AGRONOMY REPORT

LAND MANAGEMENT UNIT NO.10

WR 6775

AGRONOMY REPORT OF LAND MANAGEMENT UNIT NO. 10

I. General Description of Unit

Land Management Unit No. 10 is located approximately in the center of the Reservation in Apache County, Arizona. It is approximately forty-four miles long north and south and thirty-two miles wide from east to west.

Roughly, the unit lies between the 109°15' and the 110°00' meridians of longitude and the 35°50' and 36°30' parallels of latitude.

The total area of the unit, according to present boundaries, is 799,256 surface acres. With proposed boundary changes the total acreage would be 814,397, or a difference of 15,141 acres additional. This total acreage includes Canyon De Chelly and Frazer Demonstration Area (8690 acres).

Present and proposed boundaries are located on the base map.

II. Boundary Changes

Changes in the boundary as originally set up appear to be desirable in order that the unit may represent as nearly as possible a true land management unit in regard to geographical and physical features and present use.

A. Upper Polacca

Proposed on study of Land Management Unit No. 4 by Study Group "C". 15,011 surface acres taken from unit.

B. Many Farms - 10,071 surface acres additional

C. Agua Sal - 18,846 surface acres additional

D. Sheep Dip Wash - 4,797 surface acres subtracted.

E. Canyon De Chelly - 6,032 surface acres additional - Proposed by Study Group "B" on study of Unit No. 18.

III. Physiography and Drainage

Unit No. 10 includes most of the Chin Lee Valley physiographic sub-province and the western margin of the Defiance Plateau physiographic sub-province.

The main physiographic features are Canyon De Chelly and its tributary canyons on the eastern margin of the unit, Nazlini and Beautiful Valley on the southern, and Black Mountain and Balakai Mesa escarpment on the western margin of the unit.

The principal stream is the Chin Lee Wash, which heads in Canyon De Chelly and the Steep watershed of Nazlini Valley and Black Mountain and flows northward, emptying into the San Juan River. All drainages in the unit are tributaries to the Chin Lee Wash.

IV. Geology, Soils, and Erosion.

A. Geology

The main geological formations in the unit are, namely:

1. De Chelly Sandstone, found in Canyon De Chelly.

2. Chin Lee Formation.

The type locality for this formation is in the Chin Lee Valley. It is composed of shale, sandstone, silt, and limestone.

3. Wingate Formation - Occurs between the Chin Lee Formation and Navajo Sandstone.

4. Navajo Sandstone - Occurs directly above the Wingate Formation in this unit.

5. Carmel Formation - Occurs directly above the Navajo Sandstone. (Dakota Sandstone, Mancos Shale, and Morrison Formation also are found in the Black Mountain country.)

B. Soils

A discussion of soils on this unit should take cue from this discussion of geology because geological formations are the parent material from which the soil is derived. The residual soils are almost identical in color and texture with the geologic formation. Valley fills, though often mixed, frequently show a resemblance to the parent materials.

C. Erosion

Erosion in this unit varies from slight to severe. The Chin Lee Valley proper is relatively free from serious erosion except in localized areas. Beautiful Valley and Black Mountain badlands and potential badlands in valleys on the western rim near Salina and Black Mountain present the most serious erosion condition in the unit.

V. Climate

The elevation ranges from 8,300 feet in the southeastern portion of the unit near Fluted Rock to 5,510 feet at Chin Lee. Balakai Mesa on the west has an elevation of 7,500 feet, while Yale Point

on Black Mountain has an elevation of 7,900 feet.

The slope in the unit is from south to north down the Chin Lee Valley, dropping from 5,510 at Chin Lee to 5,320 at Many Farms.

Prevailing winds are from the southwest.

Precipitation records in the unit are:

Chin Lee	8.75 In.	(1909-1928)
	9.26 "	(1934-1936)
Frazer Demonstration Area	4.99 "	(1935)
Chilchinbito	7.65 "	(1935)
Black Mountain	15 to 18 In.	
Fort Defiance Plateau	20 to 24 In.	

Length of growing season varies from 120 days at Black Mountain to 100 days on the Fort Defiance Plateau and 140 to 150 days in the Chin Lee Valley. Killing frost in Chin Lee Valley occurred on October 17, 1935 and October 7, 1936.

Average Temperature

Southeastern portion on Plateau	- 60+ to -20
Chin Lee	- 100+ to -5
Black Mountain	- 100+ to -20

VI. Ecological Zones

The largest portion of Unit No. 10 is in the upper Sonoran Zone. This would include all the grassland in the Chin Lee Valley and pinon and juniper woodlands under Black Mesa on the east side of the valley above Chin Lee. This amounts to approximately 753,408 surface acres.

All of the yellow pine country from the Sawmill north and west to the woodland types east of Chin Lee Valley is in the Transitional Zone. This includes approximately 45,848 surface acres.

VII. Trading Posts, Schools, Hospitals, Missions, Etc.

A. Trading Posts

There are seven trading posts located in the unit:

1. Nazlini
2. Salina
3. Black Mountain
4. Rough Rock
5. Canyon De Chelly
6. Thunderbird Ranch
7. Frazer

B. Schools

One boarding school at Chin Lee and a day school at Rough Rock are the only educational facilities in the Unit.

C. Hospitals

There is one hospital at Chin Lee with one doctor stationed there.

D. Telephones

Telephones are located at Nazlini, an extension of the Ganado-Sawmill telephone line. Another telephone located at Chin Lee connects directly with Ganado. At the present time, a telephone line is being constructed from Chin Lee to Rough Rock.

E. Population

The largest population concentration in the unit is located in the valley floor of the Chin Lee Valley, extending from Nazlini north to Many Farms. Minor concentrations are found in Canyon De Chelly and in the Salina-Black Mountain region.

F. Roads

The unit is fairly accessible by automobile. Roads are present everywhere, one primary road traversing the length of the unit from Ganado to Chin Lee and continuing down the Chin Lee Valley to Round Rock. Another primary road runs from Chin Lee to Nazlini and from Chin Lee to the Sawmill.

Secondary roads run from Chin Lee to Black Mountain and Salina and from Chin Lee to Rough Rock.

VIII. Livestock Statistics.

There is a total of 40,769 sheep units, according to 1936 dipping records.

27,336 sheep	=	27,336 Sheep Units
3,703 goats	=	3,703 "
672 cows	=	2,688 "
1,403 horses	=	7,015 "

IX. Totals

Total number of acres of agricultural land	3,689
Total number of people	2,196
Total number of consumption groups	294

X. Agricultural Land

The total 3,689 acres of agricultural land is composed of:

3,571 acres Flood Irrigated

118 acres Dry Farm (located on Ft. Defiance Plateau).

There is a total of 475 tracts; 443 of which are Flood Irrigated and 32 are Dry Farm.

WR 6781

In the study of this unit, these tracts were located through the use of aerial photographs and agricultural survey notes made previously. Each tract was numbered and located on the base map.

Farm ownership was obtained in a portion of the unit, but a large number of Navajos were harvesting the pinon crop and were never contacted. Also, due to a lack of time to complete studies, ownership in concentrated areas in the Chin Lee Valley was not obtained.

The largest portion of agricultural land in the unit is located in the Chin Lee Valley. Small tracts, however, are scattered throughout the entire unit. Lesser agricultural concentrations are found near Nazlini on the mountain plateau, and near Black Mountain and Salina Trading Posts. The farms in this locality are located in small valleys below the escarpment of Black Mountain and Balakai Mesa

The total acreage of the unit has been broken down to correspond with population concentrations. These divisions are as follows:

Area	Acres of Agricultural Land A	Population
Chin Lee	1,568	889
Rough Rock	962	341
Black Mountain and Salina	355	336
Nazlini	277	398
Canyon De Chelly and Canyon Del Muerto	527	232
Total	3,689	2,196

Each of these areas has a distinctive type of farm characteristic of the area itself.

A. Chin Lee and Rough Rock Area

Located in the valley floor of the Lower Chin Lee Valley, this type constitutes the best agricultural land in the unit. Water is obtained from headings in the Chin Lee Wash.

The length of the growing season varies from 140 to 150 days. The first killing frost in this area in 1935 was October 7; in 1936, it was October 17.

Annual precipitation will vary from seven to nine inches.

Elevations range from 5,510 feet at Chin Lee to 5,320 feet at Many Farms.

Present crops grown are corn, melons and squash, beans, alfalfa, and peach trees.

In addition to these crops, wheat, oats, and garden vegetables could be grown. Also, potatoes could be grown in this area.

B. Black Mountain and Salina Area

The farms in this area are located in valleys breaking off from Balakai Mesa and Black Mountain. These farms are located usually on the fan end of a wash, and obtain irrigation water from this source.

The elevation is approximately 6,800 feet.

Annual precipitation varies from twelve to fifteen inches.

Length of the growing season is approximately 120 days.

Crops grown at present are corn, beans, melons and squash.

C. Nazlini Area

A large portion of the farms in this area are located on the Ft. Defiance Plateau and are strictly a dry farm type, depending on rain water almost exclusively.

The elevation is approximately 8,000 feet.

Annual precipitation varies from twenty to twenty-four inches.

Length of growing season is approximately 100 days.

Crops grown are potatoes, oats, some alfalfa and corn, and a few melons and squash. Occasional peach and apple orchards also are found.

Potatoes and wheat can be grown to a greater extent than is now being done.

D. Canyon De Chelly and Canyon Del Muerto

Small tracts of agricultural land, varying from one to ten acres in size and located on both sides of the canyon, present a different type from any other farms on the unit.

Water is obtained ordinarily from runoff from overhanging rocks. Some water is obtained from the canyon itself.

Corn, melons and squash, alfalfa, and peach orchards constitute the major portion of crops grown.

XI. Use of Available Water.

The Navajos in this unit are making quite an effort to control flood waters on the farm land by use of borders and dykes. This is

true especially in the Chin Lee Valley where practically all present agricultural land is bordered and handling available water efficiently.

Small tracts scattered throughout the unit not located in the Chin Lee Valley are usually located on the fan end of a wash. No structures are ordinarily found to control this water and it is at present spreading inefficiently over the field, resulting in considerable sheet and gully erosion. Generally speaking, the land is irrigated in the early spring when flood water is available. Some irrigation also is done in late summer months when fall flood water is available from flash storms.

XII. Farming Practices

Farm practices vary from primitive to modern. Ordinarily corn is planted and harvested by hand. However, it is sometimes planted in the plow furrow during the plowing operation.

Alfalfa is planted by hand and cut with mowers and scythes. Crude, Navajo-constructed balers are used in the baling operations. Two horse power hay balers are in use in the unit.

Oats are grown for hay, baled, and used for horse feed.

Beans, melons and squash are planted and harvested by hand.

XIII. Crop Yields

An increase in present crop yields could be brought about by:

1. Making better use of available water.

2. Fall plowing methods to control cutworms and grasshoppers. Also to conserve soil moisture and break up clods. This

operation will also help to prepare a better seed bed in the spring.

3. Strip Cropping as a check where wind erosion is severe.

4. Crop rotation to maintain fertility of the soil and control crop diseases.

5. Use of improved seed varieties.

Crop	Present Yield per Acre	Expected Yield per Acre (Through use of above methods)
Corn	15 Bushels	20 Bushels
Wheat	12 "	15 "
Beans	175 Pounds	250 Pounds
Melons and Squash	1,500 "	2,000 "
Oat Hay	4,000 "	5,000 "
Alfalfa Hay	3,000 "	4,000 "
Potatoes	2,000 "	4,000 "
Peaches	200 Bushels	250 Bushels

XIV. Crop Pests

Rodents, grasshoppers, cutworms, and army worms are injuring crops on practically all cultivated areas.

In the Chin Lee Valley, extending from Beautiful Valley north to Many Farms, is located a badly weed infested area. At present some tracts of agricultural land in this area have been completely abandoned because of weed infestation. The worse offender is Night Shade (Solanum spp.)

Russian Knapweed (Centaurea repens) is also found in alfalfa fields near Chin Lee. This weed pest was probably introduced in unclean alfalfa seed.

Whorled Milkweed is also found in a few alfalfa fields near Chin Lee. The weed is cut with the alfalfa and put up as hay. Later it is fed to livestock, causing numerous fatalities.

These weed pests are all perennials and very hard to eradicate.

It is recommended that a weed control project be started in this area as soon as possible.

XV. Subjugation

Of the total 3,689 acres of agricultural land in the unit, it is recommended that 396 acres be subjugated at an average acre cost of $25.20 or a total cost of $9980.00.

This low figure was due to the fact that practically all land in the Chin Lee Valley is bordered at the present time and needs no subjugation treatment.

XVI. Potential Land

800 Acres Potential Land. This is a new irrigation project at Nazlini.

425 Acres Expansion to land already in cultivation.

21,500 acres located in the Chin Lee Valley. This acreage is not recommended. It is merely stated that there is this amount of land available. A final acreage figure will be determined by further soil and water investigations.

XVII. Summary

A. Agricultural land in Unit No. 10 involves 26,414 acres, broken down as follows:

1. Cultivated Land

a. Cultivated land now in use for agricultural production — 3,214 acres

b. Cultivated land not in crop this past year — 475 acres

B. Potential Land

1. New Irrigation Project at Nazlini, Ariz. — 800 acres

2. Expansion to land at present in cultivation — 425 acres

3. Land located in the Chin Lee Valley — 21,500*acres

C. Subjugation

396 acres or approximately ten percent of land now in cultivation is recommended for subjugation.

Average cost of $25.20 per acre or a total of $9980.00

D. Crops

71.18%	of	present	land	cropped	to	Corn
5.4 %	"	"	"	"	"	Alfalfa
2.2 %	"	"	"	"	"	Peach orchards
5.2 %	"	"	"	"	"	Melons and Squash
1.6 %	"	"	"	"	"	Beans
1.03%	"	"	"	"	"	Oats
.41%	"	"	"	"	"	Potatoes
.08%	"	"	"	"	"	Wheat
12.8 %	Not Planted this past year.					

E. Average per Capita

1.6 Acres of Agricultural Land per Capita.

12.5 Acres of Agricultural Land per Consumption Group.

F. Climate

Annual precipitation varies from nine to twenty inches.

Length of growing season varies from 100 to 140 days.

Attached is a legend of Land Classification, Chart used for estimating cost of agricultural development, Percentage of land now in cultivation and various crops grown, yield data and total production for the unit, and definitions of various terms used.

Submitted: A. J. Webber.

A. J. Webber,
Junior Agronomist.

Approved:

John O. Woods,
Chief Agronomist.

WR 6789

YIELD DATA FOR UNIT NO. 10

I. Nazlini

	- Yield	Acreage	Total Production
Melons & Squash	= 1700 lbs.	12	= 20,400 lbs.
Oats	= 2 Tons Oat Hay	34	= 68 Tons
Alfalfa	= 1½ Tons Hay	9	= 13.5 Tons
Corn	= 16 Bu.	151	= 2416 Bu.
Potatoes	= 2000 lbs.	9	= 27,000 lbs.
Wheat	= 12 bu.	3	= 36 bu.
Beans	= 145 lbs.	3	= 435 lbs.
Peaches	= 3 bu. per tree		
	= 100 trees per A.	6	= 1800 bu.

II. Chin Lee

	Yield	Acreage	Total Production
Corn	= 15 bu.	1057	= 15,885 bu.
Melons & Squash	= 1500 lbs.	71	= 106,500 lbs.
Alfalfa	= 1½ Tons	135	= 202.5 Tons
Beans	= 200 lbs.	29	= 5800 lbs.
Oats	= 1½ Tons Oat Hay	4	= 6 Tons
Peach & Apple Orchard	= 2 bu. per tree		
	= 100 trees per A.	8	= 1600 bu.
Potatoes	= 2000 lbs.	6	= 12,000 lbs.

III. Rough Rock

	Yield	Acreage	Total Production
Corn	= 15 bu.	763	= 11,445 bu.
Melons & Squash	= 1500 lbs.	35	= 52,500 lbs.
Alfalfa	= 1½ Tons	2	= 3 Tons
Beans	= 200 lbs.	17	= 3400 lbs.

IV. Black Mountain & Salina

	Yield	Acreage	Total Production
Corn	= 11 bu.	301	= 3311 bu.
Melons & Squash	= 1000 lbs.	22	= 22,000 lbs.
Beans	= 150 lbs.	10	= 1500 lbs.

WR 6790

V. Canyon De Chelly

	Yield	Acreage	Total Production
Corn	= 15 bu.	354	= 5310 bu.
Melons & Squash	= 1500 lbs.	52	= 78,000 lbs.
Alfalfa	= 1½ Tons	53	= 79.5 Tons
Peaches	= 3 bu. per tree = 100 trees per A.	68	= 20,400 bu.

Total Production for Unit No. 10

Corn	= 38,337 bu.	
Melons & Squash	= 279,400 lbs.	
Alfalfa	= 298.5 Tons	
Beans	= 11,135 lbs.	
Oat Hay	= 74 Tons	
Peaches & Apples	= 23,800 bu.	
Potatoes	= 39,000 lbs.	= 195 Tons
Wheat	= 36 bu.	

WR 6791

TABLE USED FOR CONVERTING YIELD DATA OBTAINED
FROM NAVAJOS TO POUNDS AND BUSHELS.

CORN

	Shelled Corn	=	56 lbs. to bushel
	Ear Corn	=	72 " " "
1 Load	Husked Corn	=	14 bu.
1 Double Load	" "	=	26 "
1 Gunny Sack	Shelled Corn	=	2 "
1 Seamless Sack	" "	=	2½"
150 Ears	Husked Corn	=	1 "

BEANS

	Shelled	=	55 lbs. to bu.
1 Gunny Sack	"	=	100 " " "
1 Seamless Sack	"	=	150 " " "
1 Load	In Pod = 400 lbs.	=	240 " of beans (Shelled)
1 Sack	In Pod	=	35 "

SQUASH

	Average squash	= 8 lbs.
1 Load of squash		= 100 squash or 800 lbs.

ALFALFA

1 Load	Alfalfa	= 500 lbs.
1 Bale	Alfalfa	= 60 "

OATS

1 Load	Oats (Hay)	= 330 lbs.
1 Bale	Oat Hay	= 40 "

POTATOES

1 Sack	Potatoes	= 100 lbs.

WHEAT

1 Sack	Wheat	= 100 lbs.

Single Wagon box = 14" side boards
Double " " = 26" " "
Standard " " = 10'x3'x14" (Shelled Corn 1" in depth = 2 bu.)

WR 6792

ACREAGE OF VARIOUS CROPS GROWN IN LAND MANAGEMENT UNIT NO. 10

Quad. No.	Corn	Alfalfa	Melons & Squash	Beans	Peach Orchards	Oats	Potatoes	Wheat	Not Farmed	Total
12	142		11	6					16	175
23	976	2	47	25					193	1,243
25	424	53	55	2	72	2	11		5	624
26	36	4	4	1	6	2			8	61
27	7	5				30	4	3		49
46	3									3
51	319	135	60	21	4	4			225	1,268
52	68		4						22	94
56	151		11	4					6	172
TOTAL	2,626	199	192	59	82	38	15	3	475	3,689

WR 6793

TOTAL AGRICULTURAL LAND IN LAND MANAGEMENT UNIT NO. 10

	Flood Irrigated					Dry Farm				Potential		Total Pres. & Potential Land
	A	B	C	Tracts	Total	A	B	Tracts	Total	Flood	Dry	
Quad. 12 109°45'x 36°15'	108	67		37	175					93		268
Quad. 23 109°30'x 36°30'	1,157	83	3	68	1,243					21,500*		21,500* 1,243
Quad. 25 109°15'x 36°15'	569			99	569	44	11	10	55	8	45	677
Quad. 26 109°15'x 36°00'	46	1		18	47	8	6	4	14	800	2	863
Quad. 27 109°00'x 36°00'						49		12	49		28	77
Quad. 46 109°15'x 36°30'	3			2	3							3
Quad. 51 109°30'x 36°15'	1,151	95	22	118	1,268					285		1,553
Quad. 52 109°30'x 36°00'	39	55		28	94					25		119
Quad. 56 109°45'x 36°00'	89	83		20	172					14		186
TOTAL	3,162	384	25	390	3,571	101	17	32	118	1,225 21,500*	75	4,989 21,500*

*Total land available in Chin Lee Valley.
Final Acreage to be determined pending further Soil & Water Studies.

WR 6.73.4

TOTAL ACREAGE OF AGRICULTURAL LAND FOR LAND MANAGEMENT UNIT NO. 10

	Flood Irrigated					Dry Farm			
	Class A	Class B	Class C	Total Flood	Total Flood Potential	Class A	Class B	Total Dry	Potential Dry
Nazlini	110	71	10	191	1065	69	17	86	35
Chin Lee	1386	135	15	1536	53	32	0	32	40
Rough Rock	942	20	0	962	21,500*	0	0	0	0
Black Mountain & Salina	197	158	0	355	107	0	0	0	0
Canyon De Chelly	527	0	0	527	0	0	0	0	0
TOTALS	3162	384	25	3571	1225 21,500*	101	17	118	75

* Total land in Chin Lee Valley - Final Figure pending further Soil & Water Studies.

ACREAGE AND PERCENTAGE OF VARIOUS CROPS GROWN IN UNIT NO. 10

AREA	Total Acreage & % of Total	Corn Acreage	Alfalfa Acreage	Peach Orchard Acreage	Melons & Squash Acreage	Beans Acreage	Oats Acreage	Potatoes Acreage	Wheat Acreage	% Not Farmed	No. of Tracts
Nazlini Area	277	151	9	6	12	3	34	9	3	50	82
	7.6%	54.5%	3.2%	2.2%	4.3%	1.1%	12.2%	3.2%	1.1%	18.2%	
Chin Lee Area	1568	1057	135	8	71	29	4	6	0	258	142
	42.6%	67.4%	8.6%	.5%	4.5%	1.8%	.3%	.4%	0	16.5%	
Rough Rock Area	962	763	2	0	35	17	0	0	0	145	105
	26.2%	79.3%	.2%	0	3.6%	1.8%	0	0	0	15.1%	
Black Mountain & Salina Area	355	301	0	0	22	10	0	0	0	22	59
	9.3%	84.8%	0	0	6.2%	2.8%	0	0	0	6.2%	
Canyon De Chelly	527	354	53	68	52	0	0	0	0	0	87
	14.3%	67.2%	10.1%	12.9%	9.8%	0	0	0	0	0	
Total For Unit No. 10	3689	2626	199	82	192	59	38	15	3	475	475
	100%	71.18%	5.4%	2.2%	5.2%	1.6%	1.03%	.41%	.08%	12.8%	

TOTAL ACREAGE AND CROP ACREAGE FOR AREAS IN LAND MANAGEMENT UNIT NO. 10

	Nazlini	Chin Lee	Rough Rock	Black Mtn. & Salina	Canyon De Chelly	Total
A Flood	110	1,386	942	197	527	3,162
B Flood	71	135	20	158	0	384
C Flood	10	15	0	0	0	25
Total Flood	191	1,536	962	355	527	3,571
Total Flood Potential	1,065	53	21,500*	107	0	
A Dry	69	32	0	0	0	101
B Dry	17	0	0	0	0	17
Total Dry	86	32	0	0	0	118
Total Dry Potential	35	40	0	0	0	75
Corn	151	1,057	763	301	354	2,626
Melons & Squash	12	71	35	22	52	192
Alfalfa	9	135	2	0	53	199
Beans	3	29	17	10	0	59
Oats	34	4	0	0	0	38
Peach & Apple Orchards	6	8	0	0	68	82
Wheat	3	0	0	0	0	3
Potatoes	9	6	0	0	0	15
Not Farmed	50	258	145	22	0	475

TOTAL POTENTIAL 1,225
21,500*

TOTAL AGRICULTURAL LAND 3,689

*Total land available in Chin Lee Valley.
Final Acreage to be determined pending further Soil & Water Studies.

WR 6797

TABLE FOR CALCULATING COST OF SUBJUGATION

Slope	Leveling Only	Leveling and Bordering	
		Flood	Irrigated
Less than 1%	0 to 6	8 to 12	8 to 10
1%	6 to 10	14 to 20	14 to 18
2%		20 to 30	18 to 25
3%		30 to 45	25 to 40
4%		40 to 60	35 to 50
5%		50 to 75	40 to 70

WR 6798

FLOOD IRRIGATION

Grade of Agricultural Land

A - B - C and Grass land as classified by Agronomist on Agricultural Land Survey.

A - Grade

1. Will be confined to the following soil textures: Fine sand, very fine sand, fine sandy loam, and loam.

2. Will not contain more than .2% alkali.

3. Water must be available for satisfactory growing of tilled crops. (Note all areas where watershed area is large in proportion to cultivated area, for engineering survey.)

4. Must not have over 3% slope for above mentioned soil textures.

B - Grade

1. Will be confined to soil textures included in Grade A, land plus silt loam and clay loam textures.

2. Will not contain more than .4% alkali.

3. Adequate water available under normal conditions.

4. Slope not over 5%.

C - Grade

Not recommended for Agricultural purposes.

1. Slope too steep or irregular considering type of soil and alkali condition.

2. Presence of over .6% alkali.

3. Excessive erosion conditions.

4. Lack of available water.

5. Deficient drainage.

WR 6799

IRRIGATED LAND

Existing Projects

A - Grade

1. Will be confined to the following soil textures: Fine sand, very fine sand, fine sandy loam and loam.

2. Must have adequate water supply for growing any crop.

B - Grade

1. Will be confined to soils with silt loam and clay loam textures, in addition to soil textures included in Grade A land.

2. Must have adequate water for production of two cuttings of alfalfa.

C - Grade

Not recommended for agricultural purposes.

1. Slope too steep or irregular.

2. Presence of over .4% alkali.

3. Excessive erosion.

4. Lack of available water.

5. Deficient drainage.

Note: The amount of white alkali will not exceed .4% of any irrigable land. Over .05% black alkali automatically excludes any land from project. Coarse sand, stony land, and shallow soil will be considered as non-irrigable land.

WR 6800

DRY FARMING

A - Grade

1. Will be confined to soils with fine sand, very fine sand, and fine sandy loam textures, when the slope does not exceed 5% and up to soils with loam and silt loam textures, when the slope does not exceed 2%.

2. Adequate seasonal rainfall for the growth of beans and corn.

B - Grade

1. Will include any dry farms which are not classed as A grade, and which would not be recommended to take out of production because of excessive erosion.

WR 6801

POTENTIAL LAND

Grade A and B

Specifications for Grades A and B under this heading are the same as for flood irrigated land.

Grade C

1. Will include only soils with loam, silt loam, and clay loam textures.

2. Area must be large enough to use probable water supply or such as to economically justify control of excess water.

3. Slope must not exceed 3% and preferably not exceed 2%.

WR 6802

IRRIGATED LAND (Available water supply continuous or nearly so).

Proposed Areas (Under consideration at present)

A - Grade

1. Will be confined to soils with fine sand, very fine sand, fine sandy loam, and loam textures when slope does not exceed 5%, and up to soils with silt loam and clay loam textures when slope is not more than 3%.

2. Must have adequate water supply.

3. Must be easily put under ditch.

4. No leveling allowed for this class.

B - Grade

1. Will be confined to silt loam and clay loam soils.

2. An uncertain water supply would justify placing soils of fine sand, very fine sand, fine sandy loam, and loam textures in this grade.

3. A slight amount of leveling is permissible.

C - Grade

Not recommended for agricultural purposes.

1. Slope too steep or irregular.

2. Presence of over .4% alkali.

3. Excessive erosion.

4. Lack of available water.

5. Deficient drainage.

WR 6803

EXPLANATION OF TERMS FOR LAND MANAGEMENT STUDY

Tract No. — Each tract or farm is numbered on the quadrangle. The study will use these numbers as permanent in reference to location of a farm under consideration. In referring to tract, refer to number on quadrangle.

Acres — Number of acres of tract as measured by the agronomist in the agricultural survey.

Topography — The surface conditions of a location or locality listed as follows: Slope, roughness or smoothness of land surface. Terms used: Even, rolling and per cent slope.

Soil — Soil texture graduated into light, medium, heavy.

Alkali — Amounts and Kinds. Determined by soil laboratory tests where necessary, as indicated by salt, tolerant plants and surface deposits of alkali.

Erosion — The extent of erosion: Gully or sheet caused by wind or water. Classification: Slight, moderate, severe.

Water — Surface water available for crop production. Classification: Sufficient, insufficient.

Expansion — The possibilities of expanding present land to take in additional adjacent land for crop production.

Yields — Past yields of crops obtained by field estimates.

Crops — Crops that have been grown on tract in the past.

Treatment — Recommended soil and water conservation practices that have been proven effective, such as borders, dikes, terraces, furrows, and other land management features.

Costs — Estimated cost per acre of leveling and bordering land with Indian labor and teams.

Contour Furrow — A single furrow plowed on contour.

Border — Two or more furrows thrown together to confine water to a restricted area.

Terrace — A long mound of earth thrown up against the slope of the land, using dirt below to construct border above.

WR 6804

Bench Terracing	A series of steps constructed across the slope on steep land forming benches which are level both ways and can be watered by means of flooding from ditches.
Dike	An enlarged border used for protection.
Basin	An area of land surrounded by borders.
Remarks:	Will include type of land, irrigated, flood irrigated, and dry farming. Potential land will appear under expansion.

WR 6805