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LAND MANAGEMENT UNIT NO.5
RANGE MANAGEMENT BRANCH
REPORT
SOIL CONSERVATION SERVICE
APRIL 1937

RANGE DIVISION FILE

BY W.R. McKINNEY
JUNIOR RANGE EXAMINER

WR 13086

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LAND MANAGEMENT UNIT NO. 5.

RANGE MANAGEMENT BRANCH REPORT

By

W. R. McKinney
Jr. Range Examiner

Soil Conservation Service
April, 1957.

I. Foreword.

Land Management Unit No. 5 occupies the southwestern corner of the Navajo Reservation, in Coconino and Navajo Counties, Arizona. The larger portion is in Coconino County with only a small part of the eastern area in Navajo County. The greater portion of this area, or the "Old Leupp Reservation" was made an Indian Reservation by an Executive Order on November 14, 1901; that portion north of the 35°30' parallel of latitude and east of the 111°00' meridian of longitude was made Reservation by an Executive Order on December 16, 1882; the area north of the 35°30' parallel of latitude and west of the 111°00' meridian of longitude was annexed by [illegible] on January 8, 1900; and the area east of the Navajo-Coconino County line, except for the railroad and other patented lands which have not yet been reconveyed, was added by the Congressional Act of June 14, 1934.

All of the Unit except the portion east of the Navajo-Coconino County line, and the portion north of the 35°30' parallel of latitude and east of the 111°00' degree of longitude is unsurveyed.

Area and Boundaries.

The area is computed to contain 811,870 acres. The boundaries

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are all rather well defined and easy to follow in the field. The west boundary from the Little Colorado River south and the entire south boundary are fenced. The other boundaries follow mesa escarpments, ridges and washes, or proceed directly from one prominent point to another.

The original boundaries of this Unit were not well defined, and present use was not properly divided. Therefore, several boundary changes were made in order to make the boundaries more easy to follow and to properly divide the present range use. Map No. 2 shows a number of livestock movements for the area. Each livestock operating unit has exploratory notes at the end of, and are made a part of this report. Unbiased and unprejudiced decisions on the boundary locations were made at all times, with special consideration being given to topography and land management. Five changes were made, in the original boundaries, the compilation of which is shown in Table No. 1

Table No. 1 - Boundary Changes.

Changes	Status	Surface Acres	Forage Acres	Carrying Capacity
Bird Springs	Addition	151,303	9,589	3,836
Tevor Mesa	Addition	16,110	1,045	418
Total Additions		167,413	10,634	4,254
Shonto Springs	Subtraction	9,210	785	314
Dennihbito	Subtraction	19,548	1,603	673
Black Falls	Subtraction	34,232	2,787	1,115
Total Subtractions		62,990	5,255	2,102
Original Area		707,447	63,320	25,144
Present Area		811,870	68,695	27,396

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The acreages and carrying capacities on all the above changes except Bird Springs are approximate only. However, Table No. 1 shows that around 104,423 surface acres with a carrying capacity of 2,152 sheep yearlong were added to this Unit. The Bird Springs change was an addition from Unit No. 7, Tower Mesa, an addition from Unit No. 6, Zhonto Springs, a subtraction thrown into Unit No. 6, and Dinnehbito and Black Falls were subtractions thrown into Unit No. 3.

LAND STATUS

All of the lands which have not yet been reconveyed or transfered to the Government are in that portion of the Unit which was added to the Reservation by the Congressional Act of June 14, 1934, excepting 74.34 acres along the A.T. & S.F. Railroad right-of-way in the southwest corner of the Unit. The following table shows the total acreage and carrying capacity of each class of land in Unit No. 5 not owned by the Government.

Land Status F.A.R. = 2.5

OWNER	Surface Acres	Forage Acres	Carrying Capacity
A. T. & S. F. Railroad	4,799	452	181
New Mexico and Arizona Land Co.	68,393	5,042	2,017
Indian Allotments (Patented)	2,720	267	107
TOTAL	75,912	5,761	2,305

See map at end of this report.

These acreages are not exact nor the land status exactly as shown because of lack of legible section corners in the field.

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II. Basic Information

A. General Description

1. Elevation, Topography, Precipitation and Temperature.

The elevation of this Unit varies from approximately 5800 ft. on the mesas in the north to about 4500 ft. on the west boundary where the Little Colorado River leaves the Unit. The elevation at Leupp is 4700 ft; at Tolchico 4674, and at Tolani Lakes 4939 ft.

The topography is greatly influenced by the Little Colorado River Valley. The northern portion slopes in a southwesterly direction, and is crossed by several large drainages which empty into the Little Colorado River, namely; The Jeddito, the Polacca, the Oraibi, and the Dinnehbito. Newberry and Garcia Mesas are the largest and most important mesas in this portion of the Unit. They exhibit mesa walls and escarpments on the east, south, and west sides, but there are no lines of demarcation on the north sides since they gradually blend into the higher lands farther north. The southern portion slopes toward the Little Colorado River in a northeasterly direction, and is crossed by Canyon Diablo. Canyon Padre, with its large tributary, San Francisco Wash, is the largest tributary of Canyon Diablo.

Climatological data for this Unit was taken from the records for Winslow, Keams Canyon, Tuba City, Leupp, and Tolchico, and supplemented with estimates and information from other parts of the Unit. The average precipitation is probably about 8 inches per year, or may be roughly classified as follows:

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4100 to 4700 ft. elevation - 6 to 7 inches precipitation.
4700 to 5300 " " 7 to 8 " "
5300 to 5800 " " 8 to 9 " "

The average annual temperature is probably around 55°F that Winslow being 55.0°F, Tuba City 54.8°F, and Keams Canyon 50.0°F. The maximum temperature for Leupp and Tuba City is around 105°F. and the minimum about -10 or -12°F. The growing season varies from about 145 days in the highest elevations to about 165 days along the Little Colorado River. The agricultural area at Tolani Lakes probably has a growing season of 150 to 155 days.

The average date of the first killing frost in the fall is probably about October 20th, and the last killing frost in the spring about May 10th. At winslow, killing frosts have been known to occur as late as June 2 and as early as September 27.*

2. Geology.

A brief summary of the geology of this Unit has been written by Mr. Tom Meeks, and is quoted below in full:

"In this unit the geology is represented by strata of Permian, Triassic and Jurassic age with some recent lava flows in the western margin. The Permian is represented by the Kaibab Limestone, the Triassic by the Moenkopi, Shinarump, and Chin Lee formations and the Jurassic by the Wingate, Navajo (?) and Morrison formations.

* H. V. Smith, "The Climate of Arizona", University of Arizona, Bul. 130. 1930.

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PERMIAN
Kaibab Limestone

The Kaibab limestone takes in only the southwestern corner on the unit and is easily differentiated from the other formations since it is the only limestone of any consequence on the entire reservation. It offers a marked contrast to the dark chocolate colored Moenkopi formation which overlies it. The Kaibab consists almost entirely of limestone with numerous bands and nodules of chert. Sandstones are present locally. The Kaibab is usually thin bedded and jointed and south of Winslow and Holbrook it has a marked tendency to form sink holes. Wells drilled in this unit show the thickness to be from 200 to 250 feet thick.

TRIASSIC
Moenkopi Formation

The Moenkopi formation is confined to the area west of the Little Colorado south of Leupp but crosses the river just north of Leupp and continues northward to the vicinity of Black Point where its margin again crosses to the west side of the river. Its western margin is clearly defined by the white beds of the underlying Kaibab. The Moenkopi is composed of dark red to chocolate brown sandstones and shales with gypsum present locally. Ripple marks are quite common in the sandstones of the Moenkopi.

Shinarump Conglomerate

The Shinarump conglomerate occupies only a narrow strip between the Moenkopi and the Chin Lee formations north of Leupp but is present on top of many of the low mesas and buttes of the Moenkopi. In many places the Shinarump is entirely absent

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but its former presence is indicated by the pebbles left after its erosion. The Shinarump is usually a light brown, coarse grained sandstone with pebbles of silica and much petrified wood.

Chin Lee Formation

The Chin Lee forms a wide band which extends entirely through the district east of the Little Colorado. It forms the first escarpment east of the river and continues to the dark red sandstone cliffs which occur near the northeastern margin of the unit. The Chin Lee is composed of four divisions all of which are present on the unit. Division A, the upper is composed of dark red siltstones with some shales. Division B, which forms the escarpment is composed of alternating beds of cherty limestones and dark red shale. Division C, is composed entirely of soft clays and marls which weather into badland forms. It is variegated in color with blues, grays, purple, and red being the dominant colors. Division D, is composed of dark brown and red sandstone and shale which closely resembles the Moenkopi in some places. It weathers into low mesas and buttes caused by the resistant capping of sandstone.

JURASSIC
Wingate and Navajo Formations

The Wingate is a massive, cross bedded red sandstone which forms the cliffs on the northeast margin of the area. It is conformable with division A of the Chin Lee. Its exposures are confined to the cliff face. It is not certain

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that the Navajo is present in this locality but if it is it would be extremely difficult to differentiate it from the Wingate.

Morrison Formation

The Morrison overlies the Navajo, Wingate on top of the red cliffs and easily separated by its color. It is composed of a hard silicious sandstone near the margin but further north it is a cross bedded, easily friable, fine grained sandstone with some shale lenses of red.

QUATERNARY LAVA FLOWS

The lava flows of the San Francisco field barely penetrates the unit from the west but they have had a marked effect on the channel of the Little Colorado River. At Grand Falls the flow from the west entered the channel of the river by a tributary wash and filled the channel and passed beyond. The stream expanded as a lake and eventually found its way around the flow. A similar blocking of the channel occurred at Black Falls and another flow is reported to have diverted the river south of Grand Falls.

3. Soils and Erosion *

The soils of Unit No. 5 are quite variable because of the wide range of geologic formations from which they have been derived. Residual soils occupy the smooth to undulating uplands of the southwestern part of the Unit and the mesas and mesa remnants of the central and northern portions. Wind is the predominating erosional factor upon these soils because

* From "Soils and Erosion Report" by H. F. Johnson

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sandy textures prevail. Erosion progresses from essentially none in the extreme southwestern portion of the Unit to severe in the northern portions.

The deep alluvial soils along the Little Colorado River and the valleys of the Jeddito, Polacca and Oraibi Washes are small in area as compared to the residual soils, but are more important from the standpoint of agricultural adaptation. Sheet and wind erosion are both active on these soils and occasional gullies are present.

Residual Soils:

The soils of sub-units No. 1 and No. 6, derived from basaltic cinder and lava and Kiabab limestone, are loose and permeable with a medium texture. Water is almost lacking because of the rapid penetration of water. Where 12 inches or more in depth, these soils are rated among the better range soils on the Reservation. Surface tanks are usually of little value in this area because of the lack of the ability of these soils to seal themselves and because of the cracks in the limestone.

The Keenopi Series, found extensively in sub-units Nos. 1, 2, 5, and 6, and to the northeast of the soils previously mentioned, is a soil easily recognized by its maroon color. Very severe erosion has resulted in a shallow intermittent soil cover that is slowly permeable and has a low water holding capacity. Natural geologic erosion is probably responsible in part for

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this condition. In any event, it will be slow to respond to a range improvement program.

Small areas of Shavano soil types located on remnants of the Shinarump conglomerate formation and associated with the Moenkopi Series is permeable to water and is deep enough to effect a high water holding capacity. Erosion is slight to moderate on this series.

On the uplands and mesas in sub-units Nos. 3 and 4 are soils having a loose, sandy, highly permeable surface soil which is deep enough to have a moderate water holding capacity. However, these same characteristics render them exceedingly susceptible to wind erosion when the vegetative cover is depleted. Active wind cutting and drifting sands are found over a large part of the area. This soil is rated as "B" or "C" range land, depending upon the severity of erosion. Probably in most cases, these soils will respond readily to a range improvement program except where there are moving dunes.

Alluvial Soils:

Along the valleys of the Jeddito, Polacca, and Oraibi Washes are located soils of the Ives and Tolani Series. These soils are friable and range in texture from loamy sand to heavy clay. They are generally low in alkali. Where the texture is suitable, they can be farmed with favorable results. Sheet and wind erosion

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are moderately active and occasional gullies are present. Little difficulty should be experienced with earth structures when due consideration is given to texture.

Broad expanses of Winslow soils, situated on the second benches along the Little Colorado River and at the bases of mesas, are too high in alkali and heavy in texture for agricultural purposes. However, they are adapted to the growing of shadscale and saccaton. These soils are slowly permeable. Erosion by wind and water has removed a large part of the surface soil. In most places, this soil will warrant extreme care in earth construction work. Range revegetation will be slow on these soils.

The river bottom soils, known as the Silt Series, average a clay loam in texture and are generally permeable to water. Alkali is present in many areas in sufficient quantities to limit plant growth. Where this is not the case, they are suited to growing most crops adapted to the region. They are subject to deposition of sand from the river bed by wind during the dry seasons of the year and to deposition of silt by large floods.

4. Vegetative Types.

For all general purposes, the vegetation of Unit No. 5 can be classed into two major types, namely, Grassland and Browse. (See Map No. 1). All lands classed as inaccessible, barren and barren with weeds, have been termed waste. (See Table No. 2)

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Table No. 2 - Vegetative Types.

Forage Types	Surface Acres	Percent of Area	Forage Acres	Carrying Capacity	Percent of C. C.
Grassland	278,515	34.30	36,037	14,415	52.46
Weeds	2,375	.29	21	8	.03
Sage Brush	13,046	1.61	1,215	486	1.77
Browse	435,754	53.67	31,320	12,528	45.59
Waste	80,660	9.94	0	0	0
Pinon & Juniper	865	.11	102	41	.15
Cultivated	655	.08	0	0	0
Total	811,870	100.00	68,695	27,478*	100.00

* Compiled on the basis of 2.5 F.A.R. Buck pastures are compiled on the basis of 3 F.A.R. making the carrying capacity of the Unit 27,396 sheep units yearlong.

The following is a list of the most common vegetative species:

Grasses:

Blue grama .....(Bouteloua gracilis)

Black grama .....(Bouteloua eriopida)

Galleta .....(Hilaria jamesii)

Alkali sacaton .....(Sporobolus airoides)

Three awn .....(Aristida spp.)

Shrubs:

Chamiso .....(Atriplex canescens)

Shadscale .....(Atriplex confertifolia)

Salt bush .....(Atriplex cuneata)

Yellow bush .....(Chrysothamnus greenii)

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Mormon tea .....(Ephedra spp.)

Greasewood .....(Sarcobatus vermiculatus)

Rayless goldenrod .....(Applopappus heterophyllu

Weeds:

Russian thistle .....(Salsola pestifer)

Loco .....(Astragalus spp.)

Sunflower .....(Helianthus spp.)

The vegetation over the whole Unit is in poor condition except in a few areas in the southwest corner and on some of the mesas. An exceptionally poor condition exists along the Little Colorado River and along the valley floors of all the major drainages.

5. Poisonous Plants.

The most important poisonous plant species found on the Unit are: Loco (Astragalus spp.) and Rayless goldenrod (Applopappus heterophyllus), Whorled milkweed (Asclepias galioides), Broadleaf milkweed (Asclepias speciosa), and Cocklebur (Xanthium commune) are found in localized areas, but are of less importance because of their small abundance. (See Map No. 1). The small areas infested with Whorled milkweed and Cocklebur are known to the Indians, and, as a rule, they do not graze these areas during the danger period, thereby, avoiding almost all losses. Broadleaf milkweed is very scattered and results in very few losses. There is one area of Whorled milkweed in Canyon Diablo Buck Pasture No. 2, which may prove to be dangerous but in the past has caused but very

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few losses. Two bucks died from eating Whorled milkweed in this pasture, but a little precaution and care would have undoubtedly prevented even this loss.

Loco is most abundant in the southwestern corner of the Unit. On an average of approximately once every five years this plant has a sufficient abundance to cause notable losses. These losses, however, are confined to horses mainly. The losses occurring the remaining four years may be considered negligible.

Rayless goldenrod is found all along the Little Colorado River, along the Dinnehbito Wash and along many of the side drainages. The principal losses are of cattle during the winter, especially during snow storms. These losses can be largely prevented by moving the cattle out of the River bottom in the winter and early spring.

Inasmuch as there are no large cattle owners in this Unit, there is no reason why these losses cannot be almost entirely eliminated with a minimum of effort and expense by the individual cattle owners.

6. Water Developments and Range Improvements.

Water for livestock is moderately abundant but more water is needed in some places. For the most part, permanent water is most needed. The extreme southwest portion of the Unit, or that area known as the lava and cinder country, is in need of more water. However, either permanent or temporary water is very difficult to obtain because of the depth to permanent water, and the very slight runoff and lack of the ability

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of these soils to seal themselves.

At the present time, there are 9 temporary Indian surface tanks, 69 temporary government surface tanks, 3 semi-permanent government surface tanks, 3 permanent Indian dug wells, 26 permanent government dug wells (two are dry), 3 permanent undeveloped springs, 4 permanent developed springs, 8 permanent deep drilled wells, and 2 temporary natural lakes, or a total of 45 permanent and 80 temporary supplies. There is an average of one water for every 6,487 surface acres, but only one permanent supply for every 18,041 surface acres. If the proposed new water supplies are developed, of which there are 5 drilled wells and 3 surface tanks, there will be one supply for every 6,104 surface acres or one permanent supply for every 16,237 surface acres.

As soon as the recommended maintenance and new developments are completed, the possibility of securing proper range utilization and livestock distribution will be greatly increased.

7. Rodents.

Kangaroo rats are probably the most abundant and at the present time probably cause the most damage. The areas in need of treatment have been mapped and recommendations made by the Branch of Biology.

Prairie dogs are not abundant except in the extreme southwest corner of the Unit. These rodents are coming in from outside the reservation and immediate control is necessary to prevent further influx and spread.

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The recommendations and maps made by Mr. Wayne Morris in regard to rodents are in harmony with the observations made by the Branch of Range Management.

8. Predatory Animals.

Coyotes are probably the most abundant and cause the most damage. Once in a great while, a lion , and now and then, a bobcat may come into the Unit. No control of predators is needed at the present time, and probably the natives will continue to keep the influx of these animals at a minimum.

9. Livestock Pests and Diseases.

Probably the most important livestock pest from the standpoint of damage is lice. Some lice are found on sheep, but mostly on cattle, and in some cases, infestations are severe enough to cause considerable damage.

Horn flies are present in sufficient numbers to cause some damage.

Heel flies are present, and, at times, are sufficient in number to be termed a nuisance.

Grub-in-the-head are of little consequence, and screw worms are seldom found.

Ear ticks cause some damage to horses, cattle and sheep.

Infectious diseases are practically unknown at the present time. Dourine in horses and scab in sheep were present here at one time, but are seldom present now, if at all.

10. Other General Conditions.

The whole Unit is very accessible to livestock. There are a few canyons and mesa escarpments which are inaccessible

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but there are a sufficient number of trails so that they do not constitute a livestock management problem of any consequence. The value of the grazing land from the standpoint of soils varies quite widely. Practically all of the area in the Telani Lake sub-unit is sandy and strict precaution should be taken to prevent overgrazing and consequent severe wind erosion. This same condition is true of the northeast portion of Bird Springs sub-unit. In sub-unit No. 5, north of Grand Falls, there is an area characterized by shinarump conglomerate formation which is classed as good grazing land. In the western portion of sub-unit No. 1, there is a limestone area which is good grazing land. In sub-unit No. 6, the limestone and lava formations are classed as good grazing land. The remainder of the Unit is made up of heavy clay flats, high in alkali, and is classed as poor grazing land. The latter classification makes up a large share of this Unit, and is located as follows: The east portion of sub-unit No. 1, all of sub-unit No. 2, all of sub-unit No. 3, except the northeast corner, the valley floors and lake bottoms in sub-unit No. 4, all of sub-unit No. 5, except the area of good land north of Grand Falls, and all of sub-unit No. 6, except the limestone and lava areas in the southwest portion.

The areas classified as good from the standpoint of soils have the highest carrying capacities, and the least severe utilizations of any of the other areas. The sandy area in the northern portion has the next highest carrying capacity, but parts of it are severely overutilized. The clay areas, or the poor range land, from the soil standpoint, have

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a very low carrying capacity and utilization is generally severe. (See Map No. 2 for relative utilization.)

These poor grazing lands have been severely overgrazed for many years because of the availability of water, whereas the better grazing lands have never been overgrazed so heavily. The nature of the soils themselves are a major factor in determining the potential values of the grazing lands in this Unit. Fuel, posts, hogan poles, and any other wood products are very scarce on this Unit. There is a limited amount of dead cottonwood logs along the Little Colorado River, which are used as hogan material principally. As a result, fuel consists of mostly chamise, greasewood, and Rabbit brush(Crysothamnus biglovii). In some places, areas are being stripped of chamise, a valuable forage plant. All the posts that are used must be imported, and, in the past, have been brought in from the Coconino National Forest. These conditions make apparent the tremendous need for woodland areas in this Unit, or immediate access to woodland areas. The people are rather widely scattered, but there are two areas in which they are more highly concentrated, namely: In sub-unit No. 4, especially near Tolani Lakes, and in sub-unit No.6. There are very few people living in sub-units 1, 2, and 5. There are four trading posts, Leupp, Sunrise, Red Lake, and Dinnehbitoh on the Unit, Canyon Ledge, Airport, Meteor Mountain, and Winslow, a railroad town off the Unit. There is one highway traversing this area. It is the Winslow-Oraibi road , which leaves U. S. Highway 66, 12 miles west of Winslow, Ariz. enters the south boundary, goes through Leupp, and leave the

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Unit on the north boundary. There are ~~three~~ four maintained secondary roads. One of these, the Leupp-Dilcon road, connects with the Oraibi-Winslow road at Leupp, and leaves the east boundary of the Unit near Bird Springs. The Leupp-Canyon Diable road leaves the Winslow-Oraibi road approximately two miles south of Leupp, and leaves the Unit at Canyon Diablo, connecting with U. S. 66 at the Canyon Diablo bridge. The Back Road leaves the Winslow-Oraibi road at Sunrise Trading Post and leaves the west boundary of Unit 8 miles south of Grand Falls connecting with U. S. 66 about 12 miles east of Flagstaff, Arizona. Another road takes off from the Back Road 1/4 mile west of Sunrise Trading Post, crosses Canyon Padre 1 mile below the junction of Canyon Padre and San Francisco Washes, crosses the Santa Fe Railroad at Hibbard, and connects with U. S. Highway 66 3 miles east of Canyon Padre Bridge. There are numerous car and wagon trails over all parts of the Unit. The Unit is well supplied with telephones. The main line comes in from Winslow, following along the Winslow-Oraibi road to Leupp, then from Leupp east to Indian Wells. A branch line follows the Winslow-Oraibi road from Leupp to Red Lake Trading Post and Day School. There is a switchboard in Leupp. There is an Indian Boarding School at Leupp, and a Day School at Red Lake. There is a government hospital at Leupp. The Atchison, Topeka and Santa Fe Railroad crosses the southwest corner of the Unit and Canyon Diablo and Hibbard Stations are on the Unit. There is a side rail at Canyon Diablo Station where coal and freight are set aside for Leupp. At Hibbard, there is a large stockyard with two loading chutes

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and a set of stock scales.

Wage work has been fairly abundant in this Unit. The percapita wage income is approximately $42. The greater part of the wage income, however, comes from the Tolani Lakes project in sub-unit No. 4. In sub-units Nos. 1 and 2, quite a lot of the wage income is the result of several men being employed by the Atchison, Topeka and Santa Fe Railroad. Other wages come from the traders, the Lemmp Agency and several small projects.

Agricultural income is quite low, being only $12 per capita. This is partly a result of so little agricultural land or slightly more than one-half acre per capita.

Income from livestock is approximately $47 per capita or the most important source of income on this Unit. Income from rugs, which is an indirect livestock income amounts to $4 per capita.

Miscellaneous income is approximately $1 per capita. The total per capita income is about $106.

Consumption groups in this Unit are large, having an average of 9.1 persons per group. The number of families per consumption group was not determined. The population is about 1261 people and 138 consumption groups.

There are 9 consumption groups, and about 87 people in sub-units Nos. 1 and 2, 14 consumption groups and 108 people in No. 3, 78 consumption groups and 611 people in No. 4, 4 consumption groups and approximately 35 people in No. 5, and 34 consumption groups and about 350 people in sub-unit No. 6.

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NN005039

A number of people are on relief in this Unit. In sub-unit No. 6, there are families on relief, but almost all of these people have some sheep - 60 or less. The people in this sub-unit were large stock owners at one time, but in the past few years, droughts have taken a number of sheep. Also, at one time, these people grazed over lands to the west and south of the Reservation, but since the boundary fence was built in 1953, they are confined to the Reservation, and have had to reduce their flocks. There is practically no farm land in this sub-unit, so that they depend upon their flocks for feed more than in areas where farm land is more abundant. The total number of families on relief is _____, with _____ families in sub-units 1 and 2, _____ families in sub-unit No. 3, _____ families in sub-unit No. 4.

There are 668 acres of farm land on the Unit with 80 acres in sub-unit No. 3, 422 acres in sub-unit No. 4, and 166 acres in sub-unit No. 5. Sub-units Nos. 1, 2 and 6 have no agricultural land

B. Land Use.

1. Chief Value of the Land.

The principal value of the land in this Unit is for watershed and grazing. The nature of the soil, the deep canyons and the lack of water storing or water spreading possibilities renders all but a very small portion of this area unadaptable to [illegible]. There are areas, the largest of which is along the Little Colorado River, which seem to offer good possibilities of being planted to trees for the purpose of erosion

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control, stream bed protection and fuel supply. There are probably no minerals on the Unit, and the closest coal deposits are about six miles north of the north boundary of the Unit near Padilla Mesa. Except for the concentrated agricultural areas at Tolani Lakes and Leupp, this Unit can produce little income other than by the grazing of domestic livestock.

2. Past and Present Use.

Prior to the designation of the land in this Unit as Indian Reservation, white men grazed their sheep and cattle on this area. In 1876, the Hashknife Cattle Company moved large herds of cattle into this part of Arizona. Shallow, permanent water was easily obtained along the Little Colorado River, so that since that time, overgrazing has been more or less severe on the land occupied by Unit No. 5. Since this area was made Reservation, overgrazing near the River has continued because of the lack of permanent water on adjacent lands. At the present time, permanent water is more abundant on outlaying areas, but overgrazing is still severe along the Little Colorado River, principally because of the farming operations located here. In the future, the greatest use made of this land will be for watershed and grazing.

3. Carrying Capacity.

The present estimated yearlong carrying capacity of Unit No. 5 is 27,396 sheep units*.

All of Unit No. 5 may be classed as yearlong range; that is, the whole Unit can and is grazed yearlong. It may be

* Based on a forage acre requirement of 2.5 forage acres per sheep unit yearlong.

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grazed at any season of the year which will result in the most efficient use of the land. With the exception of a few areas in the southwest part of the Unit, browse is sufficiently abundant to furnish forage during winter snow storms when they occur. However, there are areas of loco and rayless goldenrod infestations which should not be grazed when these plants are sufficiently abundant to cause serious losses. (See Map No. 1) Since loco is not dangerous except about once every five years, and, then, principally to horses, little trouble should result from this plant. Rayless goldenrod seems to affect cattle more than other classes of livestock, especially during snowstorms. At such times, the cattle should be removed from heavily infested areas.

4. Present Numbers and Classes of Livestock.

The numbers of livestock on Unit No. 5 were obtained from the 1936 dipping records. These records show 14,125 grown sheep, 1506 grown goats, 768 grown cattle or 3,072 sheep units of cattle, and 1400 horses or 7,000 sheep units of horses, making a total stock of 25,703 sheep units of livestock. See Table No. 3.

These records show an under stocking of 6.18 percent. These figures are doubtlessly low. In tabulating the figures obtained on livestock movements, we find 915 head of cattle or 147 head more cattle than are shown on the dipping records. There are more horses than our records show. The following table shows the 1936 dipping records of livestock, the carrying capacities, and the percent of over or understocking by sub-units.

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NN005042

Table No. 3

Sub-Units	Carrying Capacity	Stocking	Percent of + or - Stocking
Nos. 1 & 2	3,279	1,585	- 45.43
No. 3	3,836	3,657	- 4.67
No. 4	9,062	13,650	+ 50.63
Nos. 5 & 6	11,219	6,811	- 39.29
Total	27,396	25,703	- 6.18

The large figures of under stocking shown for sub-units Nos. 1 & 2, and for sub-units Nos. 5 & 6, are due to a lack of water and to the inaccuracy of the dipping records. Until a more accurate record of the present numbers of livestock are obtained, any program of livestock adjustment and range improvement will be extremely difficult to formulate.

Either class of livestock can utilize this whole area.

5. Utilization.

The most severe utilization on this Unit is along the Little Colorado River and adjacent to Red Lake Trading Post. Utilization is also very severe along the Jeddito, Polacca, Oraibi and part of the Minnehbito Valleys. The areas of most severe utilization are also the areas exhibiting the most severely overgrazed conditions. The areas showing the least severe utilization are in the southwest corner of the Unit, on Garcia Mesa and north of Grand Falls. All of these areas are far removed from livestock water. (See Map No. 2)

Range utilization is greatly influenced by water

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developments and streams, Trading Posts, farming areas and schools.

6. Distribution and Movements of livestock.

Some idea of the distribution of livestock can be obtained from Table No. 3, which shows that most of the livestock are found in sub-units 4, 5 and 6. Map No. 2 shows the location and movements of a large percentage of the sheep and cattle on this Unit. At dipping and selling times, there are heavy concentrations around the trading posts. In the summer, heavier concentrations are found around Leupp and Tolani Lakes. The same factors mentioned as affecting distribution also affect livestock movements.

There is some "crossing over" of sheep near Sand Springs Dipping Vat. Several bands are known to move into Unit No. 5 from Units Nos. 3 and 6. The same is true near Shonto Springs where two families move back and forth across the Unit boundary between Units Nos. 5 and 6. Except for these two places, movements across the boundary are very few.

In the future, precaution must be taken to not allow livestock to concentrate around farming areas. If people in sub-unit No. 6 are to farm at Tolani Lakes, they must not take their livestock with them. The range adjacent to permanent water supplies must be saved for use during dry seasons when the surface tanks are dry.

C. Animal Husbandry Practices.

1. Selection

Although the sheep on Unit No. 5 are of relatively good type and quality, there are numerous cases where unprogressive

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selection is evident. The sale of the better lambs, ewes, cows, and calves is ~~the~~ one reason for unprogressive selection and retrogression of the breeding stock. One of the most important remedial steps toward the correction of this practice is through control of the breeding season. In this way, the entire increase would be in a more desirable condition and of a more uniform age at selling time.

2. Bucks and Bulls.

Quite a large percentage of the bucks on this Unit are improved. However, there is much room for continued improvement especially in many of the smaller flocks. As a rule, the larger owners, those owning more than 175 sheep, have a majority of improved bucks. Very few of the smaller owners give their bucks extra care or practice breeding control. Most of the larger owners do, but not to a degree sufficient to conform to the most desirable range management or animal husbandry practices in a program of land management. Many of the bucks are too old and are usually in poor condition at breeding time.

As a rule, the bulls are not desirable from the standpoint of breeding and conformation. Many of them are too old to be of but little service. The breeding season should be controlled so as to secure a more uniform calf crop at selling time, and thus eliminate a lot of "aberts", which are held over from year to year. Bulls should be cared for during the fall and winter so as to insure a larger calf crop the following year.

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3. Breeding and Lambing.

Breeding and lambing takes place at all seasons of the year, in many cases. In most all cases, lambing is too early. As a result, some lambs freeze, many are stunted, some ewes die, and the lamb crop is not uniform. On the average, lambing should not begin until April 1. Before this time, there is little green feed and cold spells often kill some lambs and ewes. The lack of green feed at lambing time often results in the stunting of lambs and increased mortality of ewes. In many cases, ewes are too young when they first lamb, resulting in a stunted, unthrifty ewe and an unprofitable lamb.

Calves are born at all seasons of the year. This condition results in an increased mortality of cows and calves as well as an uneven calf crop. Many cows calve too young.

Controlled breeding of sheep and cattle is a necessary part of any land planning program or commercial operation.

4. Docking and Castrating.

Wether lambs are usually docked too long, giving them a shaggy appearance. The same is very often true of ewes and may result in a lowered lamb crop. The proper docking of sheep should result in increased prices, in sale of some animals that are otherwise refused by the traders, in increased lamb crop, and in increased value of wool and pelts. Both wethers and steers are often not castrated young enough. The result is staggy animals which are harder to sell, and, if sold, bring a lower price on the market. One reason for the practice of not castrating young enough is in an attempt to increase the weight of the animals at selling time. The fact is that such

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a practice results in just the opposite result as well as a decrease in price per pound.

5. Shearing.

The greater part of the shearing is done by hand, although probably most of these people would accept machine shearers if they were available. Many of these people sort and sometimes tie their wool but considerable improvement can be made in these respects.

The shearing operation is almost invariably too early. In some cases, sheep are partly shorn, a spot here and there on the back or belly, in the middle of the winter. Such practices do not conform to proper livestock management and should be corrected. Fleeces are light, content of foreign material is high and bucks often are handicapped at breeding time by shearing too early. The latter part of May would probably be the most desirable shearing time or about two weeks after the end of the lambing period. The traders are responsible to a great extent for too early shearing. ? ?

6. Herding.

The errors in herding practices are much the same on this Unit as in other parts of the Reservation. The most common of these are: Corralling in the same place for long periods of time, herding too closely, trailing from water to feed and back to the corral, corralling too early in the afternoon, keeping the flocks in too late in the morning, herding too fast, and grazing the same spot for months at a time. These practices are very harmful to both livestock and range. Wet ewes, dry ewes, wethers and bucks are very often not separated at lambing time.

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NN005047

Cattle are very seldom properly handled when gathered for market or for any other reason.

Education demonstration and now and then force will be required to correct many of the errors in handling livestock.

7. Salting.

Very little salt is fed to the livestock in this Unit. Sociological surveys reports show that 774 pounds were purchased. Of this, 174 pounds were sold at Red Lake Trading Post and 600 pounds at Dinnehbito Trading Post. The salt content of the water and forage in sub-units Nos. 2, 3, 5, eastern part of No. 1 and northern portion of No. 6 is probably sufficient to reduce the salt requirement of grazing animals to a minimum. However, in the south western part of sub-unit No. 1, in the western part of sub-unit No. 6, and in all of sub-unit No. 4, there is much less salt containing forage and water is usually not so salty. Therefore, the salt requirement of the livestock in these areas probably is not satisfied unless salt is fed supplementally. On the basis of a yearly salt requirement of 7 pounds for sheep and 20 pounds for cattle and horses, approximately 40 tons of salt would be required for sub-unit No. 4 alone, on the basis of the dipping records. When we compare this with the 774 pounds purchased, we see that these livestock are probably in need of salt.

8. Supplemental Feeding.

Supplemental feeding of cattle and sheep is practicalling unknown in this area. Supplemental feeding of horses is practiced to some extent. From the Sociological Surveys

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Report we find that there were approximately 36 tons of hay, 26 tons of oats, and 2½ tons of corn purchased by the Indians of this Unit. Undoubtedly, a large portion of the hay and oats purchased was fed to the horses being used in construction work at Tolani Lakes. There is a possibility that most of the corn was purchased for seed. One Indian at Tolani Lakes put up about 3½ or 4 tons of corn silage last year and seemed to have fairly good results in feeding it to sheep this spring.

If more feeding could be done, I feel sure that some pressure on the range could be relieved. At Tolani Lakes, the Agronomy report shows that alfalfa, wheat, oats, and sudan grass can probably be grown on this agricultural area. Also, there may be a possibility of converting a part of the corn grown into silage. In the event that these crops can be grown in sufficient amounts to be used in feeding operations, the dependence upon range land for the production of a livelihood would be decreased. I have in mind here the feeding of lambs and calves produced on the surrounding ranges and converted into a more valuable commodity through the use of agricultural products raised on the Unit. In this way, the value of the agricultural products may be increased also. The supplemental feeding of range breeding stock in the late winter and spring would have a direct beneficial effect upon both the livestock and the range. The development of areas for the production of wild hay to be used as supplemental feed would be very beneficial providing these areas could be developed at not too great a cost.

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III. Range Management Objectives.

1. Livestock adjustment to the present estimated maximum carrying capacity of the range.

2. Distribution of livestock which will result in the most efficient use of the land and vegetation.

(Use of temporary water when available, move cattle out of river bottom when Rayless goldenrod is dangerous, etc.)

3. Allowance of a sufficient number of cattle and horses to meet the requirements of the people.

4. Development and maintenance of range improvements which will result in the most efficient use of the vegetation by livestock.

5. Demonstration and teaching of animal husbandry and range management practices which should result in a more efficient production of livestock and more efficient use of the natural resources.

6. The supplemental feeding of breeding livestock whenever practical.

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IV. Plans and Recommendations.

A. General Explanation, Plans and Recommendations for the Unit as a Whole.

The management plans and recommendations in this report are based primarily upon the needs of the land. The needs of the people have been assumed to be an increased monetary income from the natural resources - range.

The plans and recommendations here presented are the result of a study of the basic data.

The cooperation of all the other branches in the collection of basic data and information and in the formulation of these plans and recommendations is greatly appreciated.

1. Grazing Dates.

Unit No. 5 shall be grazed yearlong. This range is now used yearlong, and in this report, is considered as such. At the present time, there is no reason why the range should not be used yearlong. If in the future, there is some reason why seasonal use would be desirable and practical, any part of this range may be used at any season of the year desired.

2. Class of Livestock.

Six horses per consumption group or approximately ~~800~~ 830 horses should be allowed.* These horses should be bred up and their breeding controlled so that they will be more serviceable and will not increase excessively.

In allotting these horses, the size of the consumption group, the number of livestock owned, and the way in which the group derives a living should determine the number of horses

* Four horses per consumption group have generally been allowed but since the consumption groups in this Unit are apparently larger (9.1 persons) more horses should be allowed.

allowed. That is, if a group gets its living from trucking, they need no horses.

Probably 800 head of cattle is a sufficient number to allow. 760 head are shown on the 1936 dipping records. 20,056 sheep units

3. Sires.

Three bucks per hundred ewes should be allowed, or approximately 600 head. The maximum estimated yearling carrying capacity is 27,396 sheep units. If 828 horses, or 4240 sheep units of horses, and 800 cattle, or 3200 sheep units of cattle are allowed, approximately 20,056 sheep units can be run which will require approximately 600 bucks.

32 bulls will be required or 4 bulls per hundred cows.

Approximately 5 stallions should be kept on this Unit. These stallions should be absolutely controlled by the government and breed to the better mares only.

Two pastures have been fenced and will carry 430 bucks for 10 months. Another pasture is yet to be located and it will have to carry 160 bucks for 10 months.

The bulls should also be cared for in a pasture and the stallions should be kept at the Unit headquarters.

4. Breeding.

The breeding season shall be from November 10 to December 20 for sheep and from July 10 to November 10 for cattle.

5. Shearing.

The shearing dates should be from June 1 to June 10. Four machine shearing plants should be installed.

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6. Range Improvements.

The new development and maintenance work recommended should be made as prescribed in the Range Improvement Survey part of this report. Additional improvements will be needed from time to time and the observation of the Unit Manager should determine, to a large extent, the class location and need for these developments. A maintenance crew should be established to see that all water developments are properly taken care of and kept functioning.

Four sets of shearing pens should be built as outlined in the Range Improvement Survey part of this report.

A bull pasture should be built to take care of the bulls on this Unit.

7. Livestock Adjustments.

The order of livestock adjustment to the estimated carrying capacity should be as follows:

(1) Horses - Remove the least desirable animals first.

(2) Cattle - Remove steers, old cows, barren cows, and undesirable bulls first and then follow by removing the undesirable types.

(3) Goats

(4) Sheep - Remove the wethers, old ewes and undesirable bucks first and follow by removing the undesirable types.

This adjustment should take place first in sub-unit No. 4 and proceed to sub-units Nos. 3, 6, 2, 1 and 5 in the order named.

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The dipping records show that this Unit is 6.18% under stocked. From all indications, the Unit is probably about 15% over stocked on an average.

By removing the non-productive livestock first, the decrease in income by a reduction would be very little or none.

8. Livestock Numbers.

More accurate counts on the numbers and classes of livestock must be obtained. A roundup of all cattle and horses should be made. All unclaimed animals should be removed from the range, and permits issued for those that are claimed. All animals in excess of the number allowed on a permit should be sold and the money given to the owners. (It will be necessary to know the number of cattle and horses that are to be allowed each owner before this roundup is started.)

More accurate and detailed records on the number of sheep and goats must be obtained at the dipping vats. The permits should be issued to each owner at that time, and all culls, etc. removed for sale.

9. Livestock Movements and Distribution.

No more livestock shifts are to be made than is necessary to effect the proper distribution and management of the range. All excessive concentrations adjacent to permanent water supplies should be eliminated as nearly and quickly as possible. All range adjacent to temporary water supplies shall be used when water is available and the range around permanent supplies conserved for use when temporary water has dried up. The concentrations of livestock along the Little

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Colorado River in the fall and early winter is to be discontinued, and the feed conserved for use in the spring and early summer. Concentrations around the farming areas at Leupp and Tolani Lakes are to be stopped.

Two range riders are needed, one at Sand Springs, and one at Red Lake.

10. Poisonous Plants.

Eliminate concentrations of cattle along the Little Colorado River during the winter.

Eradicate the area of whorled milkweed in the Canyon Diablo Buck Pasture.

11. Education and Demonstration.

Education and demonstration of proper range management and animal husbandry practices should be carried on at all times. Education as to the proper methods of handling livestock should be carried on at dipping and selling time. The buck pastures should serve as demonstration areas in management and care of the range resources. Constant individual and group advice should be given the Indians in all parts of the Unit.

12. Immediate and Long Time Plans.

The immediate plans include the following:

(1) Livestock counts so as to arrive at the actual number of livestock on the range.

(2) Livestock adjustment.

(3) Maintenance and developments of all existing water supplies.

(4) Proper distribution.

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(5) Proper animal husbandry practices.

The long time plan includes:

(1) Proper stocking of the range as to class and carrying capacity.

(2) Improved distribution of livestock.

(3) Improved animal husbandry practices.

(4) Education and demonstration of improved range management and animal husbandry practices.

B. Sub-Units.

Land Management Unit No. 5 has been divided into six sub-units for the purpose of facilitating the management of the Unit. The sub-unit boundaries follow natural barriers or prominent topographical features as much as possible.

As much as possible, livestock should not be allowed to move from one sub-unit to another. The Indians should decide where they want to live, then stay there. In this way, the issuing of permits and general administration will be greatly facilitated and any management program will be much more easily carried out.

Table No. 4 shows the area, net forage acres, carrying capacity, cultivated and waste in each sub-unit.

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Table No. 4 - Sub-Units. F.A.R. = 2.5.

Sub-Unit	Surface Acres	Net Forage Acres	Cult.	Surface Acres Waste	Carrying Capacity S. Y. L.
No. 1	35,187	5,464	0	49	2,132
No. 2	46,020	2,868	81	12,135	1,147
No. 3	151,303	9,589	87	20,642	3,836
No. 4	325,095	22,727	469	25,495	9,062
No. 5	131,429	8,380	18	19,261	3,352
No. 6	122,836	19,667	0	3,078	7,867
Total	811,870	68,695	655	80,660	27,396

Table No. 5 shows the percent of total area, percent of total carrying capacity, percent of total waste and acreage per sheep unit by sub-units:

Table No. 5.

Sub-Unit	Percent of Area	Percent of Waste	Percent of C.C. S.Y.L.	Surface Acres per Sheep Unit.
No. 1	4.33	.06	7.78	16.50
No. 2	5.67	15.04	4.19	40.12
No. 3	18.64	25.59	14.00	39.44
No. 4	40.04	31.61	33.07	35.87
No. 5	16.19	23.88	12.24	31.21
No. 6	15.13	3.82	28.72	15.61
Total	100.00	100.00	100.00	Ave. 29.63

From the standpoint of value of the grazing land and the condition of the vegetation, the sub-units are rated in order as follows: Sub-unit Nos. 6, 1, 5, 4, 3, 2.

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1. Sub-Unit No. 1.

This sub-unit is bounded on the west and north by Canyon Diablo, which is a barrier to livestock except at two places where E. C. W. have constructed trails. The south and west sides are fenced.

24 ~~30~~ horses, 25 cattle and 1,912 ~~1,502~~ sheep should be the maximum number allowed on this sub-unit.

There are 4 ~~3~~ consumption groups on this area.

2. Sub-Unit No. 2.

This sub-unit is bounded on the west and south by a fence and on the east and north by the Little Colorado River.

24 horses, 20 cattle, and 947 sheep should be the maximum permitted on this area.

There are 4 consumption groups on this sub-unit.

3. Sub-Unit No. 3.

Bounded on the south by the Little Colorado River and on the north and west by the Palomas and Corn Washes.

64 horses, 75 cattle and 3,116 sheep are the maximum number of livestock to be allowed.

There are 14 consumption groups on this sub-unit.

4. Sub-Unit No. 4.

This sub-unit comprises practically all the northern portion of the sub-unit. The boundaries are well defined but are not barriers to livestock.

There are 70 consumption groups on this sub-unit.

468 ~~390~~ horses, 455 ~~450~~ cattle and 4,902 ~~3,160~~ sheep shall be the maximum number of livestock permitted to graze this sub-unit.

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5. Sub-Unit No. 5.

This sub-unit is bounded by the Little Colorado River on the south and Kowberry Knoll Fin on the north. The River is a good livestock barrier all the way when there is water, and all the time from Grand Falls north.

There are 4 consumption groups in this sub-unit.

24 horses, 90 cattle and 3,032 sheep are the maximum number of livestock to be allowed.

6. Sub-Unit No. 6.

This sub-unit is bounded on the north by the Little Colorado River, on the west by a fence and on the east by Canyon Diablo.

There are 3 consumption groups in this sub-unit.

204 horses, 175 cattle and 6,142 sheep shall be the maximum number of livestock allowed.

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LIVESTOCK MOVEMENTS

Land Management Unit No. 5

by

John Russell

Under Agricultural Aide

110 30 - 35 30

- 1 -

Charley Daily lives 4 1/2 miles south west of Bird Springs well. Runs 130 head of sheep on range yearlong. Farm along the Little Colorado River, and moves there to harvest his crop from August to November. Hauls his wood from the river most of the time uses dry chamise for fuel. Dips and trades at Leupp. Report considerable loss from poisonous weeds along the river.

110 30 - 35 30

- 2 -

Tahne Tahne Nez lives 3 miles south west of Bird Springs well. Runs 19 head of sheep on range yearlong. Farms along the east fork of Corn Wash, moves there to harvest his crop during the month of September. Hauls his wood from the river. Most of the time uses dry chamise and Mormon tea for fuel. Dips and trades at Leupp. Also runs 10 head of cattle and reports considerable loss from poisonous weed along river.

- 3 -

110 30 - 35 15

Harold Wagner. 6 1/4 miles southeast of Bird Springs well. Runs 100 head of sheep on range yearlong, moves occasionally to the river in summer due to shortage of water at present location. Hauls his wood from the river, uses dry chamise and greasewood for fuel most of the time. Report losses from poisonous weed along the river.

- 4 -

Hotahly Yazzie and Riley Curley both live together 15 miles south east of Leupp. Summer range 4 1/2 miles south of present location, 380 sheep on summer range from June 1 to October 1. Winter range at present location, 380 sheep on winter range from October 1 to June 1, moves to summer range because of lack of feed on winter range. Moves to winter range because of lack of fuel on summer range. Also has 20 head of cattle which range yearlong 5 miles east of his present location. His location is such that he dips and trades at Leupp.

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110 45 - 35 30

- 5 -

Chahe. Lives 12 3/4 miles east of Leupp Agency. Moved here from river for the first time last September on account of losses from poisonous plants along river. Intends to move back to river in the spring when the range gets better. 120 sheep on range at present time. He has been using the range along river yearlong. Hauls wood from river for fuel. Dips and trades at Leupp.

110 30 - 35 30

- 6 -

Roger George lives 5 1/2 miles south west of Bird Springs well. Runs 130 head of sheep and 10 head of cattle on range yearlong. Moves occasionally during year to the river for a short period. Hauls his wood from the river but most of the time uses dry chamise and Mormon tea for fuel. Dips and trades at Leupp.

110 45 - 35 30

- 7 -

Dick Scott and Big Sugar live 6 miles west of Bird Springs well. Total sheep 55 head on yearlong range. Moves to the river in summer, to farm from May to November. Grazes yearlong on same range. Hauls his wood from the river. Most of the time uses dry chamise and Mormon tea for fuel. Dips and trades at Leupp.

110 30 - 35 30

- 8 -

Hosteen Soni lives five miles west of Bird Springs well. Runs 350 head of sheep and 10 head of cattle on same range yearlong. Moves to new locations at different time during the year. Farms along the east fork of Corn Wash. Hauls his wood from the river also uses dry Mormon tea and Chamise for fuel. Dips at Red Lake vat, Trades at Leupp. Reports considerable loss during the winter.

- 9 -

Claw Souie lives 6 1/2 miles northwest of Bird Springs well. Runs 140 head of sheep and 10 head of cattle on same range yearlong. Farms along the Colorado River and moves there if he raises a good crop. Hauls his wood from the river when possible, but most of the time uses dry Chamise and Mormon tea for fuel. Reports losses from poisonous weed along the river.

- 10 -

Billie Williams and Walter George live 5 3/4 miles southeast of Leupp Agency. Runs 212 head of sheep on yearlong range, and farms every year. Uses dry Greasewood and Cottonwood for fuel. His location is such that he can get wood the year around. Dips and trades at Leupp post.

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- 11 -

Pete Sandoval lives 10 miles southwest of Bird Springs well. Runs 140 head of sheep on range yearlong. Farms every year. Along the Colorado river, his location is such that he can get wood the year around. Dips and trades at Leupp.

- 12 -

Ben Jol lives 10 1/2 miles south of Bird Springs well outside of Reservation and runs 35 head of sheep on range. Present location is temporary, moves back and forth across the river at different times during the year. Farms on the southside of the Colorado river. Gets wood the year around. Dips and trades at Leupp.

- 13 -

Dan Yazzie, lives 11 miles southeast of Leupp Agency. Runs 70 head of sheep on range yearlong, moves intermittently during the year to new location, his location is such that he can get wood the year around. Trades and dips at Leupp.

- 14 -

Claw lives 4 miles northeast of Leupp Agency. Runs 30 head of sheep on range yearlong. Farms at Tolani Lakes. Moves to his farm in the fall to harvest his crops from July to November, then moves back to present range. Uses dry Chamise and Mormon tea for fuel. Dips and trades at Leupp Agency.

- 15 -

Joe Williams lives 8 miles northeast of Leupp Agency, his movement is back and forth across Corn Wash. Runs 340 head of sheep and 55 head of cattle on range yearlong. Farms along the east fork of Corn Wash when possible. Uses dry Chamise and Mormon tea for fuel. Dips either at Leupp or Red Lake Vat, Trades at Leupp.

- 16 -

Asdzan Elthsise lives 3 1/2 miles east of Red Lake Trading Post. Runs 85 head of sheep on range yearlong. Farms at the forks of Polacca and Corn Wash when possible. Burn dry chamise for fuel, dips and trades at Red Lake Trading Post.

- 17 -

Old Belone lives 3 miles east of Red Lake Day School, 40 sheep on range yearlong, moves about over the range in vicinity of present location at different times during the year in order to get better utilization of range. Farms at Red Lake. Burns dry shrub and Chamise for fuel. Dips and trades at Red Lake.

- 18 -

Old Belone

WR 13141

CV-6417-201 NN005062

- 19 -

White Hair

- 20 -

Hosteen Elthsie

- 21 -

Yellow Singer

- 22 -

Clizzie Thlani

All live around and westward between the forks of Oraibi and Red Lake road. Total sheep on range yearlong 916 head and 30 head of cattle. Movements are occasional and within short distance of present locations. Farms in the Tolani Lake flat. In winter they have to live along the routes of Day School bus in order to have children to go to school. Dips and trades at Red Lake Trading Post. Burns Chamise for fuel.

- 23 -

Lives 5 1/4 miles west of Red Lake. Runs 120 head of sheep and 7 head of ca[illegible] range yearlong, moves occasionally in summer to new lo[illegible] arms in the Tolani Lake flat. Burns dry Chamise for fuel. Di[illegible] nd trades at Red Lake.

- 24 -

Little Joe lives 4 1/4 miles west of Red Lake Trading Post. Runs 85 head of sheep on range yearlong. Farms in the Tolani Lake flat. Occasional movement within a short distance of present location. Uses dry Chamise for fuel. Dips and trades at Red Lake.

- 25 -

Jerry Monroe lives 4 1/2 miles southwest of Red Lake Trading Post. Runs 280 head of sheep on range yearlong with occasional movement in summer. Farms in the Tolani Lake flat. Uses dry Chamise for fuel. Dips and trades at Red Lake and Leupp.

- 26 -

Asdzan Tsa lakai Nitini. Permanent home at Shonto Springs, now living 3 1/4 miles south of Red Lake trading post. Runs 95 head of sheep on range. Came down from Shonto Spring for the first time to spend the winter with relatives, and plans to move back in the near future. Dips and trades at Red Lake.

WR 13142

CV-6417-201 NN005063

- 27 -

Hosteen Ashene

- 28 -

Hosteen do na gobe Bodani

Both live 3 1/2 miles north of Tolani lake flat. Runs 107 head of sheep and 21 head of cattle on range yearlong. Farms in summer. Uses dry Chamise for fuel, moves occasionally within a short distance of present location. Dips and trades at Red Lake.

- 29 -

Big Belly

- 30 -

Big Eyes lives 9 3/4 miles northeast of Red Lake Trading Post. Runs 350 head of sheep and 55 head of cattle on range at present time, moves in summer close to Shonto Spring from June 1 to October 1, moves back to present location from October 1 to June 1. Reports considerable loss of sheep during the past winter. Uses dry brush for fuel, dips and trades at Red Lake post.

- 31 -

Hosteen Ashie lives 9 1/2 miles north of Red Lake Trading Post. Runs 170 head of sheep on range yearlong with occasional movements within a short distance of present location. Farms in the Tolani Lake flat. Uses dry Chamise for fuel. Dips and trades at Red Lake.

- 32 -

Dena Souie lives 8 1/2 miles northwest of Red Lake Trading Post. Runs 140 head of sheep and 15 head of cattle on range yearlong. Farms when possible. Moves occasionally during the summer to new locations in order to get better utilization of range. Fuel very scarce, dry shrub and chamise being the only fuel supply. Dips and trades at Red Lake.

- 33 -

Navajo Joe

- 34 -

Everett McCabe

- 35 -

Hosteen Natani

WR 13143

CV-6417-201 NN005064

All live close together 9 miles northwest of Red Lake Trading Post. Total sheep 700 head and 150 head of cattle on range yearlong. They all move occasionally during the year to new locations, sometimes living together, especially in summer. Their cattle range is along both sides of Dinnebito Wash and westward to Rock Spring which is a permanent watering place and northward to the foot of Garces Mesa. They burn dry Chamise for fuel sometimes hauls wood from the National forest. Dips and trades at Red Lake. Farms in Tolani Lake flat.

- 36 -

Baltone lives 9 1/4 miles southwest of Sand Springs. Runs 100 head of sheep and 30 head of cattle on range yearlong. Moves at different times during the year to new locations, mostly up and down along Dinnebito Wash. Burns dry Chamise for fuel. Trades and dips at Red Lake.

- 37 -

Dugah Tsosie lives 2 miles northeast of Rock Springs. Summer range 4 3/4 miles south of Sand Springs 167 sheep on summer range from June 1 to November 1. Winter range at present location, 167 sheep on winter range from November 1 to June 1, present location is in Unit # 3. Also has 90 cattle, they range in vicinity of Rock Spgs yearlong. Dips and trades at Sand Springs.

- 38 -

No dahe lives 3 miles south of Rock Springs. Summer 4 3/4 miles south of Sand with Dugah Tsosie, 100 sheep on summer range from June 1, to November 1. Winter range at present location, 100 sheep on winter range from November 1, to June 1, moves to summer range to be near dipping vat as all dipping is done in the middle of July, moves to winter range because of lack of feed on summer range. dips and trades at Sand Springs.

- 39 -

Man Puller lives 5 1/2 miles southeast of Red Lake Trading Post. Runs 200 head of sheep on range yearlong. Moves intermittently during the year to new locations in vicinity of present location for a short period at a time in order to get better utilization of range. Fuel supply very scarce, dry shrub and chamise being the only fuel the year around. Dips and trades at Red Lake.

- 40 -

Atta Kai lives 3 3/4 miles northeast of Grand Falls. Runs 180 head of sheep on range yearlong. Moves occasionally to new location during the year because of lack of feed in the vicinity of present location. Gathers drift wood along Colorado river for fuel. Dips and trades at Leupp.

WR 13144

CV-6417-201 NN005065

- 41 -

Carl Little lives 6 miles east of Grand Falls. Summer range at present location. 214 sheep on range at present time. Winter range 6 miles southeast of Grand Falls. Runs 214 sheep on winter range. Moves back and forth to winter and summer range indefinitely depending upon the condition of range and water supply on range during the year. Dips at Leupp and trades there also.

- 42 -

Addo Kai Bodani lives 7 1/4 miles northwest of Red Lake Trading Post. 200 sheep on range yearlong, moves about in vicinity of present location in summer for a short period at a time in order to get better utilization of range. Fuel very scarce. Dry shrub and Chamise being the only fuel the year around. Dips and trades at Red Lake.

- 43 -

Herbert Kelly

- 44 -

James Thompson

Both live close together miles northwest of Leupp, with separate band of sheep. Total sheep on range yearlong 90 head. In summer lives along the river 1 1/2 miles south of present location. In winter they live at present location utilizing the same range year long. Their location is such that they can get wood the yearlong. They farm when possible at Tolani Lakes flat. Both dip at Leupp and trade there also.

- 45 -

Dah he Lini Bumah lives 1 3/4 miles south of Grand Falls. Summer range in the vicinity of Box springs and occasionally near Grand Falls on north side of the Colorado river. 180 sheep on summer range from May 1 to October 1, winter range at present location and vicinity, 180 sheep on winter range from October 1, to May 1. Moves to summer range because of lack of water supply on winter range. Moves to winter range because of lack of feed on summer range. Dips and trades at Leupp.

- 46 -

Dah he Lini lives 2 3/4 miles southwest of Grand Falls. Summer in the vicinity of Box Springs and occasionally near Grand falls on north side of river. 120 sheep on summer range from May 1, to October 1. Winter range at present location, 120 sheep on winter range from October 1, to May 1, moves to summer range because of water on winter range. Moves to winter range because of lack of feed on summer range. His wife and her children are from Tuba City District, and a portion of the herd are from that District. Dipped at Cameron last year. Trades at Leupp and Cameron.

WR 13145

CV-6417-201

NN005066

- 47 -

Bili Cody lives 3 1/2 miles southwest of Grand Falls. Runs 425 head of sheep and 30 head of cattle on same range yearlong. Moves occasionally during the year to new locations in order to get better utilization of the range. Hauls wood from the Colorado river for fuel. Dips and trades at Leupp.

- 48 -

Na nil Cody lives 4 1/2 miles southwest of Grand Falls. Runs 350 head of sheep and 16 head of cattle on same range yearlong. Inter moving and utilizing the same range with Bili Cody. Hauls wood occasionally from the Colorado river but most of the time burns dry Chamise for fuel. Dips and trades at Leupp.

- 49 -

Tsini gini Souie lives 7 miles southeast of Grand Falls. Runs 100 head of sheep and 12 head of cattle on range yearlong, moving intermittently to new locations during the year to get better utilization of the range. Burns dry Chamise for fuel. Hauls wood occasionally from the Colorado river. Dips and trades at Leupp.

- 50 -

Ella Yazzie lives 9 1/2 miles south of Grand falls. Runs 55 head of sheep on range yearlong, moves occasionally to new locations during the year in order to get better utilization of the range. The windmill along the San Francisco Wash is the only permanent water supply in the area and the movement is centered around it. Uses dry Chamise for fuel sometimes. Hauls wood from National forest which is to the west of her location. Dips and trades at Leupp.

- 51 -

Mark lives 9 3/4 miles south of Grand Falls. Yearlong range 7 3/4 miles northeast of Grand Falls has been running 140 head of sheep on range yearlong until winter last year. Moved to present location in December due to the shortage of food on yearlong range, is only living here temporarily. Plans to move back there in the spring time as there is much disputes of his moving on to the present range. Dips ~~and~~ at Leupp, trades at Leupp.

- 52 -

Cherley Bega # 2 lives 10 1/2 miles south of Grand Falls. Runs 80 head of sheep on range year long. Moves to new locations at times during the year within a short distance of present location to get better utilization of the range most of the time, burns dry Chamise for fuel. Hauls driftwood occasionally from the Sand Francisco Wash. Dips and trades at Leupp.

WR 13146

CV-6417-201

NN005067

- 53 -

Todacheenie lives 4 1/2 miles north of Hibbard Railroad station. Runs 80 head of sheep on range has ranged here since the windmill was put up moves occasionally during the year in order to get better utilization of the range. Gather driftwood along the San Francisco Wash for fuel but most of the time dry Chamise is used for fuel.

- 54 -

Hosteen Tso lives 3 miles northeast of Hibbard livestock loading station. Runs 345 head of sheep on range yearlong. Cattle range 5 miles northeast of present location. Has been running his cattle across the Colorado river in the past. 30 head of cattle on range yearlong. He is permanently located here although he moves temporarily to new location in summer for no special reason other than just to be moving to get better utilization of the range. Hauls wood from woodland bordering the Coconino National Forest to the west of present location. Has a small farm plot near Leupp. Dips and trades at Leupp.

- 55 -

John Riggs lives 3 miles northwest of Hibbard livestock loading station. Runs 215 head of sheep on range yearlong and 20 head of cattle on same range with Hosteen Tso. He is permanently located at present location. Farms 1 mile above Leupp and part of the family moves there to harvest the crop in the fall. Hauls wood from the mountains for fuel. Dips and trades at Leupp.

- 56 -

Key ani lives 7 1/2 miles northeast of Hibbard livestock loading station. His present location is temporary yearlong range 6 miles southeast of Grand Falls. 200 sheep on range at present time. Moved to present location because of lack of feed on yearlong range plans to move back to yearlong range in the spring. His movement within the last year is for the first time. Burns dry Chamise for fuel. Dips and trades at Leupp.

- 57 -

Dena elth Tsiho lives 8 miles northeast of Hibbard livestock loading station. Summer range 8 1/2 miles southeast of Grand Falls 685 sheep on range summer range from May 1, to November 1. Winter range at present location, 685 sheep on winter range from November 1, to May 1. Moves to summer range because of lack of range water supply. Moves to winter range because of lack of feed on summer range also owns 66 head of cattle, they rangeon north side of river yearlong. Uses dry Chamise for fuel at times hauls wood from the Coconino National Forest. Dips and trades at Leupp.

WR 13147

CV-6417-201 NN005068

- 58 -

James Long lives 2 3/4 miles west of Sunrise Trading Post. 480 head of sheep on range at present. His movement is back and forth across the Colorado river. Most of time living on north side of Colorado river. Does not claim any permanent range. Hauls wood from Colorado river for fuel. Dips and trades at Leupp.

- 59 -

Hosteen Store lives 2 miles southwest of Sunrise Trading Post. Summer range 1 mile north of Leupp 55 sheep on summer range from June 1, to October 15. Winter range at present location 55 sheep on winter range from October 15, to June 1. Moves to summer range to farm moves to winter range because of lack of feed on summer. Hauls wood from the river for fuel, at times uses dry shrubs for fuel. Dips and trades at Leupp.

- 60 -

Tsinijini Yazzie lives 3 miles southwest of Sunrise Trading Post. Summer range 1 mile north of Leupp 50 head of sheep on summer range from June 1, to October 15, winter range at present location. 50 sheep on winter range from October 15, to June 1, moves to summer range to farm. Moves to winter because of lack of feed on summer range. Hauls at times from the river for fuel. Dips and trades at Leupp.

- 61 -

Asdzan Bitsi Lakai lives 4 1/4 miles southwest of Sunrise Trading Post. Summer range 1 mile north of Sunrise Trading Post 290 sheep on summer range from June first to November 1. Winter range at present location, 290 sheep on winter range from November 1, to June 1. Moves to summer range because of lack of water on winter range, moves to winter range because of lack of feed on summer range and for protection from cold wind in the winter time. Dips and trades at Leupp and Sunrise Trading Posts.

- 62 -

Tsili Bai Bi asdzan lives 5 miles southwest of Sunrise Trading Post. Summer range 3 1/4 miles northwest of Sunrise Trading Post, 70 sheep on summer range from May 1, to November 1. Winter range at present location. 70 sheep on winter range from November 1, to May 1. Moves to summer range to farm and because of lack of water on winter range moves to winter because of lack of feed on summer. Uses dry chamise and shadscale for fuel. Dips and trades at Leupp and Sunrise Trading Posts.

- 63 -

Charley Bega # 1 lives 6 1/4 miles southwest of Sunrise Trading Post. Present location is only temporary, yearlong across the canyon from present location, 145 sheep on range yearlong, moves occasionally in order to get better utilization of the range. Farms above Leupp in the spring. Hauls wood from nearby woodland from out of reservation. Dips and trades at Leupp.

WR 13148

CV-6417-201 NN005069

- 64 -

Bob Curley lives 9 miles southwest of Sunrise Trading Post, 56 head of sheep on range yearlong. Moves about at different times during the year to new location in order to get better utilization of the range. Farms near Leupp. Uses dry Chamise and shadscale for fuel. Dips and trades at Leupp.

- 65 -

Charles Curtis lives 1 1/2 miles southwest of Hibbard livestock loading station. Summer range 2 miles north of Canyon Diablo Railroad station. 300 head of sheep on summer range from June 1, to October 1. Winter range at present location, 300 sheep on winter range from October 1 to June 1. Moves to summer range because of lack of water on winter range moves to winter because of lack of feed on summer range. Farms near Leupp. Dips and trades at Leupp and La Barron ranch.

- 66 -

Bi dugah ni Kie Bega lives 1 3/4 miles southeast of Hibbard livestock loading station. Summer range in the vicinity of Canyon Diablo station, 100 sheep on summer range from June 1, to October 1. Winter range at present loaction, 100 sheep on winter range from October 1, to June 1. Uses railroad ties and dry shrubs for fuel. Dips and trades at Leupp.

- 67 -

Bert Greymountain lives 6 miles northeast of Hibbard livestock loading station. Summer range 4 1/2 miles north of Canyon Diablo station, 600 sheep on summer from June 1, to October 1. Winter range at present location 600 sheep on winter range from October 1, to June 1. Moves to summer because of lack of feed on winter range. Moves to winter range because of lack of water supply on summer range. Farms above Leupp. Uses Railroad ties and dry Chamise, shrubs for fuel. Dips and trades at Leupp and La Barron ranch.

- 68 -

Theodora Meffet lives at Canyon Diablo 30 head of sheep on range yearlong. Moves once in awhile to new location within a short distance of present location. Uses railroad ties for fuel. Dips and trades at Leupp.

- 69 -

Hosteen Ah mah lives 2 1/2 miles southwest of Leupp. 25 head of sheep on range yearlong. Farms above Leupp. Moves there in summer for a short while to harvest crops, this being the only movement, otherwise he is permanently located. Hauls wood from the river for fuel. Dips and trades at Leupp.

WR 13149

CV-6417-201 NN005070

- 70 -

Little Sugar lives 3 1/2 miles southwest of Leupp. 90 head of sheep on range yearlong. Farms above Leupp and moves there in summer for a short period to harvest his crops, then trails back to yearlong range. Moves occasionally to new locations on yearlong range during the year to get better utilization of the range. Hauls wood from the Colorado river for fuel, but most of the time uses dry shrubs for fuel. Dips and trades at Leupp.

- 71 -

Josephine Russell lives 7 miles northeast of Canyon Railroad station. 130 head of sheep on range yearlong, moves occasionally during the year to new location to get better utilization of range. Farms above Leupp. Uses dry shrub for fuel. Dips and trades at Leupp.

- 72 -

John Billie lives 5 1/4 miles northeast of Canyon Diablo Railroad station, 156 sheep on range yearlong, moves during the year to new locations in order to get better utilization of the range. Farms above Leupp. Hauls wood occasionally from the woodland outside of Reservation to the south of present location, but uses dry shrub for fuel most of the time. Dips and trades at Leupp.

- 73 -

Hal nishi lives 4 1/2 miles northeast of Canyon Diablo Railroad station. 260 sheep on range yearlong. Moves to new locations during the year in order to get better utilization of the range within vicinity of present location. Also has 20 head of cattle. They range along the river 3 miles above Leupp the year long. Dips and trades at Leupp.

- 74 -

Hoskon lives 3 miles south of Leupp. 200 sheep on range yearlong. Moves to new locations during summer in order to get better utilization of range. Movements are mostly during summer only for a short period. Has permanent hogans built at present location. Dips and trades at Leupp.

- 75 -

Charley Foster. Yearlong range 6 1/4 miles southeast of Leupp at old Goat, sheep ranch. Lives here yearlong and looks after old ranch and buck pasture. Runs 90 head of sheep on range, moves in summer to new locations in order to get better utilization of range. Movements are only in summer and for a short while. Dips and trades at Leupp.

WR 13150

CV-6417-201 NN005071

- 76 -

John Wolly lives 1 mile northwest of Shonto Springs. 80 sheep on range yearlong is located out of Unit # 5 in # 6. Moves around over range in summer for a short period at a time in order to get better utilization of range. Also runs 10 head of cattle on range yearlong. Farms near Shonto Springs along Oraibi Wash in summer. Dips and trades at Sand Springs.

- 77 -

Tsa lakai Ni tini lives 8 miles southeast of Sand Springs. Summer hogans are 1 mile above Shonto Spring which in Unit # 6. Summer range in vicinity of Shonto Springs, 350 sheep on summer range from June 1, to November 1. Winter range at present location and vicinity 350 sheep are on winter range from November 1 to June 1. Moves to summer range to farm, moves to winter range because of lack of feed on summer range. Fuel very scarce. Dry Chamise being the only fuel supply. Also has 20 head of cattle. They range in the vicinity of Shonto Springs yearlong. Dips and trades at Sand Springs.

- 78 -

Charley Yazzie lives 5 1/4 miles southeast of Sand Springs Vat. 220 sheep on range yearlong, moves about to new locations in vicinity of present in summer in order to get better utilization of range. Fuel very scarce. Dry shrub and Chamise being the only fuel the year around. Dips and trades at Sand Spgs.

- 79 -

Toh honi Askie lives 4 miles south of Sand Springs. 110 sheep on range yearlong. Moves about in summer in vicinity of present location for a short period at a time in order to get better utilisation of range. Fuel supply very scarce. Dry shrub and Chamise being the only fuel yearlong. Dips and trades at Sand Springs.

- 80 -

Toh Hani Begay lives 4 1/2 miles north of Sand Springs. 160 sheep on range yearlong. Moves over the range at different times during the year in order to get better utilisation of range. Farms along the Dinnebito Wash. Fuel supply very scarce. Dry shrubs and Chamise being the only fuel the year around. Dips and trades at Sand Springs.

- 81 -

Ah delth Doni and Biling Doda Jada. Both live together on north side of Tovar Mesa 306 sheep on range at present. Biling Doda Jada moved in from vicinity of Shonto Spg. for the first time last September. Ah dilth Doni also moved in from the same locality for the first time last September. Their present location is yearlong. They move about on the range in summer, in order to get better utilisation of range. They also own 32 head of cattle which range here yearlong. Both dip at Red Lake and Trade at Red Lake.

WR 13151

CV-6417-201 NN005072

LAND MANAGEMENT UNIT NO. 5

RANGE IMPROVEMENT SURVEY
INVENTORY

5-M-1 Permanent ECW Spring #41 A
110° 45' x 35° 45' - 10-1/8" W x 8-1/4" S
At Sand Springs Dipping Vat
150 ft. of 1-1/4" galv. pipe, 36' x 24" x 14" concrete trough. Pipe freezes in winter. Will water 100 sheep daily.
Put pipe deeper in ground and bring it up thru bottom of trough.

5-M-2 Temporary ECW Surface Tank #42 B
110° 45' x 36° 00' - 6" W x 15" S
Dam 500 ft. long, faced with rock, a 40-acre desilting plot fenced. Will hold water for about 8 months.
No work needed at present.

5-M-3 Permanent Drilled Well
110° 45' x 36° 00' - 6-1/2" W x 13-7/8" S
8 ft. Aermotor Windmill, 30 ft. three panel steel tower, 15,000 ga. steel storage tank, 20 ft. concrete trough. Repair shut-off valve. Bank dirt 3 ft. high around tank so overflow pipe and tank won't freeze. Fix end of overflow pipe so water will run out.

5-M-4 Permanent ECW Spring #20
110° 45' x 35° 45' - 10-1/2" W x 3/4" S
25' x 36" x 18" concrete trough and about 250 feet of 1" galv. lead pipe. Flowing approximately 2 gal. per minute.
No work needed.

5-M-5 Permanent Undeveloped Spring
110° 45' x 35° 00' - 10-1/2" W x 18" S
Used mostly for domestic purposes. Will probably water 150 to 200 sheep daily.
Development not recommended.

WR 13152

CV-6417-201 NN005073

5-M-6 Permanent BCW Well #141
110° 45' x 35° 45' - 9-1/2" W x 7" S
Well 20 ft. deep and cribbed with rock and concrete.
15' x 36" x 18" concrete trough and hand pump.
No work needed

5-M-7 Temporary Surface Tank
110° 45' x 35° 30' - 8-5/8" x 7-7/8" S
Dam 200 ft. long and 15 ft. high. Faced with rock on upstream side. Short drainage. Natural spillway. Should hold water 6 months. Range good.
No work needed.

5-M-8 Temporary Indian Surface Tank
110° 45' x 35° 30' - 9-1/2" x 6-1/4" S
Dam 250 ft. long and 10 ft. high. Short drainage. Should hold water 4 to 5 months. Range good.
No work needed at present.

5-M-9 Temporary BCW Surface Tank
110° 45' x 35° 30' - 8-5/8" W x 2-5/8" S
Charco type tank. Holds very little water. Silted up. 40-acre desilting plot fenced. Probably hold water one month or six weeks.
Deepen and put silt traps in desilting plot.

5-M-10 Temporary Indian Surface Tank
110° 45' x 35° 45' - 19-3/4" W x 16-1/8" S
Dam 500 ft. long and 4 ft. high. Silted up. Catches water only during high floods. Valuable as an erosion control structure but not as livestock water. Range fair to poor.
No work needed.

5-M-11 Temporary BCW Surface Tank
110° 45' x 35° 45' - 10-3/4" W x 16-3/8" S
Charco. Flat drainage. Little storage capacity to tank. Probably hold water 2 months. Range poor.
No work warranted. 1 mile from 5-M-14

5-M-12 Temporary Indian Surface Tank
110° 45' x 35° 30' - 15-1/4" W x 3/4" S
Dam 300 ft. long and 4 ft. high. Short drainage. Probably hold water 3 months. Range fair to good.
No further work needed.

WR 13153

5-M-13 Temporary ECW Surface Tank
110° 45' x 35° 30' - 13-1/2" W x 1-3/4" S
Dam 200 ft. long. Short barren drainage. A deep charco type tank. Should hold water 4 months. Range poor south of tank. Good feed on top of mesa and good trail up on to the mesa.
No work needed.

5-M-14 Permanent Shallow Dug Well
110° 45' x 35° 45' - 10-3/4" W x 15-3/4" S
Well 20 ft. deep, cribbed with rock and concrete. Diaphram hand pump. 20' x 24" x 14" concrete trough. Clean out well. Put up an 8 ft. windmill, 15,000 gal. steel storage tank, float and float box, and 20 ft. more concrete trough.
Range fair to poor and badly overgrazed but a supply of permanent water is needed in this part of the range.

5-M-15 Permanent Shallow Dug Well
111° 00' x 35° 45' - 2-1/2" x 15-1/4" S
Well 20 ft. deep. Cribbed with concrete. Quick sand in bottom. 20' x 36" x 18" concrete trough. Range poor to fair.
Deepen well and case off quick sand. Put on hand pump.

5-M-16 Temporary Indian Surface Tank
110° 45' x 35° 30' - 12" W x 11-5/8" S
Dam 600 ft. long. Badly silted up. Probably hold water 6 weeks. Range poor and overgrazed.
No work warranted.

5-M-17 Permanent Shallow Dug Well
110° 45' x 35° 30' - 13-1/2" W x 11-3/4" S
Well 20 ft. deep, cribbed with rock and concrete, diaphram hand pump- 2 troughs 20' x 14" x 12".
Fill in dirt around well so water won't run in.
Range poor. Water salty but alright for livestock.

WR 13154

CV-6417-201 NN005075

5-M-18 Permanent Shallow Dug Well
110° 45' x 35° 45' - 13" W x 10-1/4" S
Well 30 ft. deep, cribbed with rock and concrete.
15' x 14" x 12 " concrete trough. Well dry now. Never is much water here. Doesn't warrant further development.

5-M-19 Permanent Shallow Dug Well
110° 45' x 35° 30' - 13-1/8" W x 13-5/8" S
At Sunrise Bridge below Leupp
Well 25 ft. deep, cribbed with rock and concrete, concrete top. 20 ft. steel tower, 14 ft. Aermotor windmill, 2000 gal. galv. iron storage tank on wooden frame 6 ft. high. 1-1/4" galv. lead pipe and 40' x 24" x 16" concrete trough.
Put in a 15,000 gal. steel storage tank, 40 ft. concrete trough and float box.

5-M-20 Semi-permanent ECW Surface Tank
110° 45' x 35° 30' - 10-7/8" W X 8-7/8" S
Half of tank to be in Toland Lake Buck Pasture
Holds about 10 ft. of clear water. Leaking badly.
A water lot and a 40-acre desilting plot fenced.
Put a masonry case wall in this tank to stop leak.

5-M-21 Temporary ECW Charco
111° 00' x 35° 30' - 2-3/4" W X 5-3/8" S
Dam 250 ft. long, 800 ft. of diversion dike. Will hold about 2 or 3 months. Dry now. Range poor to fair. Drainage too small to warrant further development.

5-M-22 Temporary ECW Charco
111° 00' x 35° 30' - 5-1/4" W x 2-5/8" S
Dam 300 ft. long. Some water now. Should hold for 2½ or 3 months. Fair drainage. Range poor to fair.
Deepen Bar pit to 10 ft. x 100 ft. x 100 ft. and fence an 80-acre desilting plot above.

5-M-23 Shallow Dug Well (Dry)
111° 00' x 35° 30' - 7-5/8W x 1-1/4" S
Well 15 ft. deep, cribbed with rock and concrete, concrete top and diaphram hand pump. No trough. Well dry now. Range fair.
Dig well deeper and see if can get water. If can get good flow of water, build a 20 ft. concrete trough and put in a pitcher type hand pump.

WR 13155

CV-6417-201 NN005076

5-M-24 Temporary ECW Surface Tank
111° 00' x 35° 45' - 5-1/2" x 16-1/2" S
Dam 600 ft. long and 10 ft. high. Bar pit quite flat but tank will hold a lot of water. Will have to be cleaned out in a couple of years. Should hold water for 5 or 6 months. Good drainage. 80 to 100 acre desilting plot and water lot fenced. Range fair to poor.
No work needed at present.

5-M-25 Temporary ECW Surface Tank
111° 00' x 35° 30' - 1" W x 1/8" S
Dam 125 ft. long. Faced with rock on upstream side. Will hold 6 to 8 ft. of water, 4 ft. water now. Short barren drainage. Should hold water for 6 or 8 months. Range fair to poor.
No work needed.

5-M-26 Temporary ECW Charco
111° 00' x 35° 30 - 3/8" W x 6-3/8" S
Dam 250 ft. long and 6 ft. high. Bar pit about 4 ft. deep. North end of dike broken. Tank holds good. Should hold water for 3 to 4 months. Some water now. Dig bar pit 6 ft. deeper and fence an 80-acre desilting plot above.

5-M-27 Temporary ECW Surface Tank
110° 45' x 35° 30' - 5-1/2" W x 8-1/2" S
Dam 150 ft. long and 12 ft. high. Faced with rock on upper side. Spillway cut through hill 150 ft. back from dam. Should hold 4 to 5 months. Some water now. Short drainage. Range poor.
No work needed at present.

5-M-28 Temporary ECW Surface Tank.
110° 45' x 35° 30' - 4-3/4" W x 7-3/4" S
Dam 200 ft. long, faced with rock on upper side, 10 ft. spillway. Diversion dike washed out. Should hold water 4 to 5 months when it fills. Range poor to fair.
Replace diversion dike and make spillway 10 ft. wide.

5-M-29 Temporary Indian Surface Tank
110° 45' x 35° 30' - 4-5/8" W x 4-1/4" S
Dam 60 ft. long and 4 ft. high. Holds 3 ft. water. 1 mile from Tolani Lake Vat. Range poor.
Development not warranted.

WR: 13156

CV-6417-201 NN005077

5-M-30 Permanent Shallow Dug Well
110° 45' x 35° 30' - 5-3/8" W x 4-1/4" S
At Tolani Lake Dipping Vat
Well 20 ft. deep, cribbed with rock and concrete, concrete top, 10 ft. Aermotor windmill, steel tower, pump jack, 1½ H. P. engine, 50,000 gallon steel storage tank, float box, float and 40' x 14" x 14" concrete trough. Range poor.
Re-leather pump.

5-M-31 Permanent Shallow Dug Well
110° 30' x 35° 30' - 13-1/4" W x 2-1/4" S
10 ft. Ace windmill, 5,000 gal. galv. iron tank, 20' x 36" x 18" concrete trough. Belongs to Big Billy.
No development recommended.

5-M-32 Temporary E CW Charco
110° 30' x 35° 30' - 12-3/8" W x 2-1/2" S
Dam 300 ft. long and 4 ft. high, bar pit 4 ft. deep. Full now. Should hold water for 4 months. Range fair to poor.
No work needed.

5-M-33- Temporary E CW Surface Tank
110° 45' x 35° 30' - 1-1/8" W x 3-3/8" S
Dam 100 ft. long and 15 ft. high. Barren drainage. Water is deep in this tank. 1/3 full now. Apparently hold good. Should be almost permanent water. 40-acre desilting plot and water lot fenced. Range fair to poor.
No work needed.

5-M-34 Temporary ECW Surface Tank
110° 45' x 35° 30' - 1/4" W x 5-1/4" S
Dam 200 ft. long and 10 ft. high. A good tank site. Washed out. Tank washed out because it has a drainage of about 600 acres and a spillway 51 inches wide. Tank needed for livestock water and to stop severe head cutting.
Rebuild tank and build a 40-foot spillway. Allow 4 ft. freeboard.

5-M-35 Permanent Shallow Dug Well
110° 45' x 35° 30' - 3" W x 8-1/4" S
Well 20 ft. deep, cribbed with rock and concrete, 20' x 14" x 14" concrete trough, diaphram hand pump, water running in around well.
Build up around well.

WR 13157

CV-6417-201 NN005078

5-M-36 Permanent Indian Shallow Dug Well
110° 45' x 35° 30' - 2-7/8" W x 7-1/2" S
Well 6 ft. deep and in bottom of Jeddito Wash.
Fills with sand during floods. Used by one family.
2 miles from good ECW shallow well No. 5-M-3[illegible]
Range poor.
Development not warranted.

5-M-37 Temporary ECW Charco
110° 45' x 35° 30' - 5" W x 11 " S
Dam 500 ft. long. Flat drainage, bar pit 3 ft. deep.
1/2 full water now. Range poor. No further development recommended.

5-M-38 Temporary ECW Charco
110° 45' x 35° 30' - 9-5/8" W x 13" S
Dam 300 ft. long. Bar pit 3 ft. deep. Should hold water for 2-1/2 months. Dry now. Range very poor.
No work recommended.

5-M-39 Temporary ECW Charco
110° 45' 35° 30' - 4-7/8" W x 4-1/4" S
Dam 600 ft. long. Bar pit three feet deep. 1-1/2 miles of diversion ditch. Ditch has carried no water since it was built. Charco should hold for 2 months.
Dry now. Range poor.
No work recommended.

5-M-40 Permanent Shallow Dug Well
110° 45' x 35° 30' - 3" W x 13-3/4" S
A rock and concrete cribbed well 20 ft. deep.
15' x 24" x 14" concrete trough, and diaphram hand pump. Range poor.
Repair hand pump.

5-M-41 Temporary Surface Tank
110° 45' x 35° 15' - 1-3/4" W x 1/4" S
Dam 200 ft. long and 6 ft. high. Good drainage behind tank. 1/2 full now. Should hold 3 months.
No further development recommended.

WR 13158

CV-6417-201 NN005079

5-M-42 Permanent Shallow Dug Well
110° 30' x 35° 15' - 9-1/2" W x 4-7/8" S
20 ft. steel tower, wooden Eclipse windmill, well 30 ft. deep and cribbed with railroad ties. 50' x 50' storage tank, wooden float box and metal float, 10' x 24" x 16" concrete trough and a 60' x 50' Paige wire corral.

5-M-43 deep drilled Well
110° 30' x 35° 15' - 6-1/2" W x 5-1/4" S
6" casing and 4" pump.

5-M-44 Temporary Surface Tank
110° 30' x 35° 15' - 4" W x 3-7/8 " S
A new tank. Dam 200 ft. long and 8 ft. high. Deep bar pit. Should hold 4 or 5 months when it gets trampled. Rock on upper face. Natural spillway. Range fair.
Fence a 60-acre desilting plot above.

5-M-45 Temporary Surface Tank
110° 30' x 35° 15' - 4-5/8" W x 4-1/4" S
An old tank. Dam 3 ft. high and 500 ft. long. Water stands about 2 ft. deep and spreads over about 15 acres. Water lot fenced. Range poor to fair. One mile from 5-M-44.

5-M-46 Temporary ECW Charco
110° 30' x 35° 15' - 14" W x 1/4" S
Dam 500 ft. long. Bar pit 6 ft. deep. Short drainage. 1/2 full now. Should hold 6 to 8 months. Range poor.
Fence a 40-acre desilting plot above.

5-M-47 Permanent Shallow Dug Well
110° 45' x 35° 15' - 1/4" W x 1/4" S
Well 30 ft. deep, cribbed with rock and concrete, 16' x 12" x 9" wooden trough, wooden top on well and diaphram hand pump. Range poor. 1/4 mile from 5-M-46. Repair hand pump for use when 5-M-46 is dry.

5-M-48 Temporary Indian Charco
110° 45' x 35° 30' - 2-3/4" W x 12-1/8" S
An old Indian tank. Silted up. Holds very little water. Drainage too small to warrant development. Range poor

WR 13159

CV-6417-201 NN005080

5-M-49 Temporary Surface Tank
110° 45' - 35° 30' - 1/2" W x 10-3/4" S
Dam 150 ft. long and 10 ft. high. Faced with rock on upstream side. Steep barren drainage above. 1/3 full now. Should hold water for 5 months. Range poor to fair.
No work needed.

5-M-50 Shallow Dug Well (Dry)
110° 30' x 35° 30' - 10-1/2" W x 12-3/4" S
Well 25 ft. deep, cribbed with rock and concrete, 16' x 14" x 12" concrete trough. Well is dry and hand pump has been removed.
No further development recommended.

5-M-51 Semi-permanent Shallow Dug Well
110° 30' x 35° 30' - 9-3/4" W x 12-3/4" S
Goes dry at times. 8 ft. of water now. 30 ft. deep and cribbed with rock and concrete, diaphram hand pump and 20' x 14" x 12" concrete trough. A rock jetty 60 ft. long to protect well from floods. Range poor to fair.

5-M-52 Permanent Indian Shallow Dug Well and Permanent Undeveloped Spring
110° 30' x 35° 30' - 8-5/8" W x 12-1/2" S
Bird Springs
Well 10 ft. deep, cribbed with rock, open top, 8 ft. wooden trough. Excavate spring and run out into a concrete cistern and 20 ft. concrete trough.

5-M-53 Temporary Surface Tank
110° 30' x 35° 30' - 8-5/8" W x 14-7/8" S
Dam 75 ft. long and 8 ft. high. Short barren drainage. Dry now. Should hold 3 months. Range fair to poor.
No further development needed at present.

5-M-54 Permanent Shallow Dug Well
110° 30' x 35° 30' - 7-1/2" W x 16-5/8" S
Well 12 ft. deep, cribbed with rock and concrete, concrete top, diaphram hand pump, 20' x 14" x 12" concrete trough. 2 ft. water in well. Range poor.
No further development recommended.

WR 13160

CV-6417-201 NN005081

5-M-55 Temporary Surface Tank ECW #24 A
110° 30' x 35° 15' - 10" W x 1/4" S
Dam 150 ft. long and 12 ft. high. 20-acre desilting plot fenced. Should hold water for 8 months. Range poor.
No work needed.

5-M-56 Temporary Surface Tank
110° 30' x 35° 15' 7" W x 1-3/8" S
Dam 100 ft. long and 12 ft. high. Rock on both sides, narrow spillway. Very small, steep, barren drainage.
Should hold water for 6 months. Range poor.
No work needed.

5-M-57 Temporary Surface Tank
110° 30' x 35° 15' - 5-3/8" W x 1-3/4" S
Dam 200 ft. long. Charco silted up. Water runs over south wing of dam. Holds very little water. Silted up. Range poor. Further development not warranted.

5-M-58 Temporary ECW Charco
110° 30' x 35° 15' - 11-1/2" W x 1-1/2" S
Dam about 275 ft. long. Diversion dike 500 ft. long above tank. Range poor. Should hold 6 months.
Repair diversion dike.

5-M-59 Semi-permanent Surface Tank
110° 30' x 35° 30' - 9-7/8" W x 4-3/4" S
Dam 100 ft. long and 15 ft. high. Rock spillway.
Tank leaks badly. Fence a 100-acre desilting plot.
No other work recommended.

5-M-60 Temporary Natural Lake
110° 30' x 35° 30' - 10-5/8" W x 2-3/4" S
Probably hold water for two months. Range fair to good.
Too close to other water to warrant development.

5-M-61 Temporary ECW Charco
110° 45' x 35° 30' - 1" W x 1/8" S
Deep charco. Should hold water for 6 months. 60-acre desilting plot fenced. Range poor to fair.
No work needed.

WR 13161

CV-6417-201 NN005082

5-M-62 Temporary Surface Tank ECW #98 B
110° 30' x 35° 45' - 9-1/2" W x 9-5/8" S
Dam 250 ft. long. Water lot fenced. Silting up.
Clean out and fence a 40-acre desilting plot above.
Range fair to good. Should hold 5 months.

5-M-63 Temporary ECW Charco
110° 45' x 35° 45' - 3-3/8" W x 16-1/2" S
Bar pit 4 to 5 ft. deep. Dam 250 ft. long. Good drainage. 1/4 full now. Should hold 4 months. Put 200 ft. of rock and wire sausage in spillway. Range poor.

5-M-64 Temporary Surface Tank ECW #0-74
110° 30' x 35° 45' - 1/4" W x 12-5/8" S
Dam 225 ft. long and 20 ft. high. Large sandy drainage. Will hold 15 ft. of water. Should last at least 8 months. A 40-acre desilting plot fenced. One rock and wire sausage in the 35-ft. spillway.
No work needed at present.

5-M-65 Temporary Surface Tank ECW #0-75
110° 30' x 35° 45' - 13-1/4" W x 9-1/8" S
Dam 250 ft. long and 15 ft. high. Should hold 10 ft. of water. Should last at least 8 months. Large sandy drainage. 60-acre desilting plot fenced. Range fair to good.
Put silt traps in gullies in desilting plot.

5-M-66 Temporary Surface Tank ECW #92
110° 30' x 35° 45' - 13" W x 7" S
Dam 300 ft. long and 12 ft. high. Large drainage. Silting up. Holds 8 ft. of water. Should last about 8 months. Range poor to fair.
Fence a 100-acre desilting plot.

5-M-67 Temporary Indian Surface Tank
110° 45' x 35° 30' - 5-1/4" W x 1-3/4" S
Principally a diversion dam. Catches no water since the Tolani Lake Dam was put in.

WR 13162

CV-6417-201 NN005083

5-M-68 Permanent Developed Spring
111° 00' x 35° 45' - 1-1/2" W x 16" S
300 ft. of 3/4" galv. pipe, 15' x 36" x 18" concrete trough and small concrete cistern. Not catching the water. Pipe probably stopped up. Trough filled with sand.
Dig out head of spring, clean out trough and fix so water won't fill it with sand. Range fair.

5-M-69 Temporary Indian Surface Tank
110° 45' x 35° 45' - 8-1/4" W x 13-1/4" S
Dam 100 ft. long and 10 ft. high. Barren drainage at base of cliffs. Badly silted up. 1/4 full of water now. Lasts about 3 months.
Clean out and build up old dam. Range poor.

5-M-69A. Temporary E.C.W. charco.

5-M-70 Temporary Surface Tank
110° 45' x 35° 45' - 5-3/4" W x 12-5/8" S
Dam 300 ft. long and 6 ft. high. Deep bar pit. Short sandy drainage. 2 ft. water now. Should hold for 5 months. Range poor to fair.
No work needed.

5-M-71 Temporary Surface Tank
110° 45' x 35° 45' - 3-7/8" W x 9-1/2" S
Dam 250 ft. long and 8 ft. high. Large flat bar pit. Dam and waterlot fenced. Fences in bad shape. Range fair to good. Should hold 6 months.
Fence an 80-acre desilting plot above, and take out the old fences.

5-M-72 Temporary Surface Tank
110° 45' x 35° 45' - 7-1/2" W x 8-1/2" S
Dam 250 ft. long. Large drainage. 40-acre desilting plot fenced. Range fair.
No work needed.

5-M-73 Permanent Shallow Dug Well & Spring
110° 45' x 35° 45' - 7"W x 4" S
Well 15 ft. deep, cribbed with rock and concrete, concrete top, hand pump, 20' x 14" x 12" concrete trough. Lots of live water in wash now. Range fair.
Repair hand pump.

WR 13163

CV-6417-201 NN005084

5-M-74 Permanent Developed Spring
111° 00' x 35° 45' - 13-5/8" W x 15-3/4" S
Two springs and two concrete troughs, each 20'x36"x18". One spring runs about 2 gal. per minute and the other about one gallon. A lot of live water in the canyon now. Range poor.
No work needed.

5-M-75 Permanent Spring
111° 00' x 35° 45' - 10-5/8" W x 13-3/8" S
Spring piped out into a wooden trough. Dig out spring and pipe out into a 20 ft. concrete trough. Range fair.

5-M-76 Temporary Surface Tank ECW #0-79
111° 00' x 35° 45' - 1-3/8" W x 9-3/4" S
Dam 400 ft. long and 10 ft. high. Large drainage. Bar pit shallow. Should hold for 6 months. Diversion dam above.
Fence a 100-acre desilting plot above. Range fair.

5-M-77 Permanent Indian Shallow Dug Well
111° 00' x 35° 45' - 3-1/8" W x 12-1/2" S
Well 4 ft. deep, in bottom of sand wash, fills up when wash floods. Probably goes dry at times. Range poor to fair.
Development not warranted.

5-M-78 Temporary Surface Tank
111° 00' x 35° 45' - 7-1/8" W x 10-3/4" S

5-M-79 Temporary Surface Tank
110° 45' x 35° 45' - 5-1/2" W x 1-1/4" S

5-M-80 Temporary Surface Tank ECW No. 96 C
110° 30' x 35° 45' - 7" W x 13" S
Dam 250 ft. long. Sandy drainage. Should hold water 4 months. Range fair to good. Fence a 40-acre desilting plot above dam.

WR 13164

CV-6417-201 NN005085

5-M-81 Permanent Shallow Dug Well
110° 45' x 35° 30' - 8-3/4" W x 16-3/8" S
Well cribbed with rock and concrete, concrete top, 20' x 36" x 18" concrete trough and diaphram hand pump. Range poor. Well surrounded by water at present time.
No work needed.

5-M-82 Permanent Shallow Dug Well
110° 45' x 35° 15' - 3" W x 3/4" S
Well 20 ft. deep, 5 ft. water, cribbed with rock and concrete, concrete top, two 20' x 14" x 12" concrete trough and diaphram hand pump. Range poor.
No work needed.

5-M-83 Temporary Surface Tank
110° 45' x 35° 25' - 3-3/4" W x 3-3/4" S
Dam 700 ft. long and 10 ft. high. Should hold for 6 months. 2 ft. of water now. 60-acre desilting plot fenced. Rock facing on upstream side. Range fair.
No work needed.

5-M-84 Permanent Shallow Dug Well
110° 30' x 35° 15' - 13-1/4" W x 5-3/8" S
Well 25 ft. deep, cribbed with rock and concrete, concrete top, diaphram hand pump, 20' x 14" x 12" concrete trough. Two feet of water. Range poor.
No further development recommended.

5-M-85 Permanent Shallow Dug Well
110° 30' x 35° 15' - 11" W x 5-1/4" S
Well 20 ft. deep, cribbed with rock and concrete, concrete top, diaphram hand pump, 20' x 14" x 12" concrete trough. Range poor. No work needed.
This well used by Sanduval to irrigate garden.

5-M-86 Permanent Deep Drilled Well
110° 45' x 35° 15' - 11-1/8" W x 5-1/2" S
30 ft. steel tower, 14 ft. Aermoter windmill, 30,000 gal. concrete storage tank, dirt storage tank to catch overflow. 60' x 24" x 14" concrete trough and 30 ft. of iron trough. Furnishes water for two buck pastures and outside. Oil windmill.

WR 13165

CV-6417-201 NN005086

5-M-87 Temporary Surface Tank
110° 45' x 35° 15' - 11-1/4" W x 5" S
Washed out. Too close to 5-M-86 and 5-M-88 to warrant replacement.

5-M-88 Permanent Deep Drilled Well
110° 45' x 35° 15' - 10-1/2" W x 5-3/4" S
30 ft. steel tower, 14 Ft. Aermotor windmill, 10,000 gal. concrete storage tank, dirt storage tank to catch overflow and 60' x 24" x 14" concrete trough. Inside buck pasture.
Re-leather pump and oil windmill.

5-M-89 Temporary Surface Tank
110° 45' x 35° 15' - 13-1/2" W x 5-1/2" S
Dam 200 ft. long and 10 ft. high. Narrow rock spillway. Rock drainage. Rock facing on upstream side. Should hold 5 months. Some water now. Range fair.
No work needed.

5-M-90 Temporary Surface Tank
111° 00' x 35° 15' - 3/4" W x 5-5/8" S
Dam 100 ft. long. Covered with rock facing. Catches some water but it leaks out very rapidly through cracks in the rocks. Very little value. Range fair to good.
No work recommended.

5-M-91 Temporary Charco - ECW & 22 A
111° 00' x 35° 15' - 2-1/2" W x 6-1/4" S
Dam 275 ft. long and made of rock mostly. Charco dug out of solid rock. Should hold 3 months if it fills. Range fair to good.
No work needed.

5-M-92 Temporary Surface Tank
111° 00' x 35° 15' - 3-7/8" W x 5-1/4" S
Dam 150 ft. long and 8 ft. high. Vertical rock wall on lower side. Rock facing on upper side. Catches some water but doesn't hold. Cannot be depended upon. Range fair.
No work warranted.

WR 13166

CV-6417-201 NN005087

5-M-93 Temporary Surface Tank
111° 00' x 35° 15' - 1-5/8" W x 4-1/8" S
Dam 200 ft. long and 6 ft. high. Rock facing on upstream side. Flat bar pit. Probably won't hold for more than 6 weeks.
No work recommended.

5-M-94 Permanent Deep Drilled Well
111° 00' x 35° 15' - 2-1/8" W x 5-1/4" S
30 ft. steel tower, 14 ft. Aermotor windmill, 10,000 gallon concrete storage tank, 60' x 24" x 14" concrete trough.
No work needed.

5-M-95 Temporary Surface Tank
111° 00' x 35° 15' - 1-7/8" W x 1-7/8" S
Dam 200 ft. long and 6 ft. high. Faced with rock on both sides. Silted up. Doesn't hold much water. Probably lasts 2-1/2 months. Dry now. Range fair to poor.
No work recommended.

5-M-96 Temporary Surface Tank
111° 00' x 35° 15' - 3/4" W x 2-3/8" S
Dam 250 ft. long, rock facing on upper side. Dry now. Probably holds water 2 to 3 months.
No work recommended.

5-M-97 Temporary Surface Tank
110° 45' x 35° 15' - 12" W x 2-1/2" S
Dam 600 ft. long and 8 ft. high. Rock facing on upper side. A large tank. Has never run over. Should hold at least 4 months. Almost dry now. Inside buck pasture.
No work needed.

5-M-98 Temporary Surface Tank ECW #21 A
110° 45' x 35° 15' - 13-1/4" W x 1-3/4" S
Dam 300 ft. long and 10 ft. high. Dry now. Should hold 4 months. 40-acre desilting plot fenced. Range fair.
No work needed.

WR 13167

CV-6417-201 NN005088

5-M-99 Temporary Surface Tank
111° 00' x 35° 30' - 1" W x 15" S
Dam 250 ft. long and 8 ft. high. Shallow barrow pit. Rock facing on u per side. Should hold 4 months. Some water now. Range poor to fair.
No work needed.

5-M-100 Temporary ECW Charco
111° 00' x 35° 30' - 2-3/4" W x 15-7/8" S
Dam 500 ft. long. Bar pit 4 ft. deep. Should hold 5 months. Some water now. Fair drainage. 60-acre desilting plot fenced. Range fair to poor.
No work needed.

5-M-101 Temporary Surface Tank
111° 00' x 35° 30' - 2-7/8" on the 35° 15' quad line.
Dam 250 ft. long, faced with rock on upper side. 1-1/2-acre desilting plot fenced above. Range fair to good. Should hold 4 months.
No work needed.

5-M-102 Temporary ECW Charco
111° 00' x 35° 30' - 9" W x 16-1/2" S
Dam 600 ft. long and 8 ft. high. Bar pit 3 ft deep. In an old lake bottom. Also a small broken Indian dam here. Should hold 4 months. Range very good.
No work needed.

5-M-103 Permanent Deep Drilled Well
111° 00' x 35° 30' - 11-1/2" W x 16-1/2" S
18 ft. No. 12 Dempster windmill, 30 ft. steel tower, 50,000 gal. steel storage tank. 40' x 14" x 12" concrete trough, concrete float box and float. Range excellent.
No work needed.

5-M-104 Permanent Deep Drilled Well
111° 00' x 35° 30' - 12-3/8" W x 9-7/8" S
[illegible] ft. No. 12 Dempster windmill, 30 ft. steel tower, 50,000 gal. steel storage tank, 40' x 14" x 12" concrete trough. All improvements now being constructed by ECW. Range excellent.

WR 13168

CV-6417-201 NN005089

5-M-105 Temporary Surface Tank - ECW #26 A
111° 00' x 35° 30' - 10-1/2" W x 6-1/4" S
Dam 225 ft. long and 8 ft. high, bar pit 3 ft. deep. Should hold 5 months. Some water now. Range fair to poor.
No work needed.

5-M-106 Temporary Surface Tank
111° 00' x 35° 30' - 8-7/8" W x 12-3/4" S
Dam 150 ft. long and 8 ft. high. Faced with rock. Shallow bar pit. Short drainage and low runoff. Should hold 2-1/2 to 3 months. Some water now. Range good. No work needed.

5-M-107 Temporary Surface Tank
111° 00' x 35° 30' - 7-3/8" W x 13-1/4" S
Probably hold water for 2-1/2 months. Road crosses on dam. Range fair to good.
No work needed.

5-M-108 Permanent Deep Drilled Well
111° 00' x 35° 30' - 5-1/2" W x 15-3/4" S
14 ft. Aermotor windmill, steel tower, 10,000 gal. concrete storage tank, 60' x 24" x 12", concrete trough and small dirt reservoir to catch overflow water. This well is said to have caved in. Permanent water is badly needed in this area. Range fair.

5-M-109 Temporary Surface Tank
111° 00' x 35° 30' - 4-7/8" W x 13-3/4" S
Dam 200 ft. long and 10 ft. high. Faced with rock. Road crosses on dam. Probably holds water 3 months. Some water now. Range fair.
No work needed.

5-M-110 Permanent Shallow Dug Well
111° 00' x 35° 30' - 7/8" W x 12-1/4" S
Well 25 ft. deep, cribbed with rock and concrete, concrete top, 20' x 14" x 12" concrete trough, and plunger hand pump. 8 ft. of water in well. A dirt storage tank here which is not being used at the present time. Range poor.
No work needed.

WR 13169

CV-6417-201 NN005090

5-M-111 Permanent Shallow Dug Well
111° 00' x 35° 30' - 3" W x 10-7/8" S
Well 30 ft. deep, cribbed with rock and concrete, concrete top, 20' x 14" x 12" concrete trough and plunger hand pump. Range poor.
Repair hand pump.

5-M-112 Permanent Shallow Dug Well
111° 00' x 35° 30' - 4" W x 9" S
Same as above except has diaphram hand pump.
No work needed.

5-M-113 Temporary Indian Surface Tank
111° 00' x 35° 30' - 6-1/8" W x 9-3/8" S
Very small dam. Holds very little water. Very small drainage. Probably holds 3 weeks or one month.
Range fair to good.
Development not warranted.

5-M-114 Temporary Surface Tank
111° 00' x 35° 30' - 8-5/8" W x 8-5/8" S
Dam 500 ft. long and 6 ft. high. Bar pit 3-1/2 ft. deep. Good drainage. Has run over. Should hold for 3 or 4 months. Dry now. Range fair.
No work needed.

5-M-115 Temporary Surface Tank
111° 00' x 35° 30' - 7" W x 10-7/8" S
Dam 200 ft. long and 5 ft. high. Faced with rock on upper side. Silting up. Clean out silt. Fence a 40-acre desilting plot above. Should then hold for 5 or 6 months. 3/4 full now. Range good.

5-M-116 Temporary Surface Tank - ECW #42 A
111° 00' x 35° 30' - 5" W x 11-7/8" S
Dam 250 ft. long and 8 ft. high. Bar pit 5 ft. deep. 30-acre desilting plot fence. Almost dry now. Should hold 4 or 5 months. Range good.
No work needed.

5-M-117 Temporary Surface Tank
111° 00' x 35° 30' - 1" W x 13-1/2" S
Flat bar pit. Probably holds for 3 months. Road crosses on dam and two culverts for overflow. Range fair to poor.
No work needed.

5-M-118 Temporary Surface Tank
111° 00' x 35° 30' - 1" W x 14-1/8" S
Dam 150 ft. long and 6 ft. high. Bar pit 4 ft. deep. Should hold 4 months. Some water now. Range poor.
No work needed.

5-M-119 Temporary Surface Tank
111° 00' x 35° 15' - 7-1/4" W x 3-3/4" S
Dam 200 ft. long and 5 ft. high. Almost silted up. Probably doesn't last more than 3 weeks. Dry now. Range good.
No work recommended.

5-M-120 Temporary Surface Tank - ECW # 27 A
111° 00' x 35° 15' - 6-3/8" W x 3-1/8" S
Dam 150 ft. long and 6 ft. high. Covered with rock facing. 20-acre desilting plot fenced. Deep bar pit. Doesn't hold good and probably never will. Dry now. Further development not recommended.

5-M-121 Temporary Water Hole
111° 00' x 35° 15' - 6-1/8" W x 8-3/4" S
In a deep boxed canyon. Has been a trail in from each side but trails are washed out. Livestock can come in from below. Probably holds water for 3 months. Range good. No work needed.

5-M-122 Permanent Deep Drilled Well
111° 00' x 35° 15' - 9-1/2" W x 4-1/4" S
30 ft. steel tower, 18' No. 12 Dempster windmill, 50,000 gal. steel storage tank, 40' x 14" x 12" concrete trough with 4 ft. concrete apron, float box and float. Outlet end of overflow pipe is buried. Fix overflow pipe so water will flow away from it and it won't get stopped up or freeze. Range good.

5-M-123 Semi-Permanent Tank
111° 00' x 35° 15' - 12" W x 3-7/8" S
A concrete dam in the bottom of Canyon Padre. Rabbits have had an engine and pump here and have pumped water up on top of the canyon into a 10,000 gallon tank and 70 ft. of concrete trough. This is too expensive to maintain and no development is recommended.

5-M-124 Temporary Surface Tank
111° 00' x 35° 15' - 10-1/8" W x 4-3/8" S
This was a large dam with a concrete core wall. Washed out. Range is good but this tank doesn't warrant replacement because tanks in this county don't hold good.

5-M-125 Temporary Concrete Dam
111° 00' x 35° 15' - 13" W x 3-1/4" S
There is supposed to be an ECW concrete dam at this location but all roads were blocked by high water and I didn't inspect this structure.

5-M-126 Permanent Shallow Dug Well
110° 30' x 35° 15' - 13-1/2" W x 3-1/4" S
Supposed to be a shallow dug ECW well at this location. I didn't find this development.

5-M-127 Temporary Surface Tank
110° 45' x 35° 45' - 8-1/4" W x 5-3/8" S
Supposed to be an ECW Surface Tank at this approximate location but I didn't find it.

5-M-128 Permanent Shallow Dug Well
110° 48' x 35° 30' - 6-1/4 " W x 16-1/4" S
20' x 12" x 14" concrete trough. Well 25 ft. deep. Cribbed with rock and concrete, concrete top and diaphram hand pump.
Put up a 15,000 gal. steel storage tank, 8 ft. windmill, float box and 20 ft. more concrete trough.
Range poor.

5-M-129 Dry drilled well - Inv. No. 551
5-M-129 110° 0' x 35° 30' 8 1/2" S x 8 3/4" W
515 ft. deep.

WR 13172

CV-6417-201 NN005093

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Immediate Maintenance

5-[illegible]-1 Permanent R. C. W. Spring #41 A
110 45' x 35 45' 10 1/8" W x 2½" S #4
At Sand Springs Dipping Vat
Put pipe deeper in ground so it won't freeze. Bring pipe up through bottom of trough.
Estimated cost, $25.00

5-[illegible]-3 Permanent Drilled Well
110 45' x 36 00' 6½" W x 13 7/8" S #4
Repair shut-off valve and bank dirt 3 ft. high around bottom of tank and over overflow pipe to prevent freezing. Fix end of overflow pipe so it won't stopp up with mud and ice.
Estimated cost, $35.00

5-[illegible]-17 Permanent Shallow Dug Well #5
110 45' x 35 30' 13½" W x 11 3/4" S
Fill in dirt around well cribbing so that water won't run in well.
Estimated cost, $10.00

5-[illegible]-28 Temporary R. C. W. Surface Tank
110 45' x 35 30' 4 3/4" W x 7 3/4" S
Replace diversion dike and make spillway 10 ft. wider. #4
Diversion dike, 800 yds. at 45¢ , $360.00
Spillway, 150 yds. ——— ——— 225.00
Total, $585.00

5-[illegible]-30 Permanent Shallow Dug Well
110 45' x 35 30' 5 3/8" W x 4 1/4" S #4
At Telani Lake Dipping Vat
Re-leather pump
Estimated cost, $10.00

5-[illegible]-34 Temporary R. C. W. Surface Tank #4
110 45' x 35 30' [illegible] ½"W x 5½ S
Washed out because this tank has 600 acres of drainage and a 54-inch spillway. Tank needed for livestock water and to stop headcutting.
Replace and build a spillway. Allow 4 ft. of freeboard.
1000 yds. @ 45¢ ——————— $450.00
Spillway, 400 cu. yds. @ $1.50 ——— 600.00
Total ——1050.00

75

WR 13173

5-W-35 Permanent Shallow Dug Well
110 45' x 35 30' 3"W x 8¼" S
Water running in around well.
Bank dirt up around well.
60 cu. yds. @ 50¢ ---------- $ 30.00

5-W-40 Permanent Shallow Dug Well
110 45' x 35 30' 3"W x 13 3/4" S
Repair hand pump.
Estimated cost ---------- $ 5.00

5-W-47 Permanent Shallow Dug Well
110 45' x 35 15' ¼"W X ¼" S
Repair hand pump for use when 5-W-46 is dry.
Estimated cost, $5.00

5-W-58 Temporary E. C. W. Shares
110 30' x 35 15' 11½"W x 1½" S
Repair diversion dike.
1500 cu. yds. @ 45¢ ---------- $675.00

5-W-68 Permanent Developed Spring
111 00' x 35 45' 1½"W x 16" S
Clean out pipe and trough. Catch the water.
Estimated cost, $70.00

5-W-73 Permanent Shallow Dug Well and Spring
110 45' x 35 45' 7" W x 4" S
Repair hand pump
Estimated cost, $20.00

5-W-86 Permanent Deep Drilled Well
110 45' x 35 15' 12 1/8" W x 3½" S
Change oil in windmill.
Estimated cost, $5.00

5-W-88 Permanent Deep Drilled Well
110 45' x 35 15' 10½" W x 5 3/4" S
Re-leather pump and change oil in windmill.
Estimated cost, $25.00

5-W-111 Permanent Shallow Dug Well
111 00' x 35 30' 3" W x 10 7/8" S
Repair hand pump
Estimated cost, $10.00

WR 13174

5-W-122 Permanent Deep Drilled Well
111 00' x 35 15' 9½"W x 4½" S

Fix overflow pipe from tank so that water will not collect around it and so that it won't get stopped up.

Estimated cost, $15.00

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WR 13175

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Secondary Maintenance

5-1-62	Temporary Surface Tank E. C. W. #98 B 110 30' x 35 45' 9½" W x 9 5/8" S Clean out this tank. 1,000 cu. yds. @ 45¢ ----------	#4 $450.00
5-1-115	Temporary Surface Tank 111 00' x 35 30' 7"W x 10 7/8" S Clean silt out of tank. 600 yds. @ 45¢ ----------	# $270.00

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WR 13176

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Immediate New Developments

5-M-9 Temporary E. C. W. Charco
110 45' x 35 30' 8 5/8" W x 2 5/8" S

Clean out silt and dig to a depth of 10 ft. Put silt traps in the desilting plot.

Reopening, 2,000 cu. yds. @ 45¢ ---------- $ 900.00
Silt traps, rock and wire
200 cu. yds. @ $3.00 ---------- 600.00
Total --- $1500.00

#2

5-M-19 Permanent Shallow Dug Well
110 45' x 35 30' 13 1/8" W x 13 5/8" S
At Sunrise Bridge below Leupp.

Put in a 15,000 gallon steel storage tank, float and float box and 40 ft. of concrete trough. Put the tank and troughs on higher ground 100 ft. north of the well.

Tank, 15,000 gal. steel ---------- $ 450.00
Trough, 60 ft. concrete ---------- 100.00
Float box, concrete ----------
Total --- $ 550.00

#5

5-M-20 Semi-permanent E. C. W. Surface Tank
110 45' x 35 30' 10 7/8"W x 3 7/8" S

Put a masonry core wall the length and height of the water basin as near the upper edge of the tank as possible.

Masonry core wall, 80 cu. yds. @ $6.00 ---------- $ 480.00
Excavation, 500 cu. yds. @ 75¢ ---------- 375.00
Total --- $ 855.00

#4

5-M-44 Temporary E. C. W. Surface Tank
110 30' x 35 15' 4" W x 3 7/8" S

Fence a 60 acre desilting plot on the contributing drainage.

1½ miles fence @ $350 ---------- $ 525.00
Total --- $ 525.00

#3

5-M-46 Temporary E. C. W. Charco
110 30' x 35 15' 14" W x 1/4" S

Fence a 40 acre desilting plot above

1¼ mile fence @ $350.00 per mi. ---------- $ 435.00
Total $ 435.00

#3

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WR 13177

5-M-59 Semi-permanent E. C. W. Surface Tank
110 30' x 35 30' 9 7/8"W x 4 3/4" S

Fence a 100-acre desilting plot above
2¼ miles fence @ $300.00 ---------- $683.00

Total $683.00

5-M-63 Temporary E. C. W. Sharpe
110 45' x 35 45' 3 3/8"W x 16½" S

Put 200 ft. of rock and wire sausage in the spillway.
40 cu. yds. rock and wire sausage @ $4.00 ------ $160.00

Total -- $160.00

5-M-65 Temporary Surface Tank E. C. W. #0-75
110 30' x 35 45' 13½"W x 9 1/8" S

Put silt traps in gullies inside desilting plot. Wire and posts 300 l. ft. at 15¢ per l. ft. ---------- $ 45.00

Total -- $ 45.00

5-M-66 ✓ Temporary Surface Tank E. C. W. #92
110 30' x 35 45' 13" W x 7" S

Fence a 100-acre desilting plot above.
2¼ miles of fence @ 300 dollars ----- ---------- $683.00

Total -- $683.00

5-M-75 Permanent Spring
111 00' x 35 45' 10 5/8"W x 35 3/8" S

Dig out spring and pipe out into a 20 ft. concrete trough.
Estimated cost ---------- $300.00

Total -- $300.00

5-M-80 Temporary Surface Tank E. C. W. #96 C
110 30' x 35 45' 7"W x 13" S

Fence a 40-acre desilting plot on the contributing watershed.
1 mile fence ---------- $350.00

WR 13178

CV-6417-201 NN005099

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Secondary New Developments

5-N-14 Permanent Shallow Dug Well
110 45' x 35 45' 10 3/4"W x 15 3/4" S

Clean out well, put up an 8' ft. windmill, 15,000 gallon steel storage tank, float and float box, and 20 ft. more concrete trough.

Cleaning out well	$ 10.00
8' windmill with steel tower	325.00
15,000 gal. storage tank	450.00
20 ft. concrete trough	60.00
Total	$ 875.00

5-N-22 Temporary E. C. W. charco
111 00' x 35 30' 5¼"W x 2 5/8" S

Deepen bar pit. 6' x 100' x 100' or 2,200 cu. yds. Fence and 80 acre desilting plot above when tank is deepened.

2,200 cu. yds. dirt @ 45¢	$ 990.00
1¼ miles fence @ $350.00	437.00
Total	$1427.00

5-N-26 Temporary E. C. W. charco
111 00' x 35 30' 3/8"W x 6 3/8" S

Deepen barrow pit. 6' x 100' x 100'
Fence an 80 acre desilting plot when tank is deepened.

2,200 cu. yds. @ 45¢	$ 990.00
1¼ miles fence @ $350.00	437.00
Total	$1427.00

5-N-52 Permanent Shallow Dug Well and
Permanent Undeveloped Spring
110 30' x 35 30' 8 5/8"W x 12½" S
Bird Springs

Excavate spring and pipe out into a concrete cistern and trough.

Estimated cost	$300.00

5-N-63 Temporary Surface Tank E. C. W. #98 B
110 30' x 35 45' 9½"W x 9 5/8" S

Fence a 40 acre desilting plot above as soon as this tank is cleaned out.

1¼ miles fence @ $350.00	$ 437.50

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WR 13179

5-[illegible]-71 Temporary Surface Tank
11[illegible] 45' x 35 45' 3 7/8" W x 9½" S
Fence an 8[illegible] acre desilting plot above dam and remove old fences.
1½ miles fence @ $350.00 ———— $525.00

5-[illegible]-76 Temporary Surface Tank E. C. W. #0-79
111 00' x 35 45' 1 3/8"W x 9 3/4" S
Fence an 80 acre desilting plot above.
2¼ miles fence @ $300 per mile ———— $675.00

5-[illegible]-115 Temporary Surface Tank
111 00' x 35 30' 7"W x 10 7/8" S
1 mile fence ———— $350.00

5-[illegible]-128 Permanent Shallow Dug Well
110 45' x 35 30' 6½"W x 15½" S

Storage tank, 15,000 gal. steel ————	$450.00
Windmill with steel tower, 30 ft. ————	325.00
Trough, 20 ft. concrete ————	60.00
Float box, concrete ————	30.00
Total —	$865.00

5-[illegible]-129 Permanent Drilled Well (Proposed)
110 30' x 35 45' 9"W x 12½" S On Polacco Wash
Drill a well and put up a 15,000 gallon steel storage tank, float box, and a 40 ft. concrete trough, and windmill.

Drilling, (Est. 150 ft.) 150 ft. @ $7.00 ————	$1050.00
Tank, 15,000 gal. steel ————	450.00
Float box, concrete ————	30.00
Trough, 40 ft. concrete ————	120.00
Windmill, 14 ft. and steel tower ————	530.00
Total —	$2180.00

5-[illegible]-130 Permanent Drilled Well (Proposed)
110 45' x 35 45' 8" W x 8 7/8" S On Oraibi Wash
Drill a well and put up a 15,000 gal. steel storage tank, 1 14 ft. windmill, steel tower, float box and 40 ft. concrete trough.

Well, Est. 150 ft. @ $7.00 per l. ft. ————	$1050.00
Windmill with steel tower, 14 ft. ————	530.00
Tank, 15,000 gal. steel ————	450.00
Trough, 40 ft. concrete ————	120.00
Float box, concrete ————	30.00
Total —	$2180.00

8a

WR 13180

5-M-132 Permanent Drilled Well (Proposed)
118 00' x 35 30' 6 7/8"W x 4" S

Drill a well, put up a 14 ft. windmill and steel tower, a 15,000 gal. steel storage tank, float box, and 40 ft. concrete trough.

Well, drilling, (Est. 200 ft. @ $7.00	$1400.00
Windmill with steel tower, 14 ft.	530.00
Tank, 15,000 gal. steel	450.00
Trough, 40 ft. concrete	120.00
Float box, concrete	30.00
Total	$2530.00

5-M-133 Permanent Drilled Well (Proposed)
110 30' x 35 30' 13¼"W x 11 3/4" S

Drill a well, put up a windmill, 15,000 gal. steel storage tank, float box, and 40 ft. concrete trough.

Well, drilling, est. 300 ft. @	$2100.00
Windmill with steel tower 18 ft.	530.00
Tank, 15,000 gal. steel	450.00
Trough, 40 ft. concrete	120.00
Float box, concrete	30.00
Total	$3230.00

WR 13181

CV-6417-201 NN005102

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Ultimate New Developments

5-M-15 Permanent Shallow Dug Well
111 00' x 35 45' 2½" W x 13½" S
Deepen well and case off quick sand. Put on hand pump.

Deepening and cribbing	$ 20.00
Hand pump	35.00
Total	$ 55.00

#4

5-M-23 Shallow Dug Well (Dry)
111 00' x 35 30' 7 5/8"W x 1¼" S
Deepen and see if can get water. If there is a good flow of water, build a 20 ft. concrete trough and replace the diaphram pump with a pitcher type pump.

Deepening well, 10 l. ft. @ 2.50	$ 22.50
20 ft. concrete trough	60.00
Hand pump	35.00
Total	$117.50

#5

5-M-69 Temporary Indian Surface Tank
110 45' x 35 45' 8¼"W x 15½" S
Clean out and build up old tank
1500 cu. yds. @ 45¢ = ~~$675.00~~ $400.00
5-M-69A Reservoir

5-M-128 Permanent Shallow Dug Well
110 45' x 35 30' 6¼"W x 15½" S
Put up a 15,000 gal. steel storage tank, 8 ft. windmill, float box and 20 ft. more trough.

Tank, 15,000 gal. steel	$450.00
Windmill and tower, 8 ft.	325.00
Float box, concrete	30.00
Trough, concrete, 20 ft.	60.00
Total	$865.00

#3

5-M-131 Permanent Drilled Well (Proposed)
110 45' x 35 45' 3 7/8"W x 13" S
Drill a well and put up a 14 ft. windmill, steel tower, 15,000 gal. steel storage tank, float box and 40 ft. concrete trough.

Well drilling, est. 100 ft.	$700.00
Windmill with steel tower, 14 ft.	530.00
Tank, 15,000 gal. steel	450.00
Trough, 40 ft., concrete	120.00
Float box, concrete	35.00
Total	$1835.00

#4

WR 13182

5-M-135 Temporary Surface Tank (Proposed)
111 00' x 35 45' 6 3/4"W x 12 3/4" S

Build a tank at this locati n that will hold about 5 acre feet of water. Fence an 80 acre desilting plot.

Dam, 2500 cu. yds. @ 45¢	$1125.00
Fence, 80 acre enclosure, 2 miles fence at $350 -	700.00
Total	$1825.00

5-M-134 Temporary Surface Tank (Proposed)
110 45' x 35 45' 12 7/8"W x 4 7/8" S

Build a dam at this locati n that will hold about 5 acre feet of water. Fence a 100 acre desilting plot above.

Dam, 25 0 cu. yds. @ 45¢	$1125.00
Desilting plot, 80 acre enclosure, 2½ mi. fence @ $300.00	$750.00
Total	$1875.00

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WR 13183

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Proposed New Developments

5-M-129 Permanent Drilled Well
110 30' x 35 45' 9"W x 12½ S
On Polnsea Wash
Drill a well at this location. Put up a windmill, 15,000 gal. storage tank, float box and 40 ft. concrete trough.
Range is fair. Permanent water is needed to insure proper livestock distribution.

5-M-130 Permanent Drilled Well
110 45' x 35 45' 8"W x 8 7/8"
Drill a well and equip the same as 5-M-129.
Range is poor to fair but permanent water is needed here to insure proper livestock distribution.

5-M-131 Permanent Drilled Well
110 45' x 35 45' 3 7/8" S x 13" S
Drill a well and equip the same as 5-M-129.
Range poor. Justification the same as for 5-M-130.

5-M-132 Permanent Drilled Well
111 00' x 35 30' 6 7/8" W x 4" S
Northeast of Grand Falls
Drill a well and equip the same as 5-M-129.
Range fair to good. Permanent water needed to insure proper livestock distribution and range utilization.

5-M-133 Permanent Drilled Well
110 30' x 35 30' 13¼" W x 11 3/4" S
Drill a well and equip the same as 5-M-129
Range good. Justification the same as for 5-M-132.

5-M-134 Temporary Surface Tank
110 45' x 35 45' 12 7/8" W x 4 7/8" S
Build a dam at this location that will hold about 5 acre ft. of water. Fence a 100-acre desilting plot above upon completion of the dam.
Range poor but water needed here to get proper livestock distribution.

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WR 13184

5-W-135 Temporary Surface Tank
111 00' x 35 45' 6 3/4" W x 12 3/4" S

Same as is recommended for 5-W-134.

Range fair to poor. Justification is the same as for 5-W-134.

WR 13185

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Dipping Vats

1 - Sand Springs Dipping Vat
110 45' x 35 15' 10 1/8" W x 2¼" S
60 ft. concrete vat, 2 concrete floored drain pens, 6 wire pens, 1 board chute 150 ft. long, 10' x 20' rock boiler house and boiler, 10' x 20 rock stockman's cabin and three wire shearing pens.
Fix up this well and pump. Close up boiler house.

2 - Tolani Lake Dipping Vat.
110 45' x 35 30' 5 3/8" W x 4¼" S
35 ft. concrete vat, two concrete drain pens, several board pens and chutes leading to vat, one large wire holding pen, 1 large wire receiving pen, 5,000 gal. galv. iron water tank, fire pit and hot water tank.

Several board corrals and chutes leading into a pair of 6-ton American platform scales.

Replace all pinon posts with juniper posts.
Build house around scales and put a lock on them.

3 - Leupp Dipping Vat
110 45' x 35 30'
At Leupp Agency
110 ft. rock and concrete vat which has been partitioned off so that now only 60 ft. of it is being used. 10,000 gal. rock and concrete storage tank, 20 ft. rock and concrete cribbed well, 10' x 20' rock house, 2 concrete floored drain pens, 1 wire pens and 150 ft. of board chute, 1 wire outlet pen. Four post 30 ft. steel windmill tower and pump jack. No windmill. The well is about filled up with rock, boards, etc. which probably were thrown in by the school children.

WR 13186

CV-6417-201 NN005107

LAKE MANAGEMENT UNIT NO. 5
Range Improvement Survey
Dipping Vats

1 - Sand Springs Dipping Vat
110 45' x 35 45' 10 1/8" W x 2¼" S
60 ft. concrete vat, 2 concrete floored drain pens, 6 wire pens, 1 board chute 150 ft. long, 10' x 20' rock boiler house and boiler, 10' x 20 rock stockman's cabin and three wire shearing pens.
Fix up this well and pump. Close up boiler house.

2 - Tolani Lake Dipping Vat.
110 45' x 35 30' 5 3/8" W x 4¼" S
35 ft. concrete vat, two concrete drain pens, several board pens and chutes leading to vat, one large wire holding pen, 1 large wire receiving pen, 5,000 gal. galv. iron water tank, fire pit and hot water tank.

Several board corrals and chutes leading into a pair of 6-ton American platform scales.

Replace all pinon posts with juniper posts.
Build house around scales and put a lock on them.

3 - Leupp Dipping Vat
110 45' x 35 30'
At Leupp Agency
110 ft. rock and concrete vat which has been partitioned off so that now only 60 ft. of it is being used. 10,000 gal. rock and concrete storage tank, 20 ft. rock and concrete cribbed well, 10' x 20' rock house, 2 concrete floored drain pens, 4 wire pens and 150 ft. of board chute, 1 wire outlet pen. Four post 30 ft. steel windmill tower and pump jack. No windmill. The well is about filled up with rock, boards, etc. which probably were thrown in by the school children.

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WR 13187

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Immediate Maintenance for
Dipping Vats.

1 - Sand Springs Dipping Vat
110 45' x 35 45' 10 1/8 "W x 2¼" S
At Dinnehbitoh Trading Post.
Clean out and repair the well and pump. Fix boiler house so that it can be locked up to prevent further damage to the equipment.

Well, cleaning out and repair	
Estimated cost ----------	$25.00
House, repairing roof and replacing doors, etc.	
Estimated cost ----------	30.00
Total ---	$55.00

2 - Tolani Lakes Dipping Vat
110 45' x 35 30' 5 3/8"W x 4½" S
At Red Lake Trading Post
Replace the pinonposts in these corrals with juniper posts. Build a house around the scales to protect them from the weather and trespass.

Posts, 50 8 ft. juniper @ 50¢ each ----------	$25.00
Setting posts ----------	30.00
House, over scales, estimated cost ----------	100.00
Total ---	$155.00

WR 13188

CV-6417-201 NN005109

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Secondary New Developments
for Dipping Vats

3 ---------- Leupp Dipping Vat
110 45' x 35 30'
at Leupp Agency

Move this dipping vat to windmill No. 5-M-19. Put the vat and pens on the high ground 500 ft. north of the windmill. Put up a 5,000 gallon tank at the vat, an engine (2½ H. P.) at the well, and a pipeline from the well to the tank at the vat.

Vat, concrete and corrals) ----------	$1500.00
Tank, 5,000 gallon steel ----------	250.00
Pipe, 1½" galv. 500 ft. @ 32¢ ----------	160.00
Engine, 2½ H. P. ----------	80.00
Pump jack ----------	40.00
Total ----	$2030.00

WR 13189

CV-6417-201 NN005110

LAND MANAGEMENT UNIT NO. 5
Range Improvement Survey
Range Fences

1 - South Reservation Boundary Fence.

Consists of approximately 45 miles of fence. Construction of this fence was started 1933 and 1934. A section of fence from the Little Colorado River east was constructed in 1936. At the present time E. C. W. is constructing 7 miles of fence immediately west of the Little Colorado River. This 7 miles of fence is in very poor condition and badly in need of reconstruction. The structure is a 5-strand fence with juniper posts 20 ft. apart, and two wooden staves between the posts. As soon as the present work is finished this fence should be in good condition and require only minor repairs for the next 10 years.

2 - West Boundary Fence

From the Little Colorado River south. Approximately 24 miles of fence constructed by E. C. W. in 1933 and 1934. This is a five-wire fence and is in poor condition.

The posts are small, crooked; the wire is not properly stretched and the corners and pull-posts poorly braced. There are no stays.

This fence is to be reconstructed by E. C. W. in the near future and if properly re-built should be in good condition for the next 10 years at least except for a few minor repairs.

3 - Canyon Diablo Buck Pasture No. 1

Consists of 8 miles of 5-strand fence built with juniper posts 20 ft. apart and two wooden stays between the posts. The fence is in good condition except for a few minor repairs.

Built by E. C. W. in 1933-34.

4 - Canyon Diablo Buck Pasture No. 2

Consists of 11 miles of 5-strand fence. The north, east and south sides are constructed of juniper posts 20 ft. apart and two wooden stays between the posts, the south fence being the South Reservation Boundary fence and the north fence is the south fence line of Buck Pasture No. 1. The west side is constructed of iron posts 20 feet apart and two wooden stays between.

The south, east and north sides were built by E. C. W. in 1933 and 1934.

WR 13190

CV-6417-201 NN005111

5 - Canyon Diablo Cooperative Area.

From Canyon Diablo Canyon west of Leupp south to Buck Pasture No. 1. $3\frac{1}{2}$ miles of five-strand fence with juniper posts 2[illegible] ft. apart and two wooden stayw between.

Fence in good condition except for minor repairs.

Built by F. C. W. in 1933-34.

6 - Tolani Lake Buck Pasture.

Now under construction by the Soil Conservation Service,; wire and supervision furnished by S. C. S., labor andposts by the Indians.

Will consist of juniper posts 20 feet apart, two wooden stays between and six wires. Carrying capacity of 137 bucks yearlong, or 157 bucks for 320 days.

Eleven miles of fence.

7 - Sam Joe Pasture

Quads 111°00' x 35°15' and 111°00' x 35°30'

1" west on the 35°15' quad line.

$2\frac{1}{4}$ miles of three-strand fence with small juniper posts 25 ft. apart and a few wooden stays in parts of the fence. The fence is in poor condition. Canyon Diablo makes the west boundary of the pasture. The estimated maximum carrying capacity is 41 sheep units or 8 horses yearlong.

A trail has been built down into Canyon Diablo and livestock in the pasture water here when there is water in the Canyon. When there is no water in the Canyon livestock must be taken out to water at the surface tanks No.s 5-M-95 or 5-M-96.

This pasture is used as a horse pasture by Sam Joe when water is available.

WR 13191

CV-6417-201 NN005112

Land Management Unit No. 5

Range Improvement Survey
Tanks in Need of Desilting Plots

5-N-22 Temporary E.C.W charco #5 Kinnebito
111 00' x 35 30' 5½"W x 2 5/8" S
Fence an 80 acre desilting plot above this tank as soon as it is deepened.
1½ miles fence.

5-N-26 ✓ Temporary E. C. W. charco #5
111 00' x 35 30' 3/8"W x 6 3/8" S
Fence an 80 acre desilting plot above as soon as this charco is deepened.
1½ miles fence.

5-N-44 Temporary Surface Tank #3
110 30' x 35 15' 4"W x 3 7/8" S
Fence a 60 acre desilting plot on the contributing drainage.
1½ miles fence

5-N-46 Temporary E. C. W. charco #3
110 30' x 35 15' 14"W x ½" S
Fence a 40 acre desilting plot on the contributing drainage.
1½ miles fence.

5-N-59 Semi-permanent Surface Tank #4 Jeddito
110 30' x 35 30' 9 7/8"W x 4 3/4" S
Fence a 100 acre desilting plot.
2½ miles of fence.

5-N-62 Temporary Surface Tank E. C. W. #98 B #4 Polacca
110 30' x 35 45' 9½"W x 9 5/8" S
Fence a 40 acre desilting plot when this tank is cleaned out.
1½ miles fence.

5-N-66 Temporary Surface Tank E. C. W. #32 #4 Oraibi
110 30' x 35 45' 13"W x 7" S
Fence a 100 acre desilting plot
2½ miles of fence.

5-N-71 Temporary Surface Tank #4 Oraibi
110 45' x 35 45' 3 7/8"W x 9½" S
Fence an 80 acre desilting plot and remove old fences.
1½ miles fence.

WR 13192

CV-6417-201 NN005113

5-H-76 Temporary Surface Tank E. C. W. #0-79
111 00' x 35 45' 1 3/8"W x 9 3/4" S #4 Dinnebito
Fence an 80 acre desilting plot above.
2¼ miles fence.

5-Y-80 Temporary Surface Tank #96 C #4 Polacca
110 30' x 35 45' 7"W x 13" S
Fence a 40 acre desilting plot on the contributing watershed.
1 mile of fence.

5-K-115 Temporary Surface Tank #6
111 00' x 35 30' 7"W x 10 7/8" S
Fence a 40 acre desiltingplot above this tank as soon as it is cleaned out.
1 mile of fence.

5-H-134 Temporary Surface Tank (Proposed) #4 Dinnebito
110 45' x 35 45' 12 7/8"W x 4 7/8" S
A proposed dam site. Upon the completion of this dam fence an100 acre desilting plot above.
2½ miles fence.

5-H-135 Temporary Surface Tank (Proposed) #5 Dinnebito
111 00' x 35 45' 6 3/4"W x 12 3/4" S
As soon asthis tank is built, fence an 80 acre desilting plot
2 miles of fence.

95

WR 13193