chapter Officers.

1. Complete control of the above area shall be exercised by the Soil Erosion Service from the above date, until this agreement shall be terminated by the common consent of the Director of the Navajo Project, the commissioner of Indian Affairs and the Navajo Tribal Council.
2. In accordance with Paragraph 1, all stock shall be excluded from the area, except during such seasons when use by designated stock will, in the opinion of the Soil Erosion Service, be beneficial.
3. The Soil Erosion Service will furnish the necessary tools, equipment, materials and supervision for work on the area.
4. Labor, both single-handed and with teams, will be paid on the basis of one day contributed out of every five days worked. It is understood that injuries received on "Contributed time" shall not be subject to U.S. Compensation regulations.
5. All wages will be subject to the Reservation-wide regulation that 25% of the wage earned shall be deposited with the disbursing agent of proper jurisdiction for the purchase of Capital Goods.
6. The above regulations shall be effective, not only for the present inhabitants of the area in question, but also for those absentee owners of existing vacant hogans who may wish to resume residence therein in the future.

Acceptance of the above regulations is hereby affirmed.

Steamboat Chapter Officers:

4-25-35 Camillus Cleveland
President

4-25-35 Hosteen sihi Begay (fingerprinted SD.A. Southern Navajo Jurisdiction
Vice-President

4-25-35 David Begay, Acting
Secretary

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WR 3599

STEAMBOAT

Average annual precipitation for this area is approximately 10.5 inches, with the greatest amount occurring in July, August and September in the form of rain. No definite data is available for the past year but it is believed that the precipitation in the summer of 1937 was about normal and occurred at a time favorable for vegetative growth.

Due to the previous continued overstocking the plants are low in vitality, browse species faring the worst due to great amount of winter grazing. The vigor of the plants has been improved under the continued proper stocking during the past year.

Density of the grasses has been well noted particularly in blue stem, both in the seeded and natural areas. Crested wheatgrass has come in good and seems to be establishing itself very well. Rye that was planted near the windmill has come in good but had met some adverse condition due to the fact that water at the well was badly needed.

Most all species seem to have produced near normal volume growth. The principle forage species being: Blue grama, Galleta, Blue stem, Saccaton, Chamise, Big sage, and Winter fat.

During the past grazing season 251,361 Sheep days feed were used off the area or 696 on a yearlong basis.

Better distribution should be had in this Demonstration Area as types and areas close to permanent water shows the stress of use. Watering facilities are inadequate for the area as a whole. Where there is water available troughs should be large enough to accomodate a large band of sheep. The small springs under the boundary rims are of no use to a large band of sheep under their present conditions.

WR 3600

The average utilization has been computed for the entire area and found to be 78 % of proper for the Spring, 1938 estimate as compared to 30.9 % for the fall, 1937 estimate.

By substitution in the formula:

$$\frac{P A}{S.Y.L;EU = x : PU} = F. A. R.$$
$$\frac{2837}{696 ; 78 = x ; 100} = F. A. R.$$

By solving the first part finding x we have 892 Sheep that would have used the area to proper utilization. Solving for the rest of the formula we find that F.A.R. = 3.18 the number of forage acres that were actually required per head.

WR 3601

UNIT # 1

Write-up No.	Type No.	F. A.	% of Total F. A.	% Utilization	Weighted Utilization
1	W-41	14	5.71	37	2.1
	W-40	3			
	W-39	11			
	W-43	2			
	W-44	29			
		59			
2	W-36	27	13.43	88	11.8
	W-37	32			
	W-34	74			
	W-31a	2			
	W-31a	3			
	W-31a	1			
		139			
3	W-33	77	7.54	100	7.5
	W-35	1			
		78			
4	W-30	10	5.89	104	6.1
	W-32	2			
	W-30	46			
	W-27	2			
	W-25	1			
		61			
5	W-35	16	13.91	91	12.7
	W-35	2			
	W-110	25			
	W-109	6			
	W-26	5			
	W-26	4			
	W-29	17			
	W-26	1			
	W-26	2			
	W-26	21			
	W-26	1			
	W-21a	4			
	W-23	9			
W-22	6				
W-21	7				
W-24	18				
		114			

WR 3602

WR 3603

UNIT # 1 (Cont'd)

Write-up No.	Type No.	F. A.	% of Total F. A.	% Utilization	Weighted Utilization
6	W-19	5			
	W-18	5			
	W-17	22			
	W-20	4			
	W-17	37			
	W-20	1			
	W-15	8			
	W-101	39			
	W-13	12			
	W-11	2			
	W-12	18			
	W-3	8			
	W-11	11			
	W-11	12			
	W-10	17			
	W-9	17			
W-5	4				
W-9	4				
W-9	7				
W-6	10				
		243	23.18	99	23.2
7	W-45	14			
	W-46	16			
	W-1	5			
	W-100	27			
	W-14	18			
		80	7.73	101	7.8
8	W-8	10			
	W-4	23			
		33	3.19	86	2.7
9	W-80	15			
	W-82	23			
	W-81	8			
	W-5	3			
	W-5	27			
		76	7.34	72	5.3
10	W-83	3			
	W-88	3			
	W-78	72			
	W-52	7			
	W-52	3			
	W-52	2			
	W-49	2			
	W-60	4			
	W-43	3			
	W-49	9			
	W-43	1			
W-42	5				
		114	11.01	53	5.8

UNIT # 1 (Cont'd)

Write-up No.	Type No.	F. A.	% of Total F. A.	% Utilization	Weighted Utilization
11	N-2	3			
	N-99	5			
		8	.77	107	.8
		1035	100		85.8

WR 3604

UNIT # 2

Write-up No.	Type No.	F. A.	% of Total F. A.	% Utilization	Weighted Utilization
12	W-53	61			
	W-54	44			
	W-55a	9			
		114	11.33	22	2.5
13	W-55	12			
	W-56	4			
	W-56	28			
	W-56	2			
	W-55a	92			
	W-55	19			
	W-55	3			
	W-56	10			
	W-58	4			
	W-58	9			
	W-57	9			
		198	19.49	21	4.1
14	W-57	150			
	W-55	7			
	W-56	7			
	W-56	15			
	W-55	10			
	W-55	8			
		13			
		210	20.88	63	17.3
15	W-51	11			
	W-63	74			
	W-63a	17			
	W-108	1			
	W-59	2			
	W-59	1			
	W-65a	1			
	W-64	27			
	W-65	33			
	W-65a	14			
	W-67	4			
		22			
		211	20.97	106	22.2

WR 3605

UNIT # 2 (Cont'd)

Write-up No.	Type No.	F. A.	% of Total F. A.	% Utilization	Weighted Utilization
16	W-18	72			
		72	7.16	112	8.0
17	W-19	16			
	W-52	36			
	W-47	61			
	W-50	20			
	W-62	26			
	W-61	5			
	W-66	28			
	W-72	9			
		201	19.98	94	18.8
		1006	100 %		72.9

WR 3606

UNIT # 3

Write-up No.	Type No.	F. A.	% of Total F. A.	% Utilization	Weighted Utilization
18	W-70	24			
	W-69	53			
	W-70	4			
	W-70	19			
	W-73	47			
	W-73	3			
	W-90	9			
	W-69	1			
		160	20.10	99	19.9
19	W666	1			
	W-52	1			
	W-52	50			
	W-78	10			
	W-71	134			
	W-89	5			
	W-91	18			
		219	27.51	95	26.1
20	W-75	28		101	
		28	3.52	101	3.6
21	W-92	3			
	W-98	45			
	W-105	7			
	W-104	19			
	W-105	11			
	W-106	15			
		100	12.56	55	6.9
22	W-93	24			
	W-86	24			
	W-85	2			
	W-84	46			
	W-84	3			
	W-83	21			
	W-79	3			
	W-87	6			
	W-88	10			
W-89	5				
		144	18.09	46	8.3

WR 3607

UNIT # 3 (Cont'd)

Write-up No.	Type No.	F. A.	% of Total F. A.	% Utilization	Weighted Utilization
23	N-85	6			
	N-93a	8			
	N-85	5			
	N-97	10			
	N-77	13			
	N-96	6			
	N-96	3			
	N-77	9			
	N-76	4			
	N-95	4			
	N-72	9			
	N-74	6			
	N-72	17			
N-69	30				
		115	18.22	51	93
		796	100		74.1

WR 3608

STEAMBOAT SUMMARY

Spring - 1938

Unit	F. A.	% of Total F. A.	Utilization Estimates	Weighted Utilization
1	1035	36.18	85.8	31.3
2	1006	35.46	72.9	25.9
3	796	28.06	74.2	20.8
	2837	100.00		78.0

WR 3609

STEAMBOAT SUMMARY

Fall - 1937

Unit	F. A.	% of Total F. A.	Utilization Estimates	Weighted Utilization
1	1035	36.43		
2	1006	35.46	50.5 %	18.4
3	796	28.06	27.0 %	9.6
			10.5 %	2.9
2837		100.00		
				30.9 %

115,045 Sheep Days feed were used up to this time.

$$\begin{array}{r}
 \frac{\% \text{ used}}{\text{No. Mos. of Use}} : \text{Actual} = \frac{\% \text{ left}}{\text{No. Mos. of Use left}} : x \\
 \frac{30.9}{7.} : 537 = \frac{45.1}{5.} : x
 \end{array}$$

x = 1681 or the number that could graze the area for the remainder of the year.

WR 3610