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PART ONE - BASIC DATA

I. LAND MANAGEMENT UNIT NO. I

A? INTRODUCTION

The Land Management Survey field work on L.M.U. No. I was started April 1, 1937 and completed May 20, 1937. A brief review of the area was made August 1st to 7th, 1937.

The personnel of the party included:

Sec. of Agronomy, H.M. Ivory,
Agricultural Aide
Sec. of Biology, R. S. Neilson,
Agricultural Aide, Ass't. Chief of Party.

Sec. of Conservation Surveys, R. H. Kerr,
Jr. Soils Technologist

Sec. of Forestry, R. S. Richardson,
Jr. Forester

Sec. of Human Surveys, J. N. Hadley,
Ass't. Soil Conservationist

Sec. of Range Management, D. G. Anderson,
Jr. Range Examiner,
Chief of Party

B. Geographical Features

1. Description

a. Location

Land Management Unit No. 1 is located in the northwestern part of the Reservation and comprises the northwestern part of the western Navajo Jurisdiction. The Unit lies in Cononino County, Arizona, roughly between $110^{\circ}45'$ and $111^{\circ}30'$ west longitude and $36^{\circ}15'$ and $37^{\circ}00'$ north latitude. Only about

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9,000 acres in the east portion of the Unit lie in Navajo Navajo County. Kaibito, Arizona, the Unit headquarters, is located approximately in the geographic center of the Unit. The area within the Unit lying south of the $36^{\circ}45'$ parallel of latitude and east of the $111^{\circ}00'$ meridian of longitude was made Reservation by an Executive Order December 16, 1882. The area west of Kaibito and south of Navajo Canyon became part of the Reservation by an Executive Order May 17, 1884. The remainder of the Unit became Reservation January 8, 1900.

b. Area and Boundaries

The area of the Unit, compiled from Range Management Extensive Grazing Survey and including approved boundary changes, is 1,035,540 acres.

Boundaries of the Unit are as follows:

Beginning on the Colorado River at Lee's Ferry, the Unit is bounded on the west by Echo Cliffs to the Gap trading post; on the south by the north boundary of L.M.U. No. 3 along Crooked Ridge, Red Mesa, Little White Mesa, the Blue Canyon; and the east and north by the west boundaries of L.M. Units 4 and 2, along Black Mesa and White Mesa to Navajo Canyon, and on the North by the south rim of Navajo Canyon and the Colorado River.

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The boundaries of the Unit for the most part are along outstanding topographical features and are easily followed. Exceptions of this occur in two places, between Black Mesa and White Mesa. In these two places the most outstanding topographic features (lakes, springs, rocks, etc.) were used in connection with economic lines used by the Indians themselves.

Boundary Changes

Two boundary changes, both effective, were involved in this Unit. The first excluded the area west of Echo Cliffs and south of Crooked Ridge from the Unit. This area of 485,000 surface acres with 40,000 forage acres and a carrying capacity of 16,000 sheep units yearlong was added to L.M.U. NO. 3. This change was proposed for reasons of usage, topography, and administration.

The second boundary change added to L.M.U. No.1, 256,000 surface acres with 18,000 forage acres and a carrying capacity of 7,200 sheep units yearlong. This change comprised the area around Red Lake, Cow Springs and Black Mesa and was originally in L.M.U. No. 3. Reasons for making the change were primarily usage and ease of administration from Kaibito rather than Tuba City.

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D. HUMAN ACTIVITY

1. Livestock Resources

A. Present Resources

At present, the principal values of the land are as range or watershed. Inasmuch as very little runoff can be expected from a large portion of the area because of the soil, range usage becomes the most important item of consideration. Of the 1,035,540 acres in this Unit, approximately one-eighth is waste or barren land. The remainder is used as range land, including the forest areas, which have a dual purpose.

(1) Carrying Capacity

From the Extensive Grazing Survey of this area in 1935, there are 85,553 forage acres with a carrying capacity of 34,221 sheep units yearlong, or 410,654 sheep months. The carrying capacity was computed using 2-1/2 forage acres requirement per sheep unit yearlong, except in the Buck Pasture where a forage acre requirement of 3 forage acre per sheep unit yearlong, was used.

(2) Seasonal Use and Class of Stock

The area is such that with the development of more water it can be used yearlong. The

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Same time furnish wood and wood products to units immediately joining the area which are lacking in this regard.

(4) GRAZING Value

The grazing value of the woodland stands within the unit is relatively low as compared to the grazing value of other range vegetative types. However, the stands serve a dual usage and furnish not only wood and wood products, but also grazing land. The woodland stands comprise two-fifths of the area and furnish approximately one-fourth of the carrying capacity of the Unit.

(5) WATERSHED AND WILDLIFE VALUE

Watershed value of woodland are relatively low for this Unit. This is due primarily to two reasons: first, the sandy soil produces only a minor run-off and secondly, the stands of woodland, as has been pointed out before, are thin, being able to retain only a slight amount of water on the watershed. One exception to the foregoing statement occurs on Black Mesa. In this area steep slopes, a more dense woodland stand and a clay soil are combined to give the woodland stand a relatively high water shed value. Wildlife value of woodland stands within the area is a negligible factor.

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woodland. In addition to this area, there is a large acreage of other types which have a scattering of trees on them. Included in these 1(9), 4(9), 5D(9) and 71a(9) types, are 74,750 acres, or approximately 7 per cent of the area of the Unit. The total area within the Unit being strictly woodland or with scattered trees is 397,090 acres, or 38.3 per cent of the area.

(3) Available Products

The survey of the Unit showed that there are more than 73,370 posts available for cutting at the present time. There are more posts actually available than this number indicates; however, because of recommended cutting practices, site class and condition of stands, the above figure represents only the posts that should be cut at the present time. In future years on a sustained yield basis more posts will be available. There are more than 33,700 cords of wood. This includes only dead material. Only a few poles on Black Mesa and White Mesa were located during the survey and they were not in large enough quantities to be of economic importance or to enable an estimate of the actual number to be made. Woodland and wood products over the area are adequate to serve the needs of the people within the Unit and at the

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II. SUB-UNITS

Land Management 1 has been divided into five sub-units for the purpose of more clearly defining conditions, ease of administration and collection and interpretation of data. The special division was made through a combined viewpoint of the various branches represented during the survey. Sub-division lines follow natural topographical boundaries wherever possible, economic lines, and lines delimiting certain general division.

A. SUB-UNIT NO. 1

Sub-Unit No. 1 is located in the northwest part of the Unit and is bounded on the north by Navajo Canyon, on the west by Echo Cliffs, on the south by Kila Kai sa ahni, and on the east by the rim west of Bert Tso's windmill. The area of the Sub-Unit is 200,510 surface acres.

Soils in the northern portion of the sub-unit are very shallow and fall into D and E classes of range soils. Large areas of sandstones with only spotted soil accumulations occur. Soils in the southern portion of the sub-unit are of a better grade and fall into A, B, and C classes of range soils. On a whole, the area is sandy with high water penetration and relatively low water-holding capacity. Run-off can be expected for the most part only in the northern portion along sandstone slopes and is not available for agricultural development.

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Range in the northern portion of the sub-unit is relatively low in carrying capacity and is characterized primarily by black-bruch types. Range in the southern portion of the area is of a much better quality and has a relatively high carrying capacity and is characterized by grassland types with high forage acre factors. The carrying capacity of the sub-unit is 5,370 sheep units yearlong and is at present used as winter range because of a lack of permanent water. Rodent damage in the area is slight.

There is at present no farmland found within the unit and no potential farmland is available. The principal reason for this is the lack of run-off on suitable farmland. Where run-off does occur the soil is such that it cannot be farmed.

Woodland resources throughout the sub-unit are more than adequate to care for needs of the people. In the northern portion of the sub-unit there is a lack of woodland stands, most of the woodland appearing in very scattered form. In the southern portion of the sub-unit there are adequate woodland stands of good quality but with a rather sparse crown cover. Many large trees are to be found. There is adequate post and fuel wood supply for the area.

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Wildlife habitat throughout the area is suitable at present for only furbearers, such as coyotes, badgers, bob-cats and skunks and game animals such as antelope and mourning doves.

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Mourning doves and antelope are the only game species to be found within the area and the area is sparsely settled with them. There are two reservoirs which provide suitable resting ground for migratory waterfowl.

B. Sub-Unit II

SubUnit II, or the coppermine Sub-Unit, is located immediately south of the Sub-Unit I and comprises the area lying within land management Unit No. 1 west of Mormon Ridges. The area of the sub-unit is 247,965 surface acres.

Soils of the sub-unit are, as a whole, very sandy with a high water penetration value and relatively low water-holding capacity. There are few rock slopes which furnish enough area for run-off and in no place is there enough rock drainage to allow water to flow out of the sub-unit. Erosion over the area is characterized by active wind erosion. Numerous sand dunes, either active or partially stabilized, are to be found within the area.

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This sub-unit offers one of the largest range resources within the Unit. The area as a whole is relatively high in carrying capacity and is characterized by very palatable species. Carrying capacity for the sub-unit is 9,755 sheep units year-lang. Because of the lack of permanent water, it has been used only as winter range and depletion of the range resources has remained at a minimum, except in the southern portion where there has been more water available. Rodent damage is severe only in the southern portion of the sub-unit.

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At present there are 85 acres of farmland, 70 acres of which are flood-irrigated and 15 acres are dry farm. Because of the low rainfall and uncertain water supply for flood-irrigated farms, and the predominance of wind erosion, this sub-unit is not^{to} be classified as an agricultural area, Active wind erosion is occurring on all present land which is farmed.

Woodland resources in this area are more than adequate to meet the needs of the inhabitants and there are large areas of woodland stands. There is an abundance of posts and fuel wood, within the area but as a whole, they are very scattered through out.

The only game species found in this area are antelope and mourning dove. The larger portion of the herd of antelope grazing within the land Management Unit No. 1 is to be found within this sub-unit.

The bird habitat is not conducive to a large bird population and there are no suitable resting places for migratory waterfowl.

The principal mineral resources of Land Management Unit No.1 are located in this area and include the Coppermine claims.

C. Sub-Unit No. III

Sub-Unit No. III is located in the central portion of the Unit and includes the area around Kaibito, bounded on the

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West by Sub-Unit No's. I and II, on the north by Kaibito Canyon, on the east by White Mesa and on the south by Sub-Unit V, and comprises 111,344 surface acres.

Soils of this sub-unit fall into the better class of range soils, are rather deep throughout with high water penetration value and high water-holding capacity. Erosion over the area is predominantly wind erosion. Active or partially stabilized sand dunes varying from a few inches to several feet deep are to be found throughout the area. Sheet and gully erosion are important only along the steeper slopes of rocky outcrops along White Mesa.

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The area in the western portion of the sub-unit is of relatively high carrying capacity and falls into medium or good range land. Usage on this part of the sub-unit has been primarily as winter range. The area near Kaibito Canyon and Kaibito has been used as yearlong range because of the presence of adequate permanent water and is in a state of bad depletion. Many indicators of over-grazing, such as snakeweed, yellowbrush, annual weeds and grasses, etc. are to be found in this part of the sub-unit. Active wind erosion is more severe in these over-utilized areas.

At present there are 76 acres of farmland within the sub-unit and they fall into the flood irrigated class. There is no potential farmland, due primarily to a lack of water for agricultural purposes where there is agricultural soil.

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Wildlife appearing within the sub-unit is only species typical of the remainder of the area. Bird habitat is not particularly good and there are no suitable resting places for migratory water fowl. Black Mesa furnishes the only suitable habitat for deer and big game.

D. Sub-Unit IV

Sub-Unit IV, or Ste Skizzie, is located in the northern portion of the Unit, is bounded on the north and east by Navajo Canyon, on the south and west by Kaibito Canyon, and on the north by subUnit No. III. It includes 141,341 surface acres. Soils over the central and southern portion of the sub-unit are rather good range soils. In the northern and western portions of the area many rocky out-crops and shallow soil deposits are to be noted. Run-off is to be expected only in the rocky outcrops and in the canyons. Soil for the most part has a high water-holding capacity and a high absorptive value. Erosion is predominantly wind erosion, some areas exhibiting gully erosion, especially in alluvial valley fills.

With the exception of the northern and western portions of the sub-unit the range soils are of the better class and range is of high forage acre factor throughout most of the sub-unit. Carrying capacity is 4,227 sheep units yearlong. Usage in the area has been yearlong with certain areas in the

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Northern and western portion being used only as winter range. Permanent livestock water is lacking within this sub-unit. Rodent damage is very severe in the southern and eastern portion of the area.

Farming resources constitute 59 acres of present farmland and an additional 20 acres of potential farmland, all falling into either flood-irrigated or dry farm. Erosion is moderately severe on farmland. Further development, with the exception of 20 acres, cannot be expected because of the lack of run-off.

Woodland resources are only moderate in this sub-unit. Extensive areas of scattered woodland are to be found with adequate available woodland products for the population. Utilization has not been severe. Insect damage is probably more severe in woodland stands within this sub-unit than in any other place in Land Management Unit No. 1. Leaf-scale is the most important woodland pest and is found in a large area north of White Mesa.

E. Sub-Unit No. V.

Sub-Unit No. V comprises the southeast portion of Land Management Unit No. 1 and is the largest of the sub-units, including the Buck Pastures. The area has been further divided by the Section of Range Management for purposes of livestock distribution. However, the data given here is for the entire sub-unit.

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Soils of the sub-unit are variable. In the north and western portion of the sub-unit soils are medium heavy, and are sandy loam or clay loam with some area exhibiting only soil material. Erosion over the area is likewise varied. The western portion which is characterized by light-textured soil is very susceptible to wind erosion and many active or partially stabilized sand dunes are present. Gully and sheet erosion become the important factor in the central and southern portions of the sub-units. Geological erosion is found on the steeper slopes of Black Mesa where only geological material and soil material are to be found. A large percentage of the agricultural soils in Land Management Unit No. 1 are to be found within this sub-unit. Range soils for the most part are of the better class.

The carrying capacity of the area is relatively low, due primarily to a depletion of palatable range species within the area. Continued use of the range because of adequate permanent water supplies and concentration of population around farming areas and trading posts has resulted in increased wind erosion and depletion of vegetative cover. The area has been used as year-long range with a concentration during the summer months. Utilization has been very severe over many years. Rodent damage to the range has been very severe but during 1934 rodent control work was carried out in a large portion of the area and only light infestations occur at the present time. However, at the

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present time, rodents are on the increase and recommendations for caring for this situation have been considered.

Farming resources in the area comprise 573 acres of present farmland, which includes 20 acres of irrigated land. There are present 305 acres of potential agricultural land, 100 of these being potential irrigated land. The better grade of agricultural soils are to be found in this sub-unit and with the development of the Cow springs Project, agricultural resources can be developed. Rodent damage to agriculture is especially important around Red Lake and Cow Springs.

Woodland resources in the area are limited to the western and southeastern portion of the sub-unit. A large area in the central portion of the sub-unit has no trees at all. Woodland products are adequate for the sub-unit but because of severe over-use, especially from outside individuals coming from other units for their posts and fuel wood, the woodland stands are in a poor condition. Extreme over-use along the slopes of Black Mesa and in the vicinity of Wild Cat Peak was noted.

Bird and game habitat are not suitable over the area, as a whole. Cow Springs lake and Red Lake with a few minor temporary reservoirs furnish the only suitable migratory waterfowl resting places.

The following table graphically represents the resources and conditions to be found within the various sub-units. Under

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Development is of vital importance in regulating range usage and deserves serious consideration in Land Management Plans for the area.

10. Livestock Movements and Distribution

The distribution of livestock over the entire Unit as uniformly as possible, as forage and water resources permit, is essential to proper use of range resources of the area. Further water development and use of temporary water when it is available will aid materially in proper use of range resources and obtain a more even distribution of livestock throughout the area. All concentration of livestock around cultivated areas and around permanent water should be avoided as much as possible for in most instances, these areas are already in a severely depleted condition, in many cases only annual or unpalatable species are present. Long shifts of livestock should be eliminated as nearly as possible. With usage of the range on the yearlong basis, this should eliminate the necessity of long seasonal shifts. For example: it should eliminate Crooked Finger's movement from Antelope Reservoir to Badger Spring. Either one location or the other should be selected as his range and his livestock allowed to remain there yearlong. A movement of stock twice a year, approximately 50 miles, will thus be eliminated. Stock movements from this Unit to surrounding units should be eliminated. Owners that, at present, go from one unit to another should select one or the other unit as their range and stay within whichever they choose.

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