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13030 GLM
Quarterly Progress Report

Quality and Quantity of Return Flow as Influenced by Trickle and Surface Irrigation

July, August and September 1973

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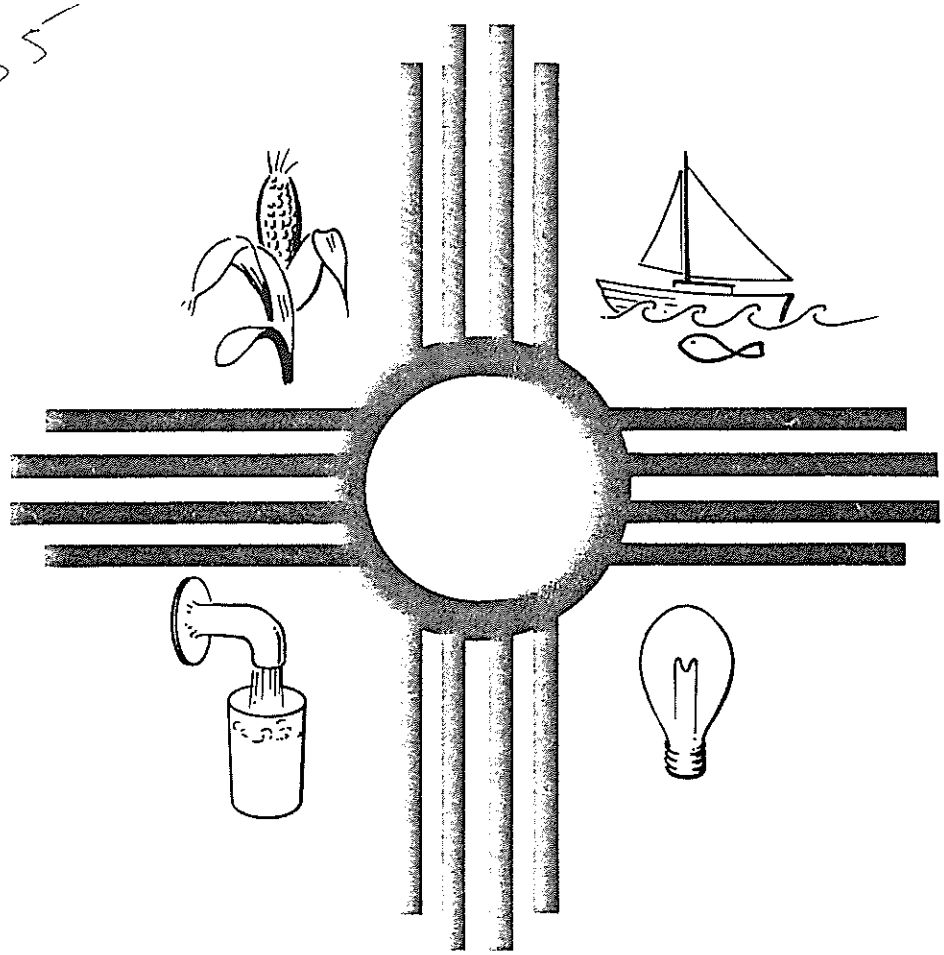

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PROJECT 13030 GLM

QUALITY AND QUANTITY OF RETURN FLOW AS INFLUENCED BY TRICKLE AND SURFACE IRRIGATION

Quarterly Report for the Period

July, August, September, 1973

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PROGRESS REPORT

WRRI-308, PROJECT 13030 GLM

July, August, September

1973

Progress during the last three months has been as planned. Accomplishments for the quarter are outlined below.

1. Growing and Harvesting the 1973 Cotton

Irrigation of the cotton being grown on the nine surface treatments was completed the last week in August. It is normal practice to terminate irrigation by the end of August to retard vegetative growth and encourage early maturity.

All treatments received 16 inches of water during the early spring while hydraulic conductivities of the control layer under each plot were being determined. The 16-inch irrigation also served as a pre-irrigation. All surface treatments received an average of 8.0 inches of water after planting and prior to June 29. Treatment depletions and efficiencies were used after that date.

Scheduling this season was based on climatological data using the Jensen method. Solar radiation, temperature, humidity, windspeed, pan evaporation, and rainfall were monitored at the project site. The climatological data were given to the Bureau of Reclamation. The Bureau's Irrigation Management Service program is currently assisting farmers in the valley on irrigation scheduling. Weekly updates showing the amount of depletion, the next irrigation date, and the amount

of the next irrigation were received from the Bureau.

Amounts of irrigation water applied, achieved efficiencies, etc. are shown in Table 1.

Table 1. Preliminary Data - Surface Irrigation Treatments

Trmt	Wtr App prior 6-29	Total App.	App. after 6-29	Rain 6-29 to 9-30	Rain and Irr. 6-29 to 9-30	ET 6-29 to 9-30	App. Eff. Planned	App. Eff. Achieved	Depletion of Available Moisture prior to irr.	No.of irr. 6-29 or 9-30
	(in)	(in)	(in)	(in)	(in)	(in)	%	%	%	
1	8.33	27.93	19.60	7.86	27.46	21.10	80	76.8	25	10
2	8.07	29.15	21.08	7.86	28.94	21.10	80	72.9	50	6
3	8.27	24.89	16.62	7.86	24.48	21.10	80	86.2	75	4
4	8.19	25.13	16.94	7.86	24.80	21.10	90	85.1	25	10
5	8.23	26.36	18.13	7.86	25.99	21.10	90	81.2	50	6
6	9.11	23.70	14.59	7.86	22.45	21.10	90	94.0	75	4
7	8.99	24.87	15.88	7.86	23.74	21.10	100	88.9	25	10
8	9.43	22.32	12.89	7.86	20.75	21.10	100	101.7	50	6
9	8.07	21.20	13.13	7.86	20.99	21.10	100	100.5	75	4

The evapotranspirations (ET) for the period are those computed using climatological data from the site and the Jensen formula in the computer model. The total ET for July, August, and September is 21.10 inches for a daily average ET of .229 inches per day.

The cotton being grown under the two trickle irrigation treatments, which have been outlined in a previous report, was irrigated according to treatment criteria from just after planting until the last of August.

On August 30 and 31, emergency surface drainage was required because 4.57 inches of rain completely inundated the plots.

Amounts of water applied, etc. are shown in Table 2.

Table 2. Preliminary Data - Trickle Irrigation Treatments

Trmt.	Water Applied prior to 6-29	Total Applied	Applied After 6-29 - 9-30	Rain 6-29 - 9-30	Rain and Irrigation 6-29 - 9-30
	(in)	(in)	(in)	(in)	(in)
TT1	5.35	13.85	8.50	7.86	16.36
TT2	5.99	12.69	6.70	7.86	14.56

The first picking on all treatments is anticipated in October with a second pick tentatively set in November.

2. Measure Water and Solute Flow

Daily monitoring of the tensiometers at two levels below the soil surface in each plot was carried out through the quarter. From the tensiometer readings, hydraulic gradients are established for each day. This, coupled with the values of unsaturated hydraulic conductivity as a function of water content, as outlined in the annual report, will be used to calculate the deep percolation losses from each plot. Soil moisture content by depth in each plot was monitored one to three times weekly throughout the quarter.

Saturated extracts obtained from samples taken from the plots prior to planting of the 1973 crop were analyzed during the quarter.

Electrical conductivity as well as constituent amions and cations were determined.

Distribution of salts within the soil profile beneath the trickle emitters has been monitored with salinity sensors. More sensors have been added to improve the coverage of the grid.

Figure 1 shows salinity levels just prior to the 4.57 inches of rain on August 29 and 30.

Figure 2 shows salinity levels following the rain. Quite significant reduction in salinity levels may be noted, especially at the shallower depths.

3. Analyze Water Samples from Suction Cups - Dry Wells and Del Rio Drain

Soil solution samples were extracted from the plots periodically through the quarter. These are presently being analyzed.

Sampling of the deep wells and the Del Rio Drain water were continued, as well as the continuous monitoring of the quantity of flow in the Del Rio Drain. Results up to July 1, 1973 were included in the Second Annual Report and will not be brought up to date herein. Current data will appear in a later quarterly or annual report. Drain flows through the summer have been considerably higher than during the previous growing season. Due to the adequate supply of river water for irrigation, very little groundwater was pumped during the season.

A large number of persons visited the field site during an Open House at the Plant Science Research Center in late September. The purposes of the project and methods being employed were explained to the visitors.

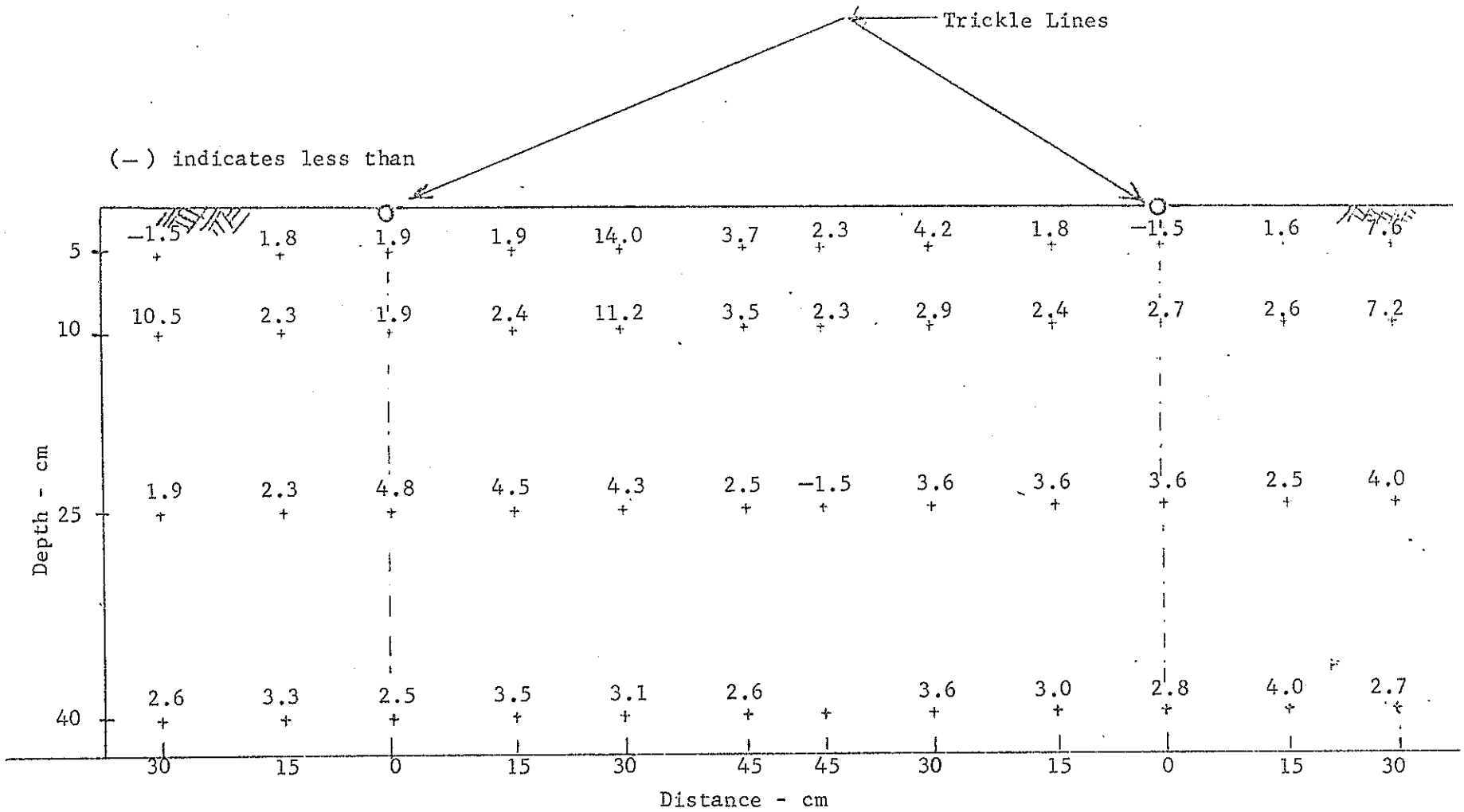

Figure 1. Soil salinity (mmhos/cm) around a trickle line measured with salinity sensors on August 16, 1973 prior to 4.7 inches of rainfall on August 29 and 30, 1973.

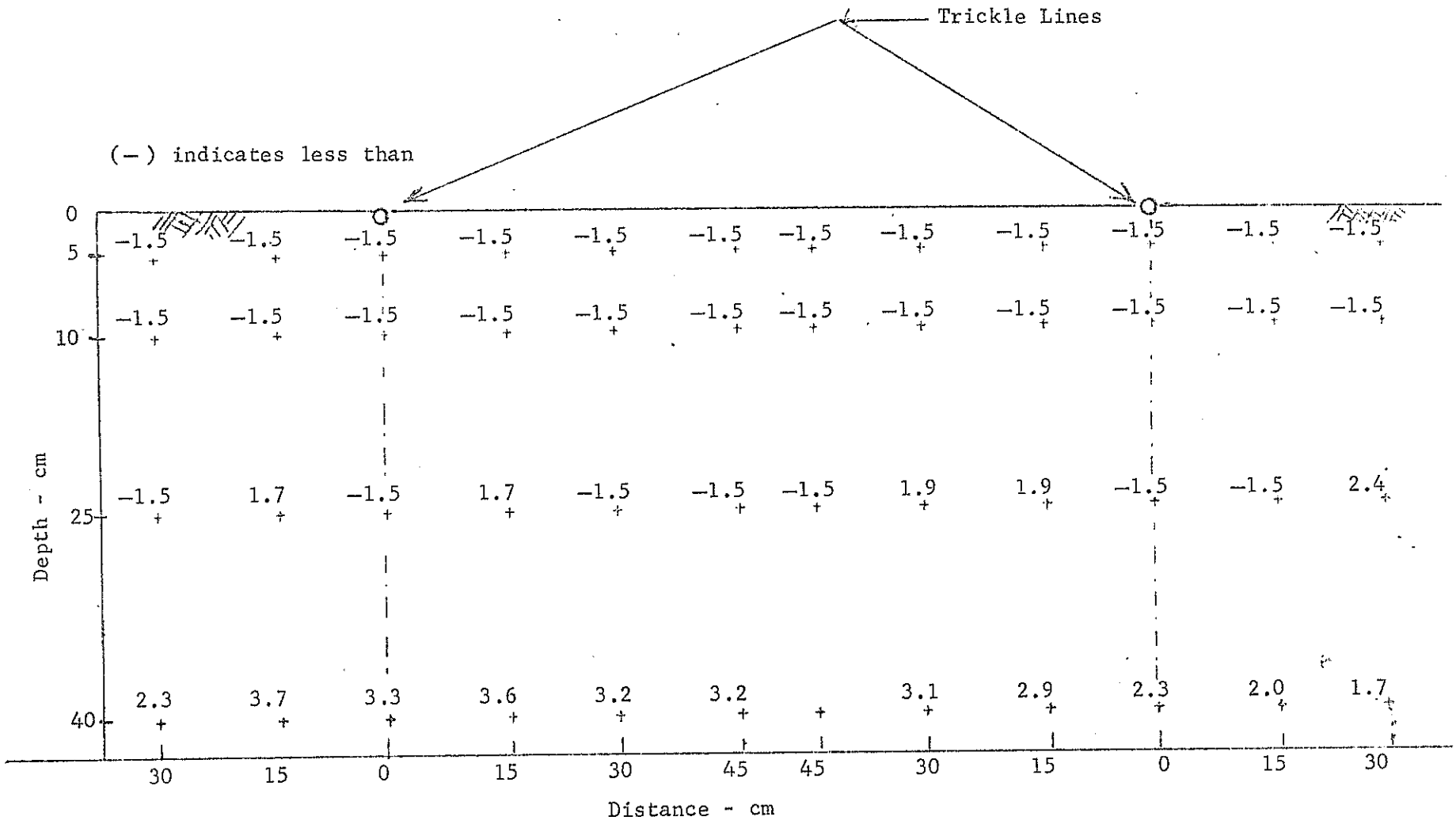

Figure 2. Soil salinity (mmhos/cm) around a trickle line measured with salinity sensors on September 9, 1973 after 4.7 inches of rainfall on August 29 and 30, 1973.