

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

NOYES CANAL, MENARD COUNTY, TEXAS
SEEPAGE INVESTIGATIONS, MAY 19-20 AND JULY 2, 1953

by

Ivan D. Yost

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Prepared in cooperation with the Texas
State Board of Water Engineers

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UNITED STATES
DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY
Surface Water Branch
1602 W. Beauregard
San Angelo, Tex.

Noyes Canal, Menard County, Texas
Seepage Investigations, May 19-20 and July 2, 1953

At the request of the U. S. Department of Agriculture, Soil Conservation Service, and the Menard Irrigation Company, a seepage investigation was made on Noyes Canal (Menard Irrigation Company Canal) in Menard County, Texas, from the headgates of the canal to where the canal empties back into the San Saba River.

On May 19-20, 1953, two U. S. Geological Survey engineers, accompanied by personnel from the U. S. Soil Conservation Service, made a series of discharge measurements along the entire length of the canal. A flow of 17.07 cfs was measured just above the headgates of the canal, and the series of discharge measurements indicated a net loss of 8.08 cfs in the canal (See Table 1). To substantiate these data and to obtain data for lower flows, another series of discharge measurements was made on July 2, 1953. A flow of 8.45 cfs was measured just above the headgates of the canal, and this series of discharge measurements indicated a net loss of 2.91 cfs in the canal (See Table 2).

Noyes Canal is supplied by gravity flow from the San Saba River, with the headgates of the canal located just above a low dam in the river about 4-1/2 miles west of Menard, Menard County, Texas. The canal is an open ditch, 9.7 miles long, following the contours down the river valley

in a general easterly direction and emptying back into the San Sara River about 4-1/2 miles east of Menard. The canal has an average fall of about 6 ft per mile as determined from the SCS plan-profile of the canal. Throughout its length, there are large trees in the banks and immediately adjacent to the canal. Therefore, large seepage and transpiration losses can be expected, together with some loss from evaporation. Several individuals living in the area have stated that when the flow of the canal is shut off for a week or more, many of the shallow wells in the area go dry.

The U. S. Geological Survey, in cooperation with the Texas Board of Water Engineers, has maintained a gaging station on Noyes Canal at Menard, Texas, and collected records of the flow of the canal since March 1924. The table shown below indicates the average monthly and annual discharges in cubic-feet-per-second for the period of record ending Sept. 30, 1952.

Oct.	Nov.	Dec.	Jan.	Feb.	Mar.	Apr.	May	June	July	Aug.	Sept.	Annual
11.9	14.1	16.3	11.9	9.90	15.6	16.6	16.3	15.4	17.9	16.1	12.7	14.6

In making the seepage investigation, the canal was divided into four sections; the two sections above the U. S. Geological Survey gage in Menard were measured on May 19, and the two sections below the gage were measured on May 20. Four to seven discharge measurements of the flow of the canal were made in each section, with measurements made at the same locations at the beginning and end of each section in order to obtain comparable data. The attached map indicates the location of each measurement. Arrangements had been made with the Menard Irrigation Company to maintain

a constant flow for the period May 18-20, and the record of the canal gage in town indicated that this had been fairly well accomplished. Table 1 shows the date each series of measurements was made, the location of the measurements, the measured discharge in cubic-feet-per-second at each location, and the loss in each section. The discharge measurements indicate that the flow of the canal fluctuated considerably. It appears that there were several surges of flow passing down the canal during the period of the investigation. This is partly explained by the possible fluctuation caused by transpiration and evaporation both in the river above the headgates as well as in the canal itself. Also, it was later learned that the irrigation company's ditchrider had cleaned out several obstructions in the canal during the period of the investigation, which would cause surges of flow to progress down the canal.

In order to substantiate the results of May 19-20 and to obtain data at a lower flow, another investigation was made on July 2. For this investigation, discharge measurements were made at six locations in the canal. The locations of these measurements together with the results are indicated in Table 2. The same fluctuation occurred during this series of measurements as was experienced during the initial investigation.

As was expected, when the flow in the canal is above that which is experienced most of the time, the losses are considerably higher. The first investigation, May 19-20, was made when the flow was well above normal and indicated a net loss of 47 percent with respect to the initial flow in the canal. The second investigation, July 2, was made when the flow was near normal and indicated a net loss of 34 percent with respect to

the initial flow. This difference is probably explained by the fact that the deposition of silt in the canal over a period of years has produced to some extent a sealing effect through the normal range of flow.

It would be difficult to obtain highly consistent results considering the conditions that exist in the canal and in the river above the canal. In order to obtain results that would indicate exact losses, it would be necessary to follow a fluctuation of flow and make discharge measurements through the same phase of the fluctuation as it progressed downstream. However, the results as obtained indicate fairly well the loss in each section of the canal taken separately.

A map of Menard Irrigation Company Canal is attached showing location of gaging stations at Menard and location of each measurement of discharge made during the seepage investigations.

IVAN D. YOST
Hydraulic Engineer
October 1, 1953

Table 1.--Measurements of discharge of Noyes Canal at
Menard, Tex., May 19, 20, 1953.

Date & Time	SCS station numbers, feet	Measured discharge, in cfs	Loss in section in cfs
May 19, 1953 (10 a.m.)	-40*	17.07	
	1,750	16.35	
	3,523	16.76	
	5,276	16.08	
	7,794	16.35	
	9,443	16.07	
	11,233	15.76	
May 19, 1953 (5:30 p.m.)	12,680	14.54	2.53
May 19, 1953 (9 a.m.)	12,680	16.24	
	13,790	15.79	
	15,818	15.09	
	18,980	15.60	
	20,642	15.02	
	21,693	13.82	
May 19, 1953 (3 p.m.)	24,560	14.55	1.69
May 20, 1953 (3 a.m.)	24,560	14.29	
	26,520	14.13	
	29,660	13.63	
	34,384	13.24	
	37,936	13.09	
May 20, 1953 (2:30 p.m.)	39,582	12.45	**1.54
May 20, 1953 (9 a.m.)	39,582	13.65	
	42,000	12.88	
	45,062	12.65	
	48,883	11.65	
May 20, 1953 (1 p.m.)	50,715	11.38	2.27
TOTAL LOSS			**8.33
CREDIT			.25
NET LOSS			8.08

* Station zero on Soil Conservation Service stationing is canal head-gates. See accompanying map.

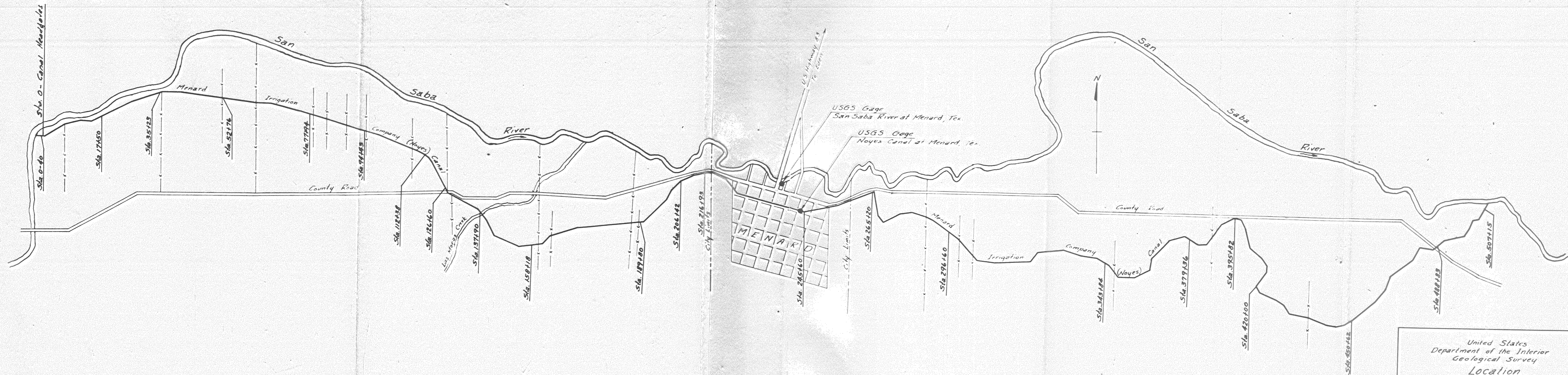
** Estimated 0.25 cfs leakage loss through diversion gates included in this figure.

Table 2.--Measurements of discharge of Hoyer Canal
at Menard, Tex., July 2, 1953.

Date	SCS station numbers, feet	Measured discharge, in cfs	Loss in section in cfs
July 2, 1953	-40*	8.45	
	12,138	8.15	
	24,560	8.52	
	39,582	6.80	
	(50,000)	** .54	2.91
	50,715	0.00	

* Station zero on Soil Conservation Service stationing in canal head gates. See accompanying map.

** All flow being diverted into field.



United States
Department of the Interior
Geological Survey
Location
of
Menard Irrigation Company Canal
(Noyes Canal at Menard, Tex.)
Prepared from U.S. Soil Conservation Service
Plan-Profile dated 1949.
Prepared by: I.D.V. April, 1952
Scale in Thousands of Feet.