

**RESOLUTION OF THE
WHITE MOUNTAIN APACHE TRIBE OF THE
FORT APACHE INDIAN RESERVATION**

WHEREAS, the Tribal Council recognizes the need of repair and major maintenance on existing irrigation structures on the Fort Apache Reservation in order to serve the tribal members for subsistence farming, and

WHEREAS, the Superintendent, Fort Apache Agency has prepared and submitted a proposed irrigation rehabilitation program to the Tribal Council

THEREFORE BE IT RESOLVED by the Tribal Council of the White Mountain Apache Tribe that the proposed irrigation repair and major maintenance program be approved as submitted, and scheduled to proceed as income and available funds of the White Mountain Apache Tribe will permit, such funds to be budgeted in the regular tribal budgets.

The foregoing Resolution was on January 7, 1957 duly adopted by a vote of 9 for and 0 against by the Tribal Council of the White Mountain Apache Tribe pursuant to authority vested in it by Article VI, Section 1 (e) & (n) of the Constitution and By-Laws of the Tribe ratified by the Tribe on August 15, 1938 and approved by the Secretary of the Interior on August 26, 1938 pursuant to Section 16 of the Act of June 18, 1934 (48 Stat. 984).

Clinton Kesson
Chairman of the Tribal Council

Mary C. Enfield
Secretary of the Tribal Council

Resume of Irrigation work Completed during FY 1955-1957 on Fort Apache
 Forestdale Project, Whiteriver Project and Glesson Creek Project

Irrigation activities on the Fort Apache Reservation during Fiscal Years 1955, 1956 and 1957 have been accelerated by liberal appropriations for operation, Maintenance and Rehabilitation of irrigation systems. A good portion of this work was in construction of silt and flood control structures affecting irrigation canals.

The active irrigation system on this reservation comprises 46.59 miles of canals and 47 diversions, many of which are in extremely rough terrain and rapid and difficult streams to control which make maintenance very expensive. The tracts of land are quite small and many along the streams totaling 1,334.79 acres of irrigated land.

Following is a tabulation of irrigation work completed during Fiscal Years 1955, 1956 and 1957:

Miles of existing canals rehabilitated --- 13 3/4 mi.
 Miles of new canals constructed ----- .2 miles

Major Structures Constructed and Rehabilitated

1. Flumes	9	
2. Diversions	2	
3. Silt and flood control structures	11	6,051.9 cu. yds.
4. Over and undershots	4	
5. Silt traps, drops & culverts	2	
6. Headgate	1	
7. Sluice	2	

Minor Structures Repaired

1. Flumes	39
2. Turnout gates	10
3. Over and undershots	2
4. Culvert	1
5. Road	2 miles

Indian Water Rights

Photographs and soil surveys were completed on all irrigated cropland not previously surveyed, approximately 420 acres were covered by these surveys. Photographs of diversions, inlets and outlets and of the farm lands were taken in compiling the reports.

Irrigation engineers measured all live streams contributing water for irrigation, they also measured ditch flow and conveyance losses of all flowing ditches and canals and estimated the flow on ditches and canals not in operation. Map scales were checked on every project surveyed pertaining to water rights.

RESUME OF WORK TO BE DONE DURING
FISCAL YEARS 1947, 1948 AND 1949

A. Diamond Creek

1. Diamond Creek #1 - 21.23 Acres

- (a) Repair diversion and head wall.
- (b) Clean main canal and repair locks in canal.
- (c) Repair one flume 40' of 24" flume.
- (d) Install one turnout.

2. Diamond Creek #2 (with above)

- (a) Repair diversion.
- (b) Install sluice gate.
- (c) Realign main canal.
- (d) Clean main canal.
- (e) Replace head gate.

B. North Fork, White River

1. Post Office - 29.65 Acres

- (a) Repair diversion.
- (b) Clean main canal.
- (c) Place one 10' 24" overshot.
- (d) Realign 600' of main canal.
- (e) Repair one turnout.

2. Airport - 19.34 Acres

- (a) Repair diversion.
- (b) Clean main canal.

3. Lake - 27.70 Acres

- (a) Clean main canal.
- (b) Realign a 200' section of main canal.
- (c) Replace 60' of 18" flume and replace main girders.
- (d) Repair one flume complete 24" 40'.

4. Beaver Dam - 6.69 Acres

- (a) Realign main canal.
- (b) Repair diversion.
- (c) Install main headgate, 24".
- (d) Clean main canal.

5. Alchessay - 25.38 Acres

- (a) Repair diversion.
- (b) Repair and clean main canal.
- (c) Install main headgate.

6. John Burke - 25 Acres

- (a) Repair diversion.
- (b) Clean canal.
- (c) Repair 40' of 13" flume and trestle.
- (d) Realign main canal.

7. A-2 - 19.42 Acres

- (a) Repair diversion.
- (b) Clean main canal.

8. Power House - 170.17 Acres

- (a) Replace wooden diversion.
- (b) Repair two 40' 13" flumes and trestles at lower end of canal.
- (c) See write up on Whiteriver project.

9. Orchard Pump - 6.52 Acres

- (a) Repair catch basin.
- (b) Clean main ditch line.

C. East Fork

1. P-5 - 40 Acres

- (a) Repair diversion.
- (b) Clean main canal.
- (c) Place one 24" 10' overshot.

2. Baha - 9 Acres

- (a) Repair diversion.
- (b) Clean main canal.
- (c) Repair one 10' 24" overshot.
- (d) Construct flood protective structures.

3. Fire Box Canyon - 6 Acres

- (a) Repair diversion.
- (b) Repair one 20' 18" flume and trestle.
- (c) Clean main ditch line.

4. Y-1 - 9 Acres
 - (a) Repair relocate diversion.
 - (b) Clean main canal.
5. Geronimo Cave - 37.33 Acres
 - (a) Repair diversion.
 - (b) Replace all 24" metal flume.
 - (c) Repair one 18" 40' flume and trestle.
 - (d) Clean main canal.
6. Y-31 -
 - (a) Repair and relocate diversion.
 - (b) Clean main canal.
7. Lily - 12 Acres
 - (a) Construct main head gate.
 - (b) Repair diversion.
 - (c) Clean main canal.
8. A-11 - 28.24 Acres
 - (a) Repair diversion.
 - (b) Repair one 24" 40' flume.
 - (c) Clean main canal.
9. Lavelere
 - (a) Repair diversion.
 - (b) Repair headgate.
 - (c) Clean main ditch line.
10. T-5
 - (a) Repair diversion.
 - (b) Clean short section of main canal.
11. B-7 - 32.55 Acres
 - (a) Repair diversion.
 - (b) Rebuild 40' of 24" metal flume.
 - (c) Clean main canal.
 - (d) Construct 2 protective diversions.
12. John Bigelow - 6 Acres
 - (a) Repair diversion.
 - (b) Clean main canal.

13. New Mission - 22.97 Acres
 - (a) Repair diversion.
 - (b) Repair and replace two 24" metal flumes.
 - (c) Clean main canal.
14. Old Mission - 10.32 Acres
 - (a) Repair diversion.
 - (b) Repair one 24" flume.
 - (c) Replace 24" metal flume on 2 flumes.
 - (d) Realign lower extension of main canal.
 - (e) Clean main canal.
15. Velasquez - 126.09 Acres
 - (a) Repair diversion.
 - (b) Repair and replace 24" metal flume on two flumes.
 - (c) Construct four 24" overshots.
 - (d) Clean main canal.
16. Fort Apache - 113.39 Acres
 - (a) Repair diversion.
 - (b) Clean canal.
 - (c) Replace 24" metal flume on 9 flumes and minor trestle repairs.
 - (d) Install flash flood protection structures from flash floods.
17. School Diversion #1 - 107.32 Acres
 - (a) Repair diversion.
 - (b) Install two 10" turnout gates.
 - (c) Clean main canal.
18. School Diversion #2 - 12 Acres
 - (a) Repair diversion.
 - (b) Repair one 20' 36" overshoot.
 - (c) Clean canal.
19. Orchard Diversion - 3 Acres
 - (a) Repair diversion.
 - (b) Realign canal and extend.
 - (c) Clean canal.

D. Whiteriver

1. Butcher Project - 10 Acres

- (a) Reorganize pump sump.
- (b) Place a 24" headgate.

2. Canyon Day Main Canal - 101.6 Acres

- (a) Realign sections of main canal.

3. West Canyon Day - 16.01 Acres

- (a) Repair diversion.
- (b) Repair two 12" 40' flumes.
- (c) Clean main canal.

4. Charles Shipp - 13.26 Acres

- (a) Repair diversion.
- (b) Clean main canal.

E. Cedar Creek

1. Mc Canyon - 29.05 Acres

- (a) Repair diversion.
- (b) Clean and realign main canal.

2. Middle Cedar - 40.19 Acres

- (a) Repair diversion.
- (b) Repair one 24" 180' flume and trestle.
- (c) Clean main canal.
- (d) Repair thirty 12" metal flumes.

F. Corduroy

1. Stockman's - 20 Acres

- (a) Repair diversion.
- (b) Clean canal.
- (c) Construct flash flood protection structures.

G. Carrizo

1. East Blue Springs - 45 Acres

- (a) Repair diversion.
- (b) Repair main canal.
- (c) Clean main canal.

2. West Blue Springs - 30 Acres

- (a) Repair diversion.
- (b) Clean main canal.

H. Gibbons

1. White Springs - 29 Acres

- (a) Repair diversion.
- (b) Clean main canal.

2. V-23 - 61.83 Acres

- (a) Repair diversion.
- (b) Reorganize main canal.

3. Philip Ewin - 11.14 Acres

- (a) Rebuild and repair diversion.
- (b) Repair and clean main canal.

4. Scott Kelly - 34 Acres

- (a) Repair diversion.
- (b) Repair one 24" 15' overshot.
- (c) Clean main canal.

5. Gibbons Farm - 290.87 Acres

- (a) Repair diversion.
- (b) Minor repairs on five 24" flumes.
- (c) Clean sections of main canal.

6. Merrill - 103.20 Acres

- (a) Repair diversion.
- (b) Clean and repair lower section of main canal.
- (c) Repair four 18" metal flumes.

7. V-19 - 45.93 Acres

- (a) Repair diversion.
- (b) Install headgate.
- (c) Repair one 12" metal flume.
- (d) Clean main canal.

8. Steelman - 111.19

- (a) Repair diversion.
- (b) Repair four 18" metal flumes.
- (c) Clean sections of main canal.

FORESTDALE IRRIGATION PROJECT

Area Surveyed:

The Forestdale Project area is located in the north central portion of the reservation in SW $\frac{1}{4}$ Sec. 25, NW $\frac{1}{4}$ Sec. 36 and NE $\frac{1}{4}$ Sec. 35, Township 9N Range 21E. The area is situated 3 miles below the Mogollon Rim and is in a rough dissected margin of the rim. This project is located 1 mile due east of Forestdale, Arizona, 8 miles south of Show Low, Arizona on U. S. Highway 60. There are 235 acres in this alluvial flat along both sides of Forestdale Canyon. Sixty of these acres located at the northern most point on the project were surveyed for irrigation.

Physiography:

This area slopes from both sides of Forestdale Canyon towards the wash. At this location, Forestdale Canyon is very shallow, ranging in depths from 12 feet at the upper end to two feet at the lower end of the project. It is broken on the east side of the wash by a side canyon which is not very deep where it enters the flat. The rest of the alluvial plain is relatively free of severe cuts. Most of the soil in the area is composed of fine sand and silt underlaid by a rather coarse permeable gravel mixed with light clay. Geologically the materials have been deposited in a heterogeneous manner, principally from the Coconino, Kiabab and Cretaceous formations which consist of sandstone, limestone and shales. The elevation at the Forestdale weather station is 6,100 feet above sea level.

Climate:

Forestdale occurs in the timber belt area which has mild summers and not too severe winters. The precipitation in the area averages about 12". Of the data available, a 3-year average, 1952-1954, is 18.6". Over an eight year period, the extremes in temperature are 98° F. coming in July and -12° in December. The average frost free season, 32° F., is about 115 days. The last spring frost comes in May and as late as June, and early fall frost hits about September 13 to October 11. Winds are quite severe but of short duration from December through May. The damaging winds occur mostly during the month of May. The average annual temperature is approximately 49° F.

Soils:

All the soils of the area, sedimentary in origin, coming from the Forestdale Canyon and the tributaries. The soil profile in the project area are mostly sandy in nature. Surface texture varies from a fine sandy loam to silt loam being gray in color. Subsoil is rather well defined as coarse sands mixed with light clay and cobble. The profile throughout is gray. Most of the surface soils are very susceptible to wind and water erosion and precaution should be exercised in cropping the land.

The purpose of this survey is to determine the feasibility of developing temporary and permanent irrigated pastures.

Project:

A more complete survey, soil grid study, etc., has to be made before further work on the project can proceed.

Proposed for the project:

1. Lined irrigation canal from source to fields.
2. A storage reservoir just below well.
3. Pumping plant at a cost of approximately \$5,000.00

WHITERIVER IRRIGATION PROJECT

The lands of the proposed Whiteriver Project are presently not irrigated. However, approximately two-hundred acres or more are dry farmed, using only natural precipitation for the source of moisture. The Apache Indian village of Canyon Day is located in the southern part of the area. The lands are covered with a good grass sod, excepting the areas occupied by dry farms. The area lies between elevation 5,000 and 5,200. The annual precipitation is approximately 18 inches. The precipitation in July and August averages 3 inches each month. The climate is pleasant, with mild winters and mild summers. Irrigated lands in the vicinity of the project produce alfalfa, corn, other grains, apples, pears, peaches and other fruits. The quality of the fruits is excellent. However, no packing facilities are available and only minor quantities of the fruit are shipped out from the area. Some crops, such as corn are produced with little or no irrigation in average years. The irrigation system proposed in the report will save 3,249 acres of the Whiteriver Project.

The soils of the proposed project are part of a broad alluvial fan. The area is well drained and no drainage problems are anticipated. A semi-detailed soil survey of the project area delineated 92 acres as Class I land suitable for cultivation without special practices; 1737 acres as Class II land suitable for cultivation with simple practices; 1677 acres as Class III land suitable for cultivation with complex or intensive practices; and 131 acres as Class IV land not suited for general cropping, but well suited for the production of orchards and pastures.

The water supply for the proposed development will be diverted from the North Fork of White River in the vicinity of Whiteriver, the headquarters for the Fort Apache Reservation. The quality of water for irrigation is excellent. Based on a peak delivery rate requirement of one cubic foot for sixty acres, the maximum diversion rate for the irrigation system will be 54.2 cubic feet per second. Based on an annual diversion rate of five-acre feet per acre, the annual requirement of the project will be 16,245 acre feet. From available records covering the period 1931 to 1951, it has been calculated that the maximum annual shortage of irrigation water would have been 21 per cent, and the average shortage for the period would have been 3.2 per cent. This shortage could be completely eliminated by construction of storage facilities in the amount of 3,500 acre feet. While the present construction program does not include construction of storage facilities, several storage sites are available---one of which could be developed at a sufficiently low cost to justify its construction to eliminate the estimated shortage.

The rights to divert or store water for irrigation of Indian-owned lands on the Fort Apache Reservation have not been covered by court decree.

The proposed plan of development will consist of replacement of the existing timber diversion dam and slight enlargement of the existing canal which were constructed in 1923 to supply a hydroelectric power plant at Whiteriver; the extension of this canal to the Canyon Day Flat; the construction of three pumping plants; and the construction of distributory laterals to deliver water to the cultivated areas. The carrying capacity of the main canal will be 55 cubic feet per second.

Cost to complete the construction of the project based on 1954 prices is 363,420. The average cost per acre will be 226.00. Financial analysis of the proposed project shows it to be economically justified because \$1.60 in measurable direct benefits would accrue to the nation for each dollar spent to realize these benefits. Financial analysis also indicates that repayment of the project costs could be realized within the normal repayment period of 40 years, following a 10-year development period.

Ref: Whiteriver Irrigation Project, Fort Apache Reservation, Arizona,
Area of Indian Affairs, Phoenix Area Office, January 20, 1955
By: R. H. Rupkey, Civil Engineer, Phoenix Area Office
John C. Walker, Soils Scientist, Phoenix Area Office
J. I. James, Agricultural Economist, Gallup Area Office,
Irrigation--Branch of Land Operations

GLEASON FLAT IRRIGATION PROJECT

The lands of the proposed Gleason Flat Project are presently not irrigated. Gleason Flat lies on the north side of the Salt River in the extreme southwest corner of the Fort Apache Indian Reservation. The lands proposed for cultivation total approximately 388 acres and lie between elevations 2300 and 2924. Prehistoric pueblo-type ruins on the project area indicate previous cultivation of the lands.

The area is a plain sloping south by southwest, broken by local washes, old river channels and low benches occurring intermittently throughout the area. The entire area is made up of water-laid sediments, part of which is recent in origin and part consisting of ancient alluvium and colluvial material. The area lying adjacent to the river and in the first bottom terrace consists of recently deposited beds of sand overlaid with finer material left by the river. The second terrace deposits consist of light substratum materials overlain with silts and fine sands. The higher lying soils are made up chiefly of sands mixed with gravel and cobble throughout the soil profile.

No drainage problem is anticipated. The normal water surface in the river is more than ten feet lower than the lowest cultivated land will be when subjugated.

A semi-detailed soil survey of the area delineated 388 acres as suitable for cultivation without special practices; 190 acres as Class II land suitable for cultivation with simple practices; 93 acres as Class III land suitable for cultivation with complex or intensive practices; and 57 acres as Class IV land not suited for general cropping, but well suited for the production of orchards and pastures.

The water supply for the proposed development will be diverted from Salt River by pumping at a site within one-fourth mile from the irrigable lands. A granite outcropping at the river bank will make an excellent site for the pumping plant. The river flow is permanently against the upper portion of this outcropping, and a shallow cut through a low rock ledge will result in a permanent flow through the pump intake structure. The quality of the water for irrigation purposes is good.

Based on a peak delivery rate requirement of one cubic foot per second for forty acres, the maximum diversion rate will be 10 cubic feet per second. Based on an annual diversion rate of six acre feet per acre, the annual requirement will be 2328 acre feet. The minimum known discharge of Salt River was 42 cubic feet per second in 1911, with an average discharge of 900 cubic feet per second. It is quite certain that there would not be a shortage of water for this project at any time.

The rights to divert water for irrigation of Indian-owned lands on the Fort Apache Reservation have not been covered by court decree.

The proposed plan of development will consist of construction of a pumping plant on the right bank of Salt River; a 24-inch concrete pipeline approximately 3000 feet long; a 16-inch pipeline approximately 5000 feet long; a sprinkler system to serve approximately 30 acres of land which lies higher than the concrete pipelines; and approximately 4000 feet of earth ditch. The capacity of the river pumping plant and the 24" pipeline will be 10 cubic feet per second.

An alternative source of water would be wells. However, the ground water supply has not yet been proven. A river pumping plant is therefore assumed for this report.

The cost to construct the Gleason Flat Project based on 1954 prices is \$99,500. The average cost per acre will be \$257. Financial analysis shows that the development of the proposed project is economically justified because \$1.07 in measurable direct cost benefits would accrue to the nation for each dollar required to realize these benefits. Financial analysis also indicates that repayment of project costs could be realized within a repayment period of 62 years, following a 10-year development period.

While the production of high quality fruit seems to offer a good opportunity for farm operators on the proposed Gleason Flat Project, it is believed that the most advantageous use of the project at the beginning would be for improvement of the livestock economy of the area. The crops grown would be alfalfa, grain and certain pasture mixtures. Suitable climate and soils are available for production of good crops, with yields of alfalfa hay averaging 3-1/2 or 4 tons per acre.

As time goes on, specialty crops such as apples, pears, peaches and other fruits, and summer vegetables may be produced in commercial quantities. All of these crops produce well in the area.

Ref: Gleason Flat Project, Fort Apache Reservation, Arizona, Bureau of Indian Affairs, Phoenix Area Office, January 27, 1955
By: R. H. Ruppke, Civil Engineer, Phoenix Area Office
John C. Walker, Soils Scientist, Phoenix Area Office
J. I. Barnes, Agricultural Economist, Gallup Area Office
Irrigation--Branch of Land Operations