

COPY

Office of
STATE LAND DEPARTMENT
State of Arizona
Phoenix, Arizona
August 3, 1954

Leonard C. Halpenny
District Engineer
Groundwater Branch
U. S. Geological Survey
P. O. Box 2270
Tucson, Arizona

Dear Mr. Halpenny:

Having attended the hearing on the Salt River Critical Area, you are conversant with the controversy in connection with the exclusion of certain lands from the critical area along the Gila River from Lateral 23 westward to the vicinity of Buckeye.

In connection with this matter the Commissioner would appreciate your furnishing him with:

- (1) All data available concerning the depths to ground water and any changes thereof within the area;
- (2) Any information available as to increased hydraulic gradient or other relative matters;
- (3) Information as to whether the high water table in the area bounded on the west by the Agua Fria River, on the east by Lateral 23, on the south by the Gila River and on the north by the "Breaks" is due to constriction or underground barrier in the vicinity of the confluence of the Gila and Salt Rivers or immediately west thereof;
- (4) Whether the high water table conditions immediately south of Buckeye are due to underground barriers or other geologic formations in the area;
- (5) Whether, from data available and from experience, a conclusion can be reached as to whether further pumping along the river would have a detrimental effect upon surface water rights of the Buckeye Irrigation District and the Arlington Canal Company.

Very truly yours,

/s/ Roger Ernst
Roger Ernst
State Land Commissioner



Arizona 194

→ Mrs. Giffen - for your file

IN REPLY REFER TO:

UNITED STATES
DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY
GROUND WATER BRANCH

P. O. Box 2270, Tucson, Arizona

OPEN FILE
on the basis of
the information
received
9/15/51

September 13, 1951

CPM

Mr. Roger Ernst
State Land Commissioner
407 State Office Building
Phoenix, Arizona

Dear Mr. Ernst:

In reply to your letter of August 3, asking five specific questions about the ground-water situation along the Gila River from Lateral 23 westward to the vicinity of Buckeye:

Our reply is based on data collected by this office during the past 10 years. A tabulation of water-level records of a few representative wells in and near the area is included herewith for your information. Our conclusions in reply to your questions are as follows:

1. Throughout most of the area in question the depth to water ranges from a few inches to 20 feet, and the Gila River is effluent. In general the depth to water is least at the river and gradually increases northward. Local influences such as pumping, and variations in surface elevations or possibly in subsoil characteristics are liable to affect the depth to water at any given point. However, as far as is known, there has been no large variation in the elevation of the water table within the area described in your letter, except during periods of abnormal climatic conditions such as floods or protracted droughts. Surface flow and underflow of the Gila River constitute the principal source of ground-water recharge to the area. There is normally little recharge contributed from runoff in the Salt River, but an unknown quantity moves into the area as a result of irrigation and canal seepage to the north and east. According to the water-table contours the direction of movement of ground water parallels the course of the Gila River in the area. The hydraulic gradient is about equal to that of the land surface - about 7-8 feet per mile. West of Buckeye the predominant direction of ground-water movement is southward toward the river.

2. There has been no noticeable change in gradient of the water table during the past 10 years.

3. According to the available data there is no abnormally high water table in the area described. Local areas of perched water may be

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present where irrigation seepage is temporarily held up on shallow clays, but there is no known constriction or underground barrier in this area.

4. There is little doubt that the shallow water-table conditions south of Buckeye are due to a constriction of the basin in that vicinity, where buried lavas may exert local effects on the position of the water table and upon ground-water movement. However, there is no complete barrier across the valley from south to north.

5. Practically any pumping along the river is certain to decrease the surface flow of the stream to some extent, but at least part of the water pumped will eventually return as underflow farther downstream. We do not believe that anyone can accurately predict just how detrimental such pumping might be. The acreage involved is small, and water use would be correspondingly small.

Very truly yours,

Leopold A. Heindl
Geologist
For: Leonard C. Halpenny
District Engineer

LEN/vs

cc: H. W. Wolcott

Water-level measurements in wells in western part of Salt River Valley

Well location	Depth to water by years										
	1928	1934	1946	1947	1948	1949	1950	1951	1952	1953	1954
NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 28, T. 1N., R. 1W. ^{a/}	-	-	12.7	12.6	15.1	17.0	20.3	20.5	17.9	21.4	24.5
SE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 23, T. 1N., R. 2W.	-	-	23.9	25.3	31.4	b/	b/	37.6	34.2	36.4	46.0
SE $\frac{1}{4}$ SW $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 13, T. 1N., R. 2W.	39.09/	50.09/	-	55.7	56.1	65.5	73.3	66.5	63.5	69.4	71.9
SW $\frac{1}{4}$ SW $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 16, T. 1N., R. 2W.	78.09/	75.09/	73.2	75.9	b/	82.6	87.2	87.1	89.2	87.1	90.5
SE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 33, T. 1N., R. 2W.	-	-	-	-	-	-	-	23.6	23.7	24.6	c/
NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 34, T. 1N., R. 3W.	60.09/	65.09/	60.9	55.2	57.0	59.9	61.4	60.4	63.1	64.4	63.2
NE $\frac{1}{4}$ NE $\frac{1}{4}$ NE $\frac{1}{4}$ Sec. 16, T. 1N., R. 4W.	-	-	167.2	167.0	167.4	165.22/	b/	169.0	169.3	169.6	172.0
NE $\frac{1}{4}$ NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 25, T. 1N., R. 4W.	-	-	66.4	66.7	67.3	71.2	76.5	b/	67.8	75.0	70.5
NE $\frac{1}{4}$ NE $\frac{1}{4}$ SE $\frac{1}{4}$ Sec. 11, T. 1S., R. 4W.	-	-	4.5	3.9	4.7	6.2	7.0	7.8	9.8	9.6	d/

- a/ Dug well.
 b/ Pumping, no measurement.
 c/ Reported measurement.
 d/ No measurement.
 e/ New well in same location.
 f/ Well sealed, no measurement.