RECORDS AND STATISTICS

# WORK REPORT

## CONSERVATION SURVEY

## NASCHITI IRRIGATION PROJECT

## AREA NO. 2

SURVEY-J.P. Bewley
Associate Soil Scientist

REPORT-H.F.Johnson
Jr. Soil Surveyor

1938

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U. S. DEPARTMENT OF AGRICULTURE

SOIL CONSERVATION SERVICE

SOUTHWEST REGION

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NAVAJO DISTRICT

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Approved:

R. H. Lovald, Head, Section
of Conservation Surveys

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The Kaschiti Irrigation Project No. 2 is located 3 miles northeast of Drollet's Trading Post in Land Management Unit No. 14. It embraces an area of approximately 640 acres, on which a conservation survey was made to determine the soil characteristics and the extent and severity of erosion, as a basis for recommendations regarding agricultural uses and limitations and erosion control.

The area includes 2 gently-sloping alluvial valleys which converge near its center. The surrounding uplands are nonirrigable because of topography and lack of soil cover. The topography of the valley land is hummocky as a result of sheet and wind erosion, but the area can be subjugated. A well defined gully enters the north valley from the west and fans near the eastern boundary. Several small irrigated plots are located on this fan.

It is proposed that water be diverted from 3 washes on to a saccaton flat approximately 2 miles long for desilting purposes, then to a storage reservoir in the north tributary. From the reservoir irrigation water will be delivered through a canal to the north valley.

The approximate annual precipitation is 9 inches, the elevation  feet and the average growing season 150 days. Strong southwesterly winds prevailing throughout a large portion of the year are the dominant erosion agent.

Information regarding the quality of the water supply is inadequate. Analysis of run-off from a local storm shows a high



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content of calcium sodium bicarbonate; however, spring run-off will be of better quality.

The soils are of recent alluvial origin and are derived from shales and sandstones, with the exception of several small areas of shallow residual soil and rough stony land. They are classified on the basis of surface texture and profile characteristics into 9 types, which are grouped and briefly described in 3 land classes. A record of the laboratory analyses follows the summary.

Group A soils were not encountered in the survey.

Group B soils are recommended for irrigation. A total of 180 acres, all lying in the north tributary and the valley east of the junction, have been classified as Group B soils.

Subjugation and cultivation will increase moisture penetration and eliminate the small "slick spots" which were caused by erosion of the friable topsoil and exposure of heavier-textured and slightly-dispersed subsoil. The water-holding capacity of the soils of this group, with the exception of the Oraibi loamy sand, is moderate. Mixing of clay and sand strata in the Oraibi loamy sand as a result of subjugation and cultivation will tend to increase the water-holding capacity.

Annuals, mainly Russian thistle (salsola pestifer), constitute the dominant vegetative cover. Scattered browse such as chamise (atriplex canescens) and small areas of sacaton grass (sporobolus airoides) are also present. Corn, melons, alfalfa, small grains and related crops are adapted to these soils.



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Alkali does not occur in harmful quantities. Adequate subdrainage is provided by the gully bisecting the proposed farm area, which penetrates the sandy subsoil. In the event that a waterlogged condition develops, an open-drain ditch along the low escarpment in the north-central part of the valley should relieve the condition.

The entire group is affected by varying degrees of wind erosion, but removal from deep, slightly-developed profiles is not serious. The deeper hummocks may cause some difficulty in subjugation.

Windbreaks should be planted to protect sandy loam and loamy sand types proposed for subjugation.

The cropping plan should be designed to prevent wind erosion.

Group C soils are poor or of doubtful quality for irrigation. Those soils, occupying 195 acres, lie almost wholly in the south tributary.

Moisture penetration is slow in the exposed "slick spot" areas because of the relatively high content of dispersed clay. The relatively heavy-textured soils common to this group have a high water-holding capacity.

Sacaton is the dominant vegetation on these soils. Crops recommended for Group B soils can be grown on C soils; however, lower yields should be expected.

White alkali is not present in harmful quantities, but there are small quantities of black alkali. If the irrigation water contains excessive quantities of the harmful salts the condition



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will be aggravated.

These soils are not so well drained as those of Group B, and drainage may become a problem if the land is irrigated.

Surplus water should be used to irrigate grassland areas, to increase hay production.

Response to reseeding on "slick spot" areas will be slow.

Group D soils are represented by the Bisti series, and are considered nonirrigable.

Excessive sheet erosion over a large portion of the area; the occurrence of an impervious parent shale at shallow depths, which restricts subdrainage; and a high alkali content prohibit use of these soils for agricultural purposes.

The barren areas, characterized by a fluffy or puffed condition, have a high soluble-salt content, and should be avoided in the construction of irrigation canals because of danger of increasing the salt content of the water by solution from these areas.

SUMMARY

The quality of the water supply is not known but it should be satisfactory if carefully used.

Group B soils occupy 168 acres and are recommended for irrigation. Corn, melons, alfalfa, small grains and related crops are recommended. Protection from wind erosion is essential.

Group C soils occupy 195 acres and are considered doubtful as croplands; however, alkali-tolerant grasses may be successfully



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irrigated and should prove productive. Excessive irrigation of these soils will result in waterlogging.

Group D soils are nonirrigable. The irrigation system should be designed to avoid the barren "fluffy" spots in order to avoid contamination of the water.



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ANALYSIS OF SOIL SAMPLES - MARCHITI IRRIGATION PROJECT #2
Collected by Bewley & Adair

| Lab. No. | Field No. | Soil Type | Depth | % Total Salts | P.P.M. $Na_2CO_3$ | % Sand | % Silt | % Clay | % Disp. |
|---|---|---|---|---|---|---|---|---|---|
| 2154 | 1A | 59.16 | 0-12 | .41 | 63 | 59.9 | 11.0 | 29.1 | 19.2 |
| 2155 | 2A | 12 | 12-24 | .38 | T | 55.3 | 14.7 | 30.0 | 37.2 |
| 2156 | 3A | | 24-36 | .51 | T | 52.4 | 15.8 | 31.8 | 35.1 |
| 2157 | 4A | | 36-48 | .23 | 63 | 64.9 | 12.3 | 22.3 | 67.4 |
| 2158 | 5A | | 48-60 | .19 | T | 64.8 | 13.2 | 22.0 | 70.5 |
| 2159 | 6A | | 60-72 | .19 | T | 48.3 | 23.0 | 22.7 | 81.5 |
| 2160 | 7A | 13 66.7 | | .14 | T | 49.3 | 30.6 | 20.2 | 15.0 |
| 2161 | 8A | ? | | 1.11 | 0 | 17.7 | 22.5 | 60.0 | 97.4 |
| 2162 | 9A | 15 59.18 | 0-10 | .15 | T | 47.0 | 18.5 | 34.8 | 19.5 |
| 2163 | 10A | | 10-24 | .12 | T | 54.1 | 12.8 | 33.1 | 26.8 |
| 2164 | 11A | | 24-36 | .15 | 84 | 58.8 | 11.0 | 30.2 | 37.3 |
| 2165 | 12A | | 36-48 | .19 | 0 | 48.1 | 14.4 | 37.5 | 14.1 |
| 2166 | 13A | | 48-60 | .28 | T | 55.9 | 12.4 | 31.7 | 23.1 |
| 2167 | 14A | | 60-72 | .19 | 42 | 61.5 | 7.6 | 30.9 | 19.5 |
| 2168 | 15A | 59.16 | 0-12 | .15 | T | 61.2 | 12.7 | 28.1 | 7.5 |
| 2169 | 16A | 12 | 12-24 | .12 | T | 65.1 | 28.5 | 26.6 | 12.6 |
| 2170 | 17A | | 24-36 | .15 | T | 54.8 | 10.4 | 34.8 | 23.3 |
| 2171 | 18A | | 36-48 | .17 | T | 52.5 | 13.0 | 34.5 | 22.4 |
| 2172 | 19A | | 48-60 | .33 | 0 | 52.4 | 13.6 | 34.0 | 15.4 |
| 2173 | 20A | | 60-72 | .19 | T | 61.2 | 11.0 | 27.8 | 19.2 |
| 2343 | 21 | 84.5 | 0-12 | .05 | 0 | 84.0 | 3.9 | 12.1 | 8.6 |
| 2344 | 22 | | 12-24 | .05 | 0 | 86.2 | 2.7 | 11.1 | 14.0 |
| 2345 | 23 | | 24-36 | .14 | 0 | 80.6 | 5.7 | 13.7 | 5.7 |
| 2346 | 24 | | 36-42 | .14 | 0 | 73.9 | 8.0 | 18.1 | 5.9 |



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| Lab. No. | Field No. | Soil Type | Depth | % Total Salts | P.P.M. $MgCO_3$ | % Sand | % Silt | % Clay | % Disp. |
|---|---|---|---|---|---|---|---|---|---|
| 2347 | 25 | SL. 65.7 | SL. 0-12 | .14 | T | 79.1 | 16.5 | 14.6 | 10.9 |
| 2348 | 26 | | SL. 12-24 | .10 | T | 68.6 | 13.1 | 18.3 | 8.7 |
| 2349 | 27 | | C 24-36 | .14 | M | 44.9 | 17.4 | 37.7 | 30.9 |
| 2350 | 28 | | C 36-48 | .38 | T | 28.2 | 22.6 | 49.2 | 28.4 |
| 2351 | 29 | | C 48-60 | .31 | O | 46.1 | 13.5 | 40.4 | 23.4 |
| 2352 | 30 | | SC 60-72 | .21 | M | 54.2 | 11.4 | 34.4 | 11.9 |



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Collected by Johnson & Gamlowies

| Lab. No. | Field No. | Soil Type | Depth | % Total Salts | P.P.M. $MgCO_3$ | % Sand | % Silt | % Clay | % Disp. |
|---|---|---|---|---|---|---|---|---|---|
| 2448 | 2101431A | 65.7 L.S. | 0-12 | .09 | 0 | 85.0 | 5.4 | 9.6 | 25.8 |
| 2449 | 31B | 4 SC | 12-24 | .26 | 0 | 53.7 | 15.2 | 31.1 | 13.8 |
| 2450 | 31C | SC | 24-36 | .2 | 0 | 53.6 | 12.0 | 34.4 | 8.6 |
| 2451 | 31D | SC | 36-54 | .18 | 0 | 51.2 | 12.5 | 36.3 | 28.5 |
| 2452 | 31E | SC | 54-72 | .21 | 0 | 54.3 | 11.3 | 34.4 | 21.1 |
| 2453 | 2101432A | 64.5 L.S. | 0-12 | .11 | 0 | 61.9 | 5.6 | 12.6 | 19.7 |
| 2454 | 32B | SL | 12-24 | .14 | 0 | 63.4 | 21.3 | 15.3 | 10.1 |
| 2455 | 32C | SCL | 24-36 | .14 | 0 | 56.8 | 13.9 | 24.3 | 15.5 |
| 2456 | 2101433A | 64.5 S | 0-12 | .02 | 0 | 86.2 | 2.9 | 10.9 | 21.8 |
| 2457 | 33B | 1 SL | 12-24 | .08 | T | 78.6 | 9.6 | 11.8 | 48.6 |
| 2458 | 33C | C | 24-36 | .26 | 0 | 45.5 | 20.9 | 33.6 | 14.0 |
| 2459 | 2101434A | 65.12 SCL | 0-12 | .13 | 0 | 59.3 | 16.0 | 24.7 | 15.5 |
| 2460 | 34B | 12 SCL | 12-24 | .14 | 0 | 62.1 | 11.9 | 26.0 | 12.9 |
| 2461 | 34C | SC | 24-36 | .17 | 0 | 56.8 | 8.5 | 34.7 | 14.0 |

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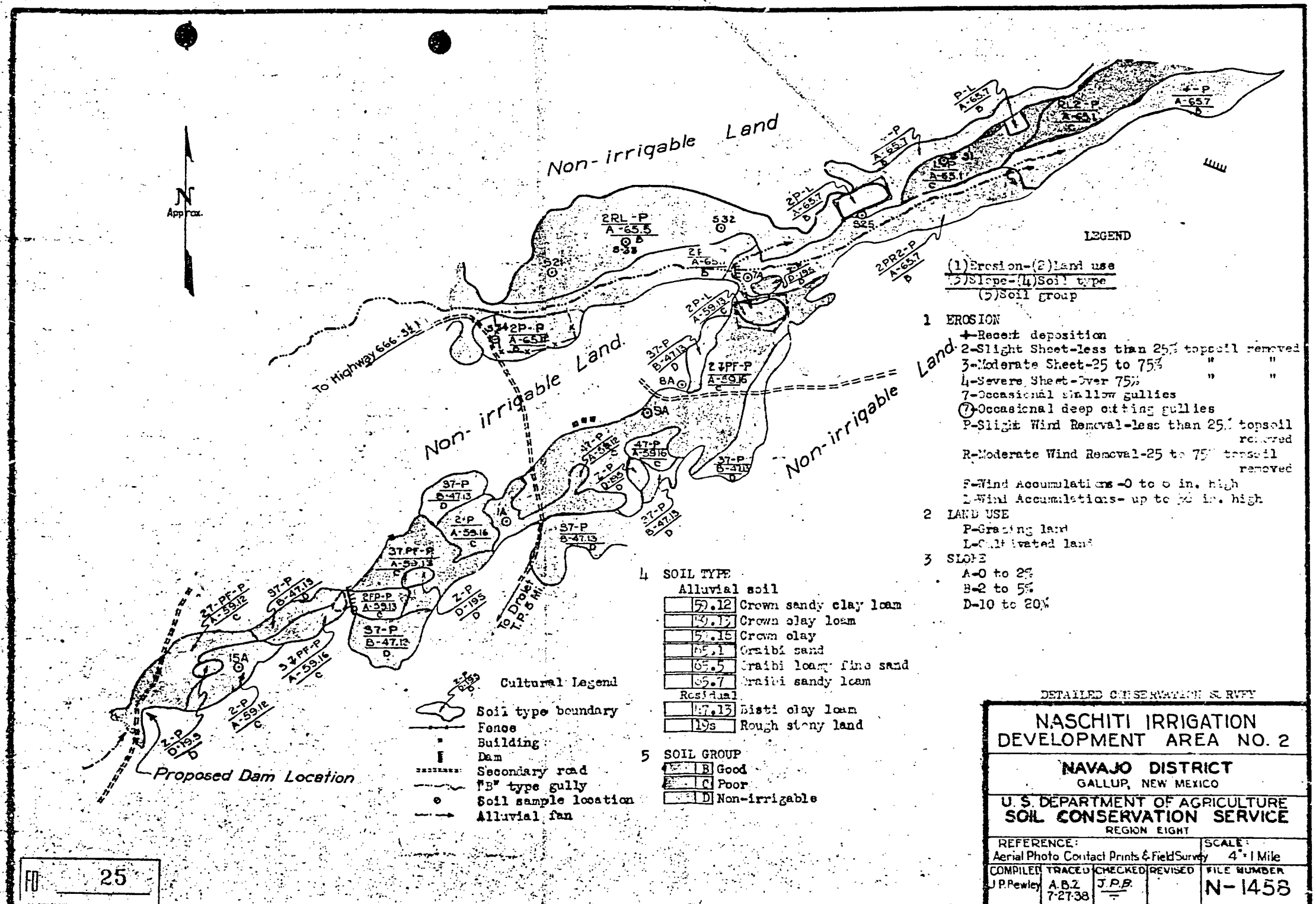


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