

# THE Cross SECTION

A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 10—No. 8

"THERE IS NO SUBSTITUTE FOR WATER"

January 1964

## District Residents Elect Directors And Committeemen



WELDON NEWSOM



CHESTER MITCHELL

Residents of the High Plains Underground Water Conservation District have elected two new District Directors and twenty-six new County Committeemen.

Also in the January 14 voting, residents of the Water District and residents of Swisher County voted on the issue of accepting a major part of Swisher County into the District. Residents of the District voted 652 for annexation of the Swisher Territory to 79 against the annexation. However in Swisher County unofficial tallies show the annexation to have failed by a vote of 191 for, to 264 against.

In Director's Precinct No. 5, the voters elected Chester Mitchell of Lockney to represent Floyd County on the District Board. Mitchell ran unopposed.

Weldon Newsom of Morton was elected to represent Director's Precinct No. 2, which consists of Cochran, Hockley and Lamb Counties. He won over three other residents of the Director's Precinct, who are V. E. Diersing of Pep, Henry J. (Chick) Schmidly of Levelland, and H. G. Walker of Olton.

Two Committeemen in each of the 13 counties comprising the Water Conservation District were elected.

The committeemen elected according to official tallies were Armstrong County, Foster Parker and Jack McGehee; Bailey County, James P. (Jimmy) Wedel and W. L. (Willie) Welch; Castro County, Ray Riley and Frank Wise; Cochran County, D. A. Ramsey and H. B. Barker; Daff Smith County, J. E. McCathern, Jr. and Charles Packard.

Floyd County, Bill Sherman and Tate Jones; Hockley County, Bryan Daniel and Leon Lawson; Lamb County, Willie Green and a tie between Leroy Fisher and Raymond Harper; Lubbock County, Bill Dorman and Weldon M. Boyd.

Lynn County, Hubert C. Teinert and Oscar H. Lowery; Parmer County, Walter Kaltwasser and Henry Ivy; Potter County, E. L. Milhon and Eldon Plunk; Randall County, Ed, Wieck and Lewis Tucek.

The Directors were elected for two-year terms of office, while the Committeemen were elected for three-year terms.

The Board of Directors is a policy-making body which, with the counsel of the County Committees, set the administrative policies of the District. The County Committees recommend all water-well drilling permits and serve in an advisory capacity on District matters in their respective counties.

## Pollution Board Continues Hearings

Representatives of the High Plains Water District traveled to Austin Wednesday, January 29, to appear before the Texas Water Pollution Control Board.

The Board set that date for continuation of the hearings on the proposed "no pit" order for the area underlain by the Ogallala formation. The proposition is whether use of salt water pits by some oil companies in disposing of the "brine" should be discontinued in this area. The Water District has outlawed for some time the use of such pits within the District.

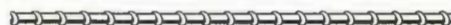
Also on the agenda for January 29, is a continuation of the hearing on the

proposed minimum standards for construction of injection wells. It is the continuation of your High Plains Underground Water Conservation District that wells used for the injection of salt water should be constructed in a manner which will adequately insure protection of the fresh water formations.

During the past month, District representatives have worked with members of the Texas Mid Continent Oil and Gas Association in an attempt to reach agreement on provisions which would protect ground water from possible pollution.

"CHIEF RUNNING WATER," SAYS—

"Make 'um sure measurements on drilling permits are correct— Save heap trouble. Water is your future. Conserve 'Um."







A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas

Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

CLAUDETTE McINNIS  
Editor

BOARD OF DIRECTORS  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Secretary-Treasurer 2806 21 St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)

Henry J. Schmidly, Vice President Rt. 2  
Levelland, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)

John Gammon, President Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)

Earl Holt Rt. 3, Hereford, Texas

Precinct 5

(FLOYD COUNTY)

J. R. Belt Jr. Lockney, Texas

District Office, Lubbock

Tom McFarland General Manager  
W. L. Broadhurst Chief Hydrologist  
Donald L. Reddell Agricultural Engineer  
Wayne Wyatt Field Representative  
H. G. Wells Attorney  
Mrs. Joy Carmon Secretary

Field Office, Hereford

Mrs. Mattie K. Robinson Secretary

Field Office, Muleshoe

David Cunningham Field Representative  
Mrs. Bertha Daniel Secretary

COUNTY COMMITTEEMEN

Armstrong County

Robert Adams, 1965 Wayside, Texas  
James Bible, 1964 Wayside, Texas  
Dewitt McGehee, 1966 Wayside, Texas  
John Patterson, 1965 Rt. 1, Happy, Texas  
Carroll D. Rogers, 1964 Wayside, Texas

Bailey County

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe

Doyle Davis, 1965 Goodland, Texas  
Lester Howard 1964 Rt. 5, Muleshoe, Texas  
Leon Lewis, 1965 Route 1, Box 98  
Muleshoe, Texas  
Leldon Phillips, 1964 Rt. 2, Muleshoe, Texas  
J. W. Witherspoon, 1966 Box 261  
Muleshoe, Texas

Committee meets last Friday of each month at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

Castro County

E. B. Noble  
City Hall, Dimmitt

C. W. Anthony, 1964 Rt. 4, Dimmitt, Texas  
George Bradford 1964 Box 732, Dimmitt, Texas  
Lester Dowell, 1966 Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 Star Rt., Hereford, Texas  
H. E. Henley, 1965 Rt. 5, Dimmitt, Texas

Committee meets on the last Saturday of each month at 10:00 a.m., City Hall, Dimmitt, Texas.

Cochran County

W. M. Butler, Jr.  
Western Abstract Co., Morton

H. B. Barker, 1964 Morton, Texas  
Ira Brown, 1965 Box 774, Morton, Texas  
Willard Henry, 1966 Rt. 1, Morton, Texas  
Weldon Newsom, 1964 Rt. 2, Morton, Texas  
L. L. Taylor, 1965 Rt. 1, Morton, Texas

Committee meets on the second Wednesday of each month at 8:00 p.m., Western Abstract Co., Morton, Texas.

Deaf Smith County

Mrs. Mattie K. Robinson  
High Plains Water District

317 N. Sampson, Hereford, Texas  
L. E. Ballard, 1966 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 807 N. Main  
Hereford, Texas

J. E. McCathern, Jr. 1964 Rt. 5  
Hereford, Texas

Billy B. Moore, 1965 Wildorado, Texas  
Charles Packard, 1964 Rt. 3, Hereford, Texas

Committee meets the first Monday of each month at 7:30 p.m., High Plains Water District office, Hereford, Texas.

Floyd County

Mrs. Katherine King  
325 E. Houston St., Floydada

G. L. Fawver, 1964 Rt. 5, Floydada, Texas  
J. S. Hale, Jr., 1966 Rt. 1, Floydada, Texas  
V. H. Kellison, 1964 Box 846, Lockney, Texas  
Grigsby "Doodle" Milton, 1965 Silvertown Star  
Route, Floydada, Texas

L. D. "Buster" Simpson, 1965 832 W. Tenn.  
Street, Floydada, Texas

Committee meets on the first Tuesday of each month at 10:00 a.m., Farm Bureau Office, Floydada, Texas.



High Plains Underground Water Conservation District No. 1

Hockley County

Mrs. Phillis Reynolds  
917 Austin Street, Levelland

Bryan Daniel, 1964 Rt. 2, Levelland, Texas  
Preston L. Darby, 1965 Rt. 1, Ropesville, Texas  
Leon Lawson, 1964 Rt. 3, Levelland, Texas  
Earl G. Miller, 1965 Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 Rt. 2  
Levelland, Texas

Committee meets first and third Fridays of each month at 1:30 p. m. 917 Austin Street, Levelland, Texas.

Lamb County

Calvin Price  
620 Hall Ave. Littlefield

Henry Gilbert, 1964 Sudan, Texas  
Willie G. Green, 1964 Olton, Texas  
Roger Haberer, 1965 Earth, Texas  
W. B. Jones, 1966 Rt. 1, Anton, Texas  
Troy Moss, 1965 Rt. 1, Littlefield, Texas

Committee meets on the first Monday of each month at 7:30 p.m., Fisher's Cafe, Littlefield, Texas.

Lubbock County

Mrs. Jean Lancaster  
1628 15th Street, Lubbock

W. J. Bryant, 1964 1902 Ave. C, Lubbock, Texas  
Bill Hardy, 1965 Rt. 1, Shallowater, Texas  
Virgil Isom, 1964 Idalou, Texas  
Edward C. Moseley, 1966 Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 Rt. 4, Lubbock, Texas

Committee meets on the first and third Mondays of each month at 1:30 p.m., 1628 15th Street, Lubbock, Texas.

Lynn County

Mrs. Jean Lancaster  
1628 15th Street, Lubbock

Earl Cummings, 1964 Wilson, Texas  
Robbie Gill, 1965 Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 Wilson, Texas  
Frank P. Lisemby, Jr., 1964 Rt. 1, Wilson, Texas  
T. J. Swann, 1965 Rt. 1, Wilson, Texas

Committee meets on the third Tuesday of each month at 10:00 a.m., 1628 15th Street, Lubbock, Texas.

Parmer County

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina

Wendol Christian, 1966 RFD, Farwell, Texas  
Joe B. Jennings, 1964 RFD, Muleshoe, Texas  
Walter Kaltwasser, 1964 RFD, Farwell, Texas  
Carl Rea, 1965 Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 Friona, Texas

Committee meets on the first Thursday of each month at 8:00 p.m., Wilson & Brock Insurance Agency, Bovina, Texas.

Potter County

T. G. Baldwin, 1964 Bushland, Texas  
W. J. Hill, Jr., 1966 Bushland, Texas

L. C. Moore, 1965 Bushland, Texas  
Temple Rogers, 1965 Rt. 1, Amarillo, Texas  
R. C. Sampson, Jr., 1964 Bushland, Texas

Randall County

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon

R. B. Gist, Jr., 1965 Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhofer, 1966 Rt. 2, Canyon, Texas  
A. C. Evers, 1965 Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1964 Rt. 1, Canyon, Texas  
Ed Wieck, 1964 Rt. 1, Canyon, Texas

Committee meets on the first Monday of each month at 8:00 p.m., 1710 5th Ave., Canyon, Texas.

EDITORIAL . . .

Even With Development Of Water Resources Shortages Coming Due

A grim warning was introduced in the debate preceding Senate passage of a bill to coordinate planning of water and related land resources in the U. S.

It was sounded by Senator Clinton B. Anderson, New Mexico Democrat, who said that "Even with full development of water resources, the nation will have inadequate water supplies in 1980 to meet anticipated increases in population and economic activity."

Water use is increasing astonishingly day by day and month by month. Population increase, new households, industrial processes and other sources of demand constitute a warning that the nation no longer can dilly-dally if areas of it are not to suffer tragic consequences.

THERE ARE NUMEROUS regions imminently threatened by water shortages. Various parts of Texas in recent years have been in fear of the effects of protracted drought. Not only is most of the West and Southwest affected, but also such wide areas as the western Great Lakes states, Northeast, some of the South and the whole great industrial area from Boston south to Norfolk, Virginia, and sweeping west to Kansas City and South Dakota.

Anderson was floor leader for the measure, which originated in 1961 when the late President Kennedy recommended legislation "to provide for comprehensive river basin plans, biennial assessments of regional water needs and supplies, aid to the states and encouragement of more efficient water development, management and use."

ANDERSON SAID that the bill ran into powerful opposition from advocates of states' rights in the field of water resources that caused a delay of two years until now.

Before it was approved by the Senate the measure was amended to meet some of the objections of the states' righters.

The House still is to act on the bill.

The warnings of prospective water deficiency have been sounded time and again, until many persons regard it only as a form of complaint. But the danger is real, and it has to be met if the nation isn't to suffer economic calamity.

Editorial from the AUSTIN STATESMAN-December 27, 1963

Drilling Statistics For November And December

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Dry Holes Drilled
Armstrong				
November	0	0	0	0
December	0	0	0	0
Bailey				
November	8	1	2	0
December	11	1	0	0
Castro				
November	6	1	1	0
December	17	7	2	0
Cochran				
November	9	3	1	0
December	6	1	0	0
Deaf Smith				
November	22	8	2	0
December	17	10	1	0
Floyd				
November	22	14	1	1
December	0	1	0	0
Hockley				
November	13	3	0	0
December	19	16	0	1
Lamb				
November	17	7	3	0
December	6	4	0	0
Lubbock				
November	10	5	1	0
December	15	5	0	2
Lynn				
November	5	3	0	0
December	4	1	0	0
Parmer				
November	19	32	3	2
December	19	15	3	1
Potter				
November	0	3	0	0
December	0	0	0	0
Randall				
November	4	5	0	1
December	7	1	0	2
Total	292	147	20	10



# “Review Of Depletion Case”

**EDITOR'S NOTE**—This article is taken from *TEXAS LAW REVIEW*, December 1963. It was written by Robert A. Venable, and is a comment on the *Shurbet V. United States Case*, 1962.

Plaintiffs, seeking a depletion deduction for ground water used in their business of irrigation farming, filed a timely claim for refund of income taxes for the year 1959 with the district director of internal revenue who disallowed the claim in full. Plaintiffs brought suit in the district court to recover the disallowed refund. Held: ground water such as that in the formation underlying plaintiffs' land is a mineral and in natural deposit in the sense of the federal tax statutes and is entitled to cost depletion under section 611 of the Internal Revenue Code of 1954.

The depletion deduction, like the depreciation deduction, allows a taxpayer to recover capital investment free of tax. The theory behind either deduction is that gross income received by a taxpayer in a given year does not represent an accretion to his wealth and does not accurately measure the actual increase in his ability to pay taxes unless an allowance is made for the portion of his capital investment which was exhausted in the production of that income.

Although the principal case is the first to extend the benefits of section 611 to ground water used in irrigation farming, the holding is not as startling as "depletion allowance for ground water" might suggest to one thinking of the deduction of a fixed percentage of income allowed under section 613 to taxpayers engaged in the production or extraction of certain natural resources. Percentage depletion under section 613 bears no necessary relation to actual capital investment or to the amount of expected recovery of capital. Section 613 expressly denies percentage depletion with respect to water but there is nothing to suggest that the exclusion carries over to section 611. The fact that ground water, as distinguished from the farm products into which it is integrated, is not sold would be a crucial consideration under section 613 since the allowance granted under that section is based upon a fixed percentage of income. The income to be derived from the sale of farm produce might be significantly higher than the income to be derived from the sale of the water alone. Cost depletion, however, is not conditioned on a sale of the mineral as such since the amount of deduction in any given year is based solely upon the portion of a taxpayer's capital investment which is used up in that year and the total amount of the deduction is limited by the amount of the taxpayer's investment.

In order to obtain an allowance for depletion under section 611, a taxpayer must meet three distinct requirements. First, he must derive income in some fashion from the extraction of the mineral and must look to that income for a return of his capital. In the principal case, plaintiffs' irrigation farm was located in the Southern High Plains, a plateau covering an area of approximately 35,000 square miles in Texas and New Mexico south of the Canadian River and east of the Pecos River. U. S. Weather Bureau records for the Southern High Plains between 1890 and 1960 indicate irregular precipitation averaging less than 20 inches annually, low humidity, high temperatures, and strong winds which cause a high rate of evaporation. Under such conditions crops are produced with more regularity and with higher yields on irrigated land than on dryland farms. Therefore, the use of irrigation water directly causes increased income from farming. The second requirement of section 611 is that the mineral must be exhaustible; while there may still be deposits of the mineral being formed over long periods of time, it must not be undergoing natural replacement in significant quantities. Water beneath the Southern High Plains is found in a geologic formation known as the Ogallala formation. The Ogallala formation is an aquifer or water-bearing formation which constitutes what hydrologists term a "ground-water reservoir." It is significant that the bottom of the Ogallala formation generally rises above the surrounding countryside and is underlain by relatively impermeable rock. The formation is isolated from the influx of new water other than that which percolates down as a result of precipitation upon the surface of the ground. While fresh water generally is considered a renewable resource, the court concluded that ground water "under the Southern High Plains in general, and under Plaintiffs' farm in particular" is a non-renewable resource. Finally, section 611 requires the tax payer to demonstrate a capital investment in the mineral in place. It is settled in Texas that the surface owner owns percolating water beneath his land but, in order to meet the requirements of section 611, a taxpayer must prove a cost basis in the water beneath his land separate and apart from his cost basis in the surface. In the principal case plaintiffs' irrigation farm consisted of 480 acres, of which 380 acres were purchased in 1946 and 100 acres were purchased in 1953. The court found that 9,500 dollars of the 38,000 dollars paid by plaintiffs for the land purchased in 1946, and 12,000 of the 28,000 paid in 1953, were paid for the acquisition of irrigation water.

Section 1. 611-2 (a) (1) of the

regulations provides that the taxpayer shall determine his annual cost depletion by dividing his adjusted basis in the mineral by the number of recoverable units of the mineral remaining at the beginning of the taxable year in order to arrive at the cost per unit. This figure is to be multiplied by the number of units sold in order to arrive at the amount of cost depletion for the year. Rather than estimate the number of gallons of water pumped by plaintiffs during the taxable year and the number left in reserve, the court in the principal case allowed as a deduction an amount which bore the same relation to plaintiffs' adjusted basis as the decline in water level during the year bore to the saturated thickness of the reservoir at the beginning of the year. While the depletion for ground water could be calculated by reference to the units actually pumped during the year, the formula used by the court was found to be more accurate and more practical. Aside from the fact that farmers do not ordinarily meter the amount of water pumped, if depletion were calculated on the basis of units

pumped, adjustments would have to be made for the recirculation of part of the water into the reservoir and for any excess in natural recharge over natural discharge which might occur. These factors are reflected in the static water level measurements. Thus, the court found that measuring the decline of the water table is the most practical, accurate, and reliable method known to hydrologists for the determining loss of storage from the Ogallala groundwater reservoir. The failure of the Secretary to anticipate the "peculiar conditions" in the case of ground water does not preclude a deduction otherwise allowable under section 611.

As a result of the holding in the principal case, a farmer who pays the high price brought by land overlying an underground reservoir may recoup that percentage of his investment attributable to ground water through cost depletion as the water in the underground formation is exhausted. The holding seems to be clearly in accord with the spirit and purpose of section 611.

## Annual West Texas Water Conference Scheduled For February 7, At Tech

8:00-9:00 Registration and Coffee  
9:00-9:10 "Welcome"- Dr. D. M. Wiggins, President, Lubbock Chamber of Commerce.  
9:10-9:45 Keynote Address—"West Texas Water"- by Judge O. F. Dent, Texas Water Commission, Austin.  
9:45-10:00 Break

### Utilization and Value of West Texas Water

Chairman: Jack Springer, Executive Vice President, West Texas Chamber of Commerce  
10:00-10:30 "The Businessman's Interest in West Texas Water"-Herbert Hilburn, Editor, Plainview Daily Herald, Plainview.  
10:30-11:00 "The Petroleum Industry's Interest in West Texas"- Kenneth Roberts, Coordinator of West Texas Water Conservation Committee, Mid-Continent Oil and Gas Association, Houston.  
11:00-11:30 "Agriculture's Interest in West Texas Water"- Art Bralley, American National Bank, Amarillo  
11:30-11:50 "Municipal Water Needs"-John Hickerson, City Engineer, Lubbock.  
11:59-12:00 Open discussion on the Value of West Texas Water.  
12:00-1:15 Lunch  
Recent Developments in Water Conservation Chairman: Dr. Rex Johns-

ton, Agricultural Research service, Amarillo.  
1:15-1:45 "Land Leveling, Contouring and Sub-Irrigation"- C. E. Fisher, Superintendent, South Plains Agricultural Research Center, Lubbock.  
1:45-2:15 "Tailwater Control and Management"- Tom McFarland, General Manager, High Plains Underground Water District.  
2:15-2:45 Multipurpose Use of Playa Lakes"- Walter Breedlove, Chief Public Health Engineer, Lubbock City-County Health Unit  
2:45-3:00 Break

### Legal, Legislative And Other Considerations Chairman Duane Crawford

Petroleum Engineering, Texas Tech  
3:30-3:30 "Ground Water Depletion as an Income Tax Allowance"-George McCleskey, Attorney, Lubbock.  
3:30-4:00 "Water Pollution and Ownership of Playa Lake Water"- J. W. Buchanan, Manager, North Plains Water District, Dumas.  
4:00-4:39 "Electric Logging and Formation Analysis"- Delbert Timmons, Engineer, North Plains Water District, Dumas.  
4:30-5:00 "Status of the West Texas Water Institute"- Gerald W. Thomas, Dean of Agriculture, Texas Tech.

**THE CROSS SECTION**

1628 - 15th Street  
Lubbock, Texas

Dear Sirs:

I do not now receive THE CROSS SECTION but would like to have it sent to me each month, free of charge, at the address given below.

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City and State \_\_\_\_\_

(Please cut out and mail to our address)

**WATER IS YOUR FUTURE CONSERVE IT**





The Break-Over Marker, invented by Don McInturff, allows the tractor operator to break the soil very close to the valve. The operator does not have to dismount but can drive his tractor over the Alfalfa Valve protector.



Shown here is the placement of a Break-Over Marker before the land is worked. The disc at the top of the device is rubber to prevent tools from hanging as implements are driven over the marker.

## New Alfalfa Value Protector Saves Tractor Operator Times And Labor

Don McInturff, a Lubbock County farmer, has invented a break-over marker, which is an alfalfa valve protector. McInturff has been using this device for one year in place of the conventional tire or tripod marker.

McInturff stated that this type marker has many advantages, over the conventional devices, one of which is the break-over marker is permanent and does not have to be moved for land conditioning. These markers, which are thirty inches above the ground and are nine inches below the surface level, are tall enough to be seen through the last cultivation of the summer period.

Also, the tractor operator does not have to dismount to make a turn on the ends of rows, but can raise his equipment over the marker which bends with cable suspension.

The color of these markers is yellow and red to facilitate visibility when cultivating the land. A rubber disc, which is made of flexible rubber, tops the marker. This disc will not catch on the tools riding over it, and pull the marker out of the ground.

This marker is made of 3/4 inch steel tubing, both the underground and above ground sections. A cable and all steel spring suspension system, allows the marker to bend to ground level, then spring back into an upright position.

McInturff has been working on the marker for one year and has tried several modifications. The final marker is now available to the public.



In the Picture above, McInturff demonstrates the suspension system which allows the marker to bend to ground level then spring back into an upright position.

**PLEASE CLOSE THOSE ABANDONED WELLS**



# THE Cross SECTION

A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 10—No. 9

"THERE IS NO SUBSTITUTE FOR WATER"

February 1964

## Bill Broadhurst Resigns From Post As Water District Hydrologist



W. L. BROADHURST

Recognizing the opportunities Mr. W. L. Broadhurst has in getting back into a field of research in which he has spent much of his life, the Board of Directors of the Water District accepted his resignation effective as of February 15, 1964.

Mr. Broadhurst's contributions to the people of the Southern High Plains during the almost eleven years he spent with the Water District will have a marked bearing on many of the future plans of water development and conservation.

He did much of the research in the water depletion case tried in the Federal District Court two years ago and spent considerable time on the stand testifying in the case as a witness called by attorneys for Mr. Marvin Shurbet, the taxpayer.

It was through Mr. Broadhurst's efforts that many of the studies of the Ogallala Formation were begun and finally brought to published forms.

Observation wells that he began measuring years ago are still being measured, resulting in long-time records of the nature of the water table beneath the Southern High Plains.

In again working with the U. S. Geological survey, it is anticipated that Mr. Broadhurst first will be on some specialized projects in Washington D. C., after which he will move on to Alabama where he will be in charge of the ground water development for the entire state.

The many friends, who knew Mr. Broadhurst personally, all wish him the best of luck.

## MUDDY WATER

Muddy water. Worst of all is muddy tail-water. The term "tail-water", as we use it, applies to that water which pours from the furrows at the lower ends of irrigated fields. And mud? Well, mud, in this case, is good, fertile top soil. When tests were run by the Water District on a series of tail-water samples to determine how much top soil was actually being washed away, the results were astounding. They were even rechecked to make certain there had been no mistakes.

As much as 14 tons of fine West Texas top soil was found to be moving with each acre foot of tail water. The smallest amount the scientists found was 5 tons per acre foot. Using a nice round 10 tons as an average and multiply that figure by 160 feet, which would be an acre foot of water over 160 acres of land, how much top soil is being removed annually from the irrigated farms of West Texas? Its disturbing isn't it? But all of the water doesn't run out the ends of the rows. Most of it soaks into the ground. How fortunate for us that most of it is soaked up by the soil for if it weren't our lakes would be filled with top soil and much of the High Plains would be caliche desert. But another startling figure came into existence at the same time the studies on soil movements were being made. By actual measurement it was found that as much as 25 percent of the water that was pumped from the wells on a certain farm escaped into the barrow ditch or was picked up and recirculated through a tail water return system.

In the cases where the water left the field, one out of every four-acre feet of water pumped rushed merrily down the barrow-ditch, carrying with it an average of ten tons of fine top soil. "It's a sin against God as well as our kids. Anybody with any common sense ought to be able to understand what we're doin' to ourselves . . .", a Parmer County farmer exclaimed.

Of course, in tail-water pits there's a problem to, when the top soil settles out and begins filling the pits. But, fortunately, the soil, as well as the water, is collected in such a way that it can be saved and redistributed. When the soil settles in the pits it is usually referred to as "Silt". It is rich in fertilizers and the organic matter so necessary to the productivity of High Plains land. The Water District is experimenting with ways of keeping the silt in suspension until the pit pumps can pump it back into the distribution systems and back onto the

land again. A few farmers who are using recirculating pits began noticing that small deltas of soil were building up a few feet down the rows from the sox attached to the outlets of their gated aluminum pipe. One farmer using tubes in a section of open ditch, watched his furrows become almost level when the silt-laden water began dropping its load within a few feet from the ends of the tubes.

"Spreading it back out don't worry me nearly as much as having it run off the low side", he remarked.

Conscientious farmers, who have convinced themselves that continuous irrigation is not only lowering their water table but is gradually removing the layer of rich top soil that has made West Texas agriculture great, have begun reviewing the situation as an interrelated problem: Water, as well as soil management.

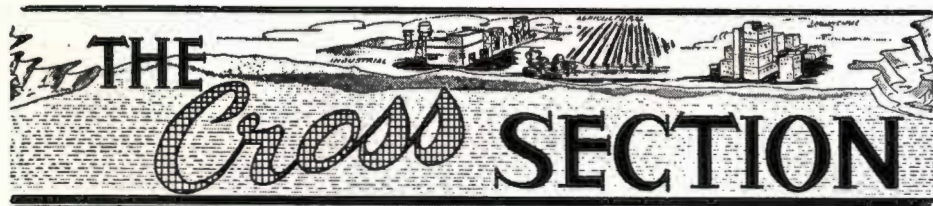


An average of 10 tons of silt, such as this which has been deposited in a barrow-ditch, are lost in each acre foot of moving irrigation tail-water. The silt in this picture has collected behind a V-Notch Weir, a device used to measure running water.



Perpendicular rows are one of the many conservation practices being used by Southern High Plains farmers. This practice lessens the irrigation tail-water that escapes from the property, and increases the in-soak time.





A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas

Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

CLAUDETTE McINNIS  
Editor

BOARD OF DIRECTORS

Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President — 2806 21st St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)

Weldon Newsom — Morton, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)

John Gammon, President — Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)

Earl Holt, Secretary-Treasurer — Rt. 3  
Hereford, Texas

Precinct 5

(FLOYD COUNTY)

Chester Mitchell — Lockney, Texas

District Office, Lubbock

Tom McFarland — District Manager  
H. G. Wells — Attorney  
Donald L. Reddell — Engineer  
Wayne Wyatt — Field Representative  
David Cunningham — Field Representative  
Dana Wacasey — Bookkeeper  
Claudette McInnis — Cross Section and Education  
Melba Wright — Secretary  
Jayne Cobb — Draftsman

Field Office, Hereford

Mrs. Mattie K. Robinson — Secretary

Field Office, Muleshoe

David Cunningham — Field Representative  
Mrs. Bertha Daniel — Secretary

COUNTY COMMITTEEMEN

Armstrong County

Robert Adams, 1965 — Wayside, Texas  
Foster Parker, 1967 — Route 1, Happy  
Dewitt McGehee, 1966 — Wayside, Texas  
John Patterson, 1965 — Rt. 1, Happy, Texas  
Jack McGehee, 1967 — Wayside

Bailey County

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe

Doyle Davis, 1965 — Goodland, Texas  
James P. Wedel, 1967 — Rt. 2, Muleshoe  
Leon Lewis, 1965 — Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 — Star Rt., Maple  
J. W. Witherspoon, 1966 — Box 261  
Muleshoe, Texas

Committee meets last Friday of each month at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

Castro County

E. B. Noble

City Hall, Dimmitt

Ray Riley, 1967 — 71 W. Lee, Dimmitt  
Frank Wise, 1967 — 716 W. Grant, Dimmitt  
Lester Dowell, 1966 — Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 — Star Rt., Hereford, Texas  
H. E. Henley, 1965 — Rt. 5, Dimmitt, Texas

Committee meets on the last Saturday of each month at 10:00 a.m., City Hall, Dimmitt, Texas.

Cochran County

W. M. Butler, Jr.

Western Abstract Co., Morton

D. A. Ramsey, 1967 — Star Rt. 2, Morton  
Ira Brown, 1965 — Box 774, Morton, Texas  
Willard Henry, 1966 — Rt. 1, Morton, Texas  
H. B. Barker, 1967 — 602 E. Lincoln, Morton  
L. L. Taylor, 1965 — Rt. 1, Morton, Texas

Committee meets on the second Wednesday of each month at 8:00 p.m., Western Abstract Co., Morton, Texas.

Deaf Smith County

Mrs. Mattie K. Robinson

High Plains Water District  
317 N. Sampson, Hereford

L. E. Ballard, 1966 — 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 — 807 N. Main  
Hereford, Texas

J. E. McCathern, Jr., 1967 — Rt. 5, Hereford  
Hereford, Texas

Billy B. Moore, 1965 — Wildorado, Texas  
Charles Packard, 1967 — Rt. 3, Hereford

Committee meets the first Monday of each month at 7:30 p.m., High Plains Water District office, Hereford, Texas.

Floyd County

Donna Sammon

325 E. Houston St., Floydada

Bill Sherman, 1967 — Rt. 4, Floydada  
J. S. Hale, Jr., 1966 — Rt. 1, Floydada, Texas  
Tate Jones, 1967 — Rt. 4, Floydada

Grigsby "Doodle" Milton, 1965 — Silvertown Star  
Route, Floydada, Texas

L. D. "Buster" Simpson, 1965 — 832 W. Tenn.  
Street, Floydada, Texas

Committee meets on the first Tuesday of each month at 10:00 a.m., Farm Bureau Office, Floydada, Texas.



High Plains Underground Water Conservation District No. 1

Hockley County

Mrs. Phillis Reynolds  
917 Austin Street, Levelland.

Bryan Daniel, 1967 — Rt. 2, Levelland  
Preston L. Darby, 1965 — Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 — Rt. 3, Levelland  
Earl G. Miller, 1965 — Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 — Rt. 2  
Levelland, Texas

Committee meets first and third Fridays of each month at 1:30 p. m., 917 Austin Street, Levelland, Texas.

Lamb County

Calvin Price

620 Hall Ave. Littlefield

Willie Green, 1967 — Box 815, Olton  
Roger Haberer, 1965 — Earth, Texas  
W. B. Jones, 1966 — Rt. 1, Anton, Texas  
Troy Moss, 1965 — Rt. 1, Littlefield, Texas

Committee meets on the first Monday of each month at 7:30 p.m., Fisher's Cafe, Littlefield, Texas.

Lubbock County

Weldon M. Boyd, 1967 — Rt. 1, Idalou  
Bill Hardy, 1965 — Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 — 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 — Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 — Rt. 4, Lubbock, Texas

Committee meets on the first and third Mondays of each month at 1:30 p.m., 1628 15th Street, Lubbock, Texas.

Lynn County

Hubert Tienert, 1967 — Wilson  
Robbie Gill, 1965 — Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 — Wilson, Texas  
Oscar H. Lowery, 1967 — Rt. 4, Tahoka  
T. J. Swann, 1965 — Rt. 1, Wilson, Texas

Committee meets on the third Tuesday of each month at 10:00 a.m., 1628 15th Street, Lubbock, Texas.

Parmer County

Aubrey Brock

Wilson & Brock Insurance Co., Bovina

Wendol Christian, 1966 — RFD, Farwell, Texas  
Henry Ivy, 1967 — Rt. 1, Friona  
Walter Kaltwasser, 1967 — RFD, Farwell  
Walter Kaltwasser, 1964 — RFD, Farwell, Texas  
Carl Rea, 1965 — Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 — Friona, Texas

Committee meets on the first Thursday of each month at 8:00 p.m., Wilson & Brock Insurance Agency, Bovina, Texas.

Potter County

E. L. Wilson, 1967 — Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 — Bushland, Texas  
L. C. Moore, 1965 — Bushland, Texas  
Temple Rogers, 1965 — Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 — Rt. 1, Amarillo

Randall County

Mrs. Louise Knox

Randall County Farm Bureau Office, Canyon

R. B. Gist, Jr., 1965 — Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoeffer, 1966 — Rt. 2, Canyon, Texas  
A. C. Evers, 1965 — Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 — Rt. 1 Canyon  
Ed Wieck, 1967 — Rt. 1, Canyon

Committee meets on the first Monday of each month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

# Water Is The Pot Of Gold At The End Of The Rainbow

Water is the "Pot of Gold at the End of the Rainbow" for West Texas, was the concluding summary of the Second Annual West Texas Water Conference at Texas Tech this month.

As a result of the conference a West Texas Water Institute was organized with headquarters at Texas Tech. This is a regional effort with a three-fold purpose; to emphasize wise use of water, to promote more research on water and to educate our people concerning the value of water.

The Institute is headed by Dr. Gerald Thomas, Dean of Agriculture at Texas Tech, and is governed by an executive committee. The committee members which were elected at the Conference are: J. W. Buchanan, Dumas; H. S. Hilburn, Plainview; Dr. Rex Johnson, Amarillo; Russell Bean, Lubbock; Bill Miller, Lubbock; Frank Moore, Plainview; Tom McFarland, Lubbock; Art Bralley, Amarillo; Marvin Shurbet, Petersburg; Charlie Fisher, Lubbock; George Dupree, Lubbock; Dave W. Sherrill, Lubbock.

O. F. Dent, of the Texas Water Commission, opened the one-day session with his keynote address which pointed out that conservation may mean the prevention of waste, but in its fullest sense, conservation of the ground-water resources of West Texas must mean the preservation of that resource for the economic, aesthetic and humanitarian values which are recognized by our people and our culture.

Dent concluded his address with a challenge to all participants of the conference: "If we, here in this conference, can light a pathway leading to an effective pursuit of a dependable supply of water for West Texans yet unborn, we can all stand a little taller and it will be good to have been here."

Herbert Hilburn, Editor of the Plainview Daily Herald, spoke on "The Businessman's Interest in West Texas Water", stressing the fact that water is the limiting factor in the economy and well-being of West Texas.

Kenneth Roberts, Houston attorney who serves as coordinator for the Texas Mid-Continent Oil and Gas Association's Water Conservation Committee, told the conference the oil and gas industry's interest in West Texas water is consistent with that of other groups. Roberts said that in its petroleum production West Texas is extremely fortunate to have a major part of its economy based on an industry that requires so little water. "I can think of no other business, industrial or non-industrial, that could contribute so much to the economy with such a small use of water resources."

Roberts told the conference of industry plans to protect fresh water from contamination by disposal of salt water from oil field operations. He said some practices for salt water disposal developed during a time when they were accepted as routine and became troublesome only after the development of agricultural, municipal and other business needs for water.

"Agriculture's Interest in West Texas Water" was delivered by Art Bralley, American National Bank, Amarillo. Bralley posed the question "What is the road ahead for agriculture?" In answering this question he said that as population increases, consumption of agricultural products will in-

crease, but will we have the necessary water to produce these products? According to Bralley, the answer is only if conservation is taken into hand. "To develop the most efficient use of our water we must strive for more education, study and research", Bralley said.

Two percent of the water consumption is in municipal usage, this group was represented by John Hickerson, City Engineer, Lubbock. Hickerson pointed out that all the municipalities in Texas use less than 50 percent of the water used in High Plains irrigation. He said that the three demands on city water were fire protection, domestic and industrial. Hickerson said that the future needs for municipal water were increasing greatly; he stated that in 1964, 150 gallons of water were being used per person per day. However, in the year 2,000, the needs would increase to 200 gallons of water per person per day.

Recent developments in water conservation were illustrated in talks given by C. E. Fisher, Superintendent, South Plains Agricultural Research Center, Lubbock; Tom McFarland, General Manager, High Plains Underground Water District; and Walter Breedlove, Chief Public Health Engineer, Lubbock City-County Health Unit.

Fisher emphasized that many farmers are over-irrigating their land, wasting water and ruining crops in the process. Land-levelling, benching and terracing were all discussed by the Experiment Station Superintendent. He related that in research carried on at the Station, 170 pounds more cotton lint per acre was produced on level land than land with slope. He also spoke on the application efficiency of sub-irrigation.

What is being done to prevent irrigation tailwater was discussed by McFarland, who illustrated the use of tailwater return systems with slides taken in the recent High Plains Water District Management Area Project near Hub, in Parmer County. The District Manager illustrated that water running down a bar-ditch is the image of waste and is a problem yet unsolved, but combatable. He pointed out that one farmer using a tailwater return system was salvaging 25 percent of the water pumped by his wells with his return system.

Breedlove spoke on multipurpose modification of playa lakes. The modification of these lakes will improve capacity and reduce the area in which mosquitoes breed, according to the Chief Engineer. Also, he stressed that this modification will increase the production acreage of land, by utilizing that land which was previously covered by water.

The last session of the day began

(Continued on Page 4)



# 1964 WATER DISTRICT BOARD OF DIRECTORS SWORN-IN

## ★ ★ ★ BOARD OFFICERS ELECTED



Weldon Newsom, who represents Hockley, Cochran and Lamb Counties on the District Board, and Chester Mitchell, who represents Floyd County, were sworn-in as members of the District Board by Judge Howard Davison, 99th District Court, Lubbock.



The Directors for 1964 are, standing, Chester Mitchell, Weldon Newsom, Earl Holt, seated left to right, John Gammon, and Russell Bean. This five-man Board will direct the activities of the Water District.



The new officers of the Board are from left to right, Earl Holt, Hereford, Secretary-Treasurer; John Gammon, Friona, President; and Russell Bean, Lubbock, Vice-President. The officers were elected by the Board.

Tom McFarland, District Manager, addressed the group present for the ceremonies which was composed of the past directors for the District, District staff and associates of the District.



President of the Board of Directors, John Gammon, speaks at the luncheon meeting at which time the new officials were sworn-in. Seated to Gammon's right is Russell Bean, to the left, H. G. Wells, attorney for the Water District, and Judge Howard Davison.



**WATER IS YOUR FUTURE CONSERVE IT**



# Water-Well Drilling Increases By 358 In 1963

The number of wells drilled within the High Plains Underground Water Conservation District during 1963 increased by 358 wells over the number drilled in 1962. In 1963, there were 1,746 wells drilled as compared to 1,388 drilled in 1962.

The total number of permits issued within the bounds of the District since February 1953 has now reached 25,055. During the same 11-year period, 20,487 wells have been completed. The difference in the two figures reflects the number of permits active

within the 13-County District.

In 1963, there were 332 more water well permits issued than in 1962, 46 more replacement wells were drilled, and 14 more dry holes than in the previous year.

Actually, with the passing of time the number of acres irrigated cropland decreases slightly, and in turn the number of agricultural, municipal, industrial and domestic wells increase. This is the result of individual well capacities decreasing as water levels decline, leaving a thinner saturated

section, which is the zone from which the well obtains its water supply.

Many other factors influence the overall well-drilling picture. Foremost among these are crop price conditions and land moisture.

The table below compares drilling in the High Plains Water District for the years 1962 and 1963 by counties.

The 11-year total of permits issued and wells drilled is also shown in the table. The total number of wells drilled includes new wells, replacement wells and dry holes.

County	PERMITS ISSUED			NEW WELLS DRILLED		REPLACEMENT WELLS DRILLED		DRY HOLES DRILLED		TOTAL WELLS DRILLED		11-yr. Total
	1962	1963	11-yr. Total	1962	1963	1962	1963	1962	1963	1962	1963	
Armstrong	1	2	54	0	2	0	0	0	2	0	4	54
Bailey	88	124	1564	47	84	13	18	5	5	65	107	1318
Castro	149	169	1965	101	113	12	20	4	1	117	134	1726
Cochran	91	134	1226	47	70	2	3	4	5	53	78	815
Deaf Smith	157	283	1984	73	174	28	26	8	6	109	206	1650
Floyd	203	195	2234	100	112	7	11	6	8	113	131	1716
Hockley	337	290	3573	224	221	11	5	17	20	252	246	2947
Lamb	153	245	2910	89	167	18	38	8	10	115	215	2201
Lubbock	344	371	4553	241	274	7	16	18	24	266	314	3773
Lynn	98	65	1754	93	40	0	0	11	6	104	46	1378
Parmer	184	234	2472	102	131	38	45	2	7	142	183	2248
Potter	2	9	31	0	7	1	0	0	0	1	7	25
Randall	68	86	735	43	63	1	2	7	10	51	75	636
<b>TOTALS</b>	<b>1875</b>	<b>2207</b>	<b>25,055</b>	<b>1,160</b>	<b>1458</b>	<b>138</b>	<b>184</b>	<b>90</b>	<b>104</b>	<b>1,388</b>	<b>1,746</b>	<b>20,487</b>

## West Texas Water Conference

(Continued From Page 2)

with George McCleskey, Lubbock attorney, discussing ground water depletion as an income tax allowance. McCleskey pointed out that in order to obtain the tax allowance, under section 611 a taxpayer must meet three requirements. First, he must derive income in some fashion from the extraction of the mineral and must look to that income for a return of his capital.

The second requirement of Section 611 is that the mineral must be exhaustible; while there may still be deposits of the mineral being formed over long periods of time, it must not be undergoing natural replacement in significant quantities.

Finally, Section 611 requires the taxpayer to demonstrate a capital investment in the mineral in place.

"Who Owns the Water in the Playa Lakes" and "Water Pollution" were discussed by J. W. Buchanan, Manager, North Plains Water District, Dumas. Buchanan said that pollution came from three sources which were natural, municipal and industrial, and oil field brines. Concerning the ownership of playa lake water, he contended that the waters of "playa lakes" are surface waters, owned by the owners of the lands upon which they appear, to which no riparian rights are attached, and to which the appropriation statutes are not applicable.

Delbert Timmons, also of the North Plains Water District, discussed electric logging of water wells. The North Plains District is using this type logging to obtain more information on the water bearing formation and the proximity of the red beds. Timmons discussed two types of logs which are Spontaneous Potential Logs and Single Resistivity Logs.

The program was concluded by Dean Thomas, who presented the constitution of the West Texas Water Institute before the group for a vote. The constitution was accepted and the institute will continue with two primary functions; education and research.

## Rules, Regulations, Modes Of Procedure Published By Texas Water Commission

Publication of the 1964 revision, the first since 1955, of the Rules, Regulations, and Modes of Procedure of the Texas Water Commission has just been completed. Joe D. Carter, Commission Chairman, stated that cover-

age of most legal aspects of the water laws of Texas as administered by the Commission is included in the publication.

Requirements for obtaining permits for the use of surface water are set out in detail in the new Rules. In addition procedures for creation of water districts, approval of bonds for water projects, amending of permits, cancellation of unused water claims, and permits for injection wells are outlined along with many aspects of State requirements in the field of water conservation and development.

Those needing copies of the Rules may obtain them free of charge from the Texas Water Commission, P. O. Box 12311, Austin, Texas 78711.

### WHEN YOU MOVE—

Please notify the High Plains Underground Water Conservation District, Lubbock, Texas on Post Office Form 22S obtainable from your local postmaster, giving old as well as new address, to insure no interruption in the delivery of "The Cross Section."

THE CROSS SECTION  
1628 - 15th Street  
Lubbock, Texas

Dear Sirs:

I do not now receive THE CROSS SECTION but would like to have it sent to me each month, free of charge, at the address given below.

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City and State \_\_\_\_\_

(Please cut out and mail to our address)

**A LITTLE LIFE IS WORTH MORE THAN A LITTLE TIME, CLOSE THOSE ABANDONED WELLS!**



# THE CROSS SECTION

A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 10—No. 10

"THERE IS NO SUBSTITUTE FOR WATER"

March 1964

## Water Well Development Problems

**EDITOR'S NOTE:** This is the first of a series of articles to focus additional attention to some common well development problems encountered in the High Plains Region.

By WILLIAM D. MILLER, Ph D.  
Geoscience Department  
Texas Technological College  
Lubbock, Texas

In some cases the actual dollar value of water production from an "old" well could be increased significantly through proper development procedures. An "old well gone bad" is not an excuse to abandon, unless all economically feasible procedures to produce water have been exhausted.

Decreasing yields from wells are usually due to (1) permanent lowering of the water table, (2) mechanical malfunctions, or (3) secondary plugging of formation, packing, casing and/or screen openings.

Permanent lowering of the water table is not readily corrected. Mechanical malfunctions of pumping equipment may be corrected, though sometimes at great expense. However, if decreasing production is caused by temporary drawdown due to plugging, in some cases reasonable remedial measures can be taken. Secondary plugging is caused by (1) chemical or biochemical precipitates, (2) biological accumulations, and/or (3) mechanical plugging by clay, sand and rock fragments from the formation. Even after water enters the pumping system, inefficiencies result from chemical and biological "build-ups" inside the column pipe.

Chemically and biochemically precipitated materials obstruct fluid flow, cause corrosion, and abrasion. The chemical and biochemical precipitates usually affect the down-hole equipment more than the aquifer. Biological pollution of wells on the High Plains also seems to be restricted principally, if not wholly, to installed equipment. Fortunately, localization of the trouble makes for a much easier cure.

Various kinds of plants (blue-green algae, brown mold fungi, diatoms, several kinds of aerobic and anaerobic bacteria) and animals (worms, beetle and fly larvae) have been reported in wells on the High Plains. Not only does the mass of organic matter prevent free flow, but some organisms cause deposition of inorganic precipitates. Some of the pitting, corrosion, and deposition of iron compounds on pumping equipment and casing is undoubtedly attributable to bacteria.

(Continued on Page 4)



Proper chemical treatment will remove, or better, will prevent "build-ups" like this on pumping equipment.

## Annual "Water Statment" Shows Continued Decline In Water Level

By DONALD L. REDDELL

The records of water-levels in wells and their interpretation have long formed an important part of groundwater work. The High Plains Water District with the assistance of the Texas Water Commission is attempting to provide the people of the Water District the best water level information available anywhere. Numerous observation wells have been established in the Water District in which depths to water below land surface are measured each year.

A bank keeps an accurate record of the amount of money on deposit for each of its depositors. The bank also keeps its depositors informed as to the amount of money on deposit by sending out bank statements. The ground-water deposited below the surface of the High Plains is similar to a bank account. It has accumulated over a long period of time and has been stored for us to use. If we use more water than goes back as recharge we have a reduction in our water deposit.

Water-level measurements help us to tell whether our deposit is getting smaller or larger. In this issue of the CROSS SECTION we are giving our annual "Water Statement" by publishing the water-levels made in observation wells in the Water District. Study these records carefully and

determine if we have withdrawn more water from our account during the past few years than we have added as recharge. A summary of the results are shown in the table below.

The Water District is attempting to inform the people of the area about the water on deposit beneath our land much as a bank informs its customers. However, time is required to obtain reliable results in ground-water investigations. Ground-water work deals with events that are always changing. Therefore, past records that were not recorded are gone forever and future records can be obtained only with the passing of time. For this reason, periodic observations should be made and records of ground water changes should be kept so that reliable data will accumulate for use in the future.

The observation-well program is extremely important. This program should keep the people of the Water District informed by furnishing them with reliable periodic inventories of ground-water on deposit beneath the Water District. With an informed people, adequate provisions may be made for the future water supply of the District. I hope that you will do more than look at these water-level measurements as published here. I hope that you will STUDY them.

### Average Change In Water Levels In High Plains Water District By Counties

County	1959-1964		1963-1964	
	No. of Wells	Average Decline Per Well	No. of Wells	Average Decline PerWell
Armstrong	—	—	9	2.99
Bailey	25	7.89	35	1.88
Castro	22	17.61	57	4.27
Cochran	43	4.80	54	1.23
Deaf Smith	33	10.47	66	3.04
Floyd	61	17.52	92	4.55
Hockley	31	4.84	70	0.66
Lamb	33	10.92	50	1.62
Lubbock	93	9.28	98	2.17
Lynn	28	+0.14	28	+0.95
Parmer	35	18.01	36	3.88
Potter	—	—	4	5.22
Randall	13	8.27	36	2.45
Totals for High Plains Water District				
Average Decline Per Well		10.34	2.49	
Average Decline Per Year Per Well		2.07	2.49	



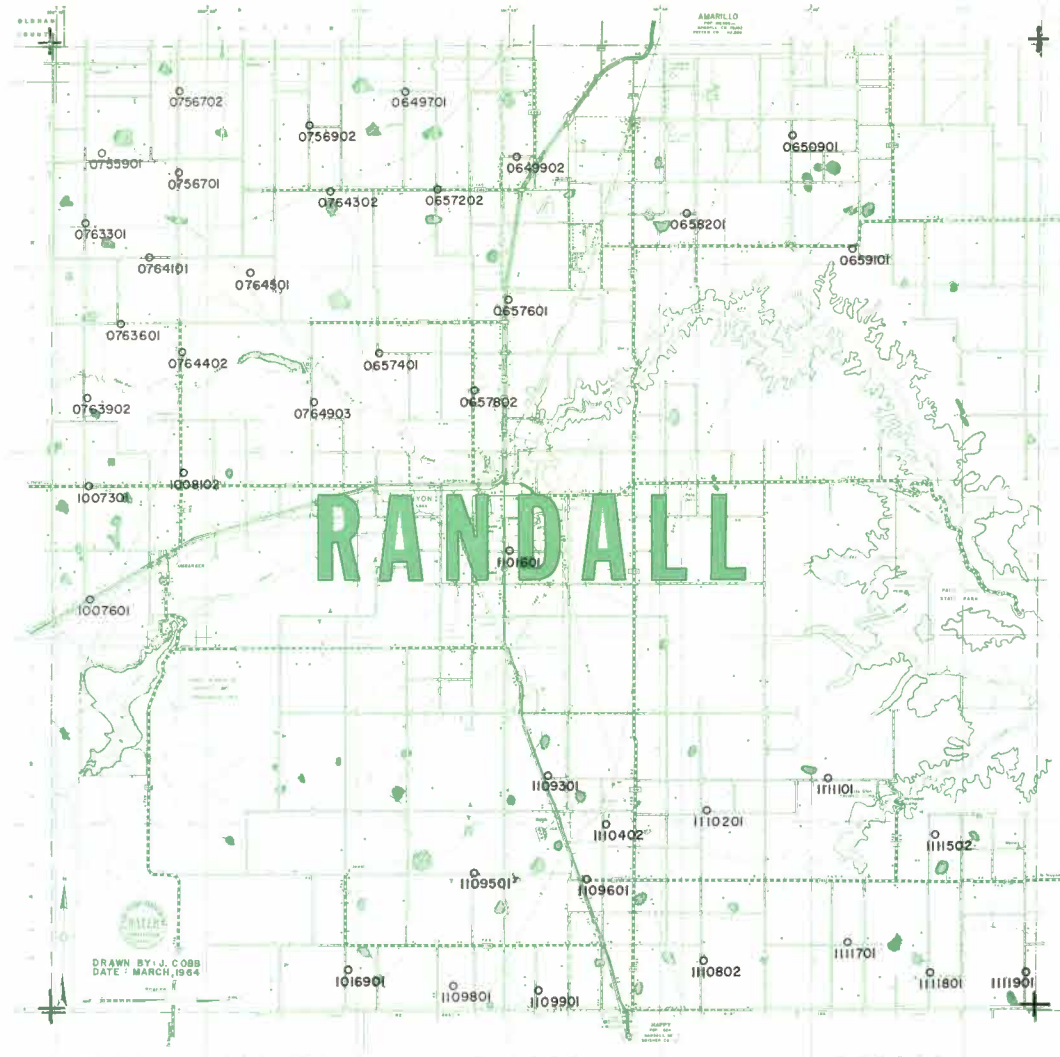
# Water Level Measurements In Observation Wells In High Plains Water District

EDITOR'S NOTE: Official water-level measurements for a majority of the observation wells within the High Plains Underground Water Conservation District are shown below. The measurements were made by the High Plains Water District in cooperation with the Texas Water Commission.

The accompanying maps show the approximate location of the observation wells together with identifying well numbers. Use of a data processing system by the Texas Water Commission in tabulating and maintaining the state-wide observation well program necessitates the use of a seven-digit number.

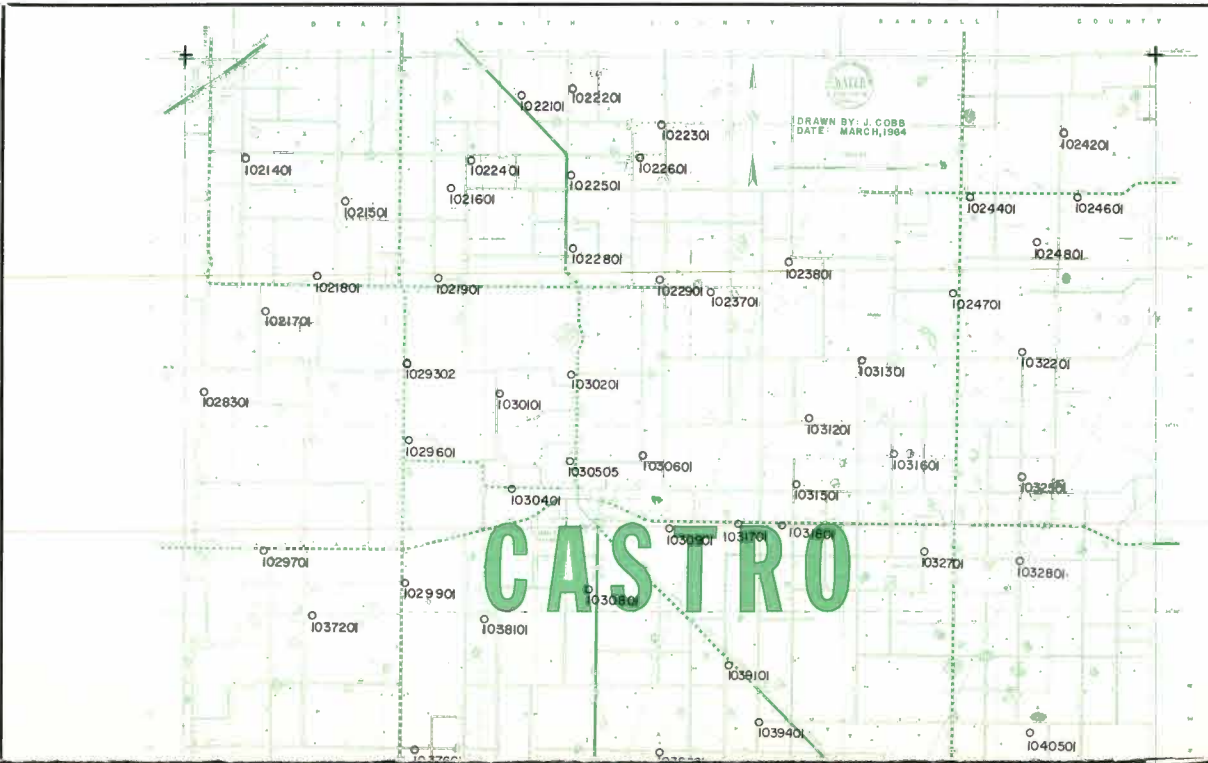
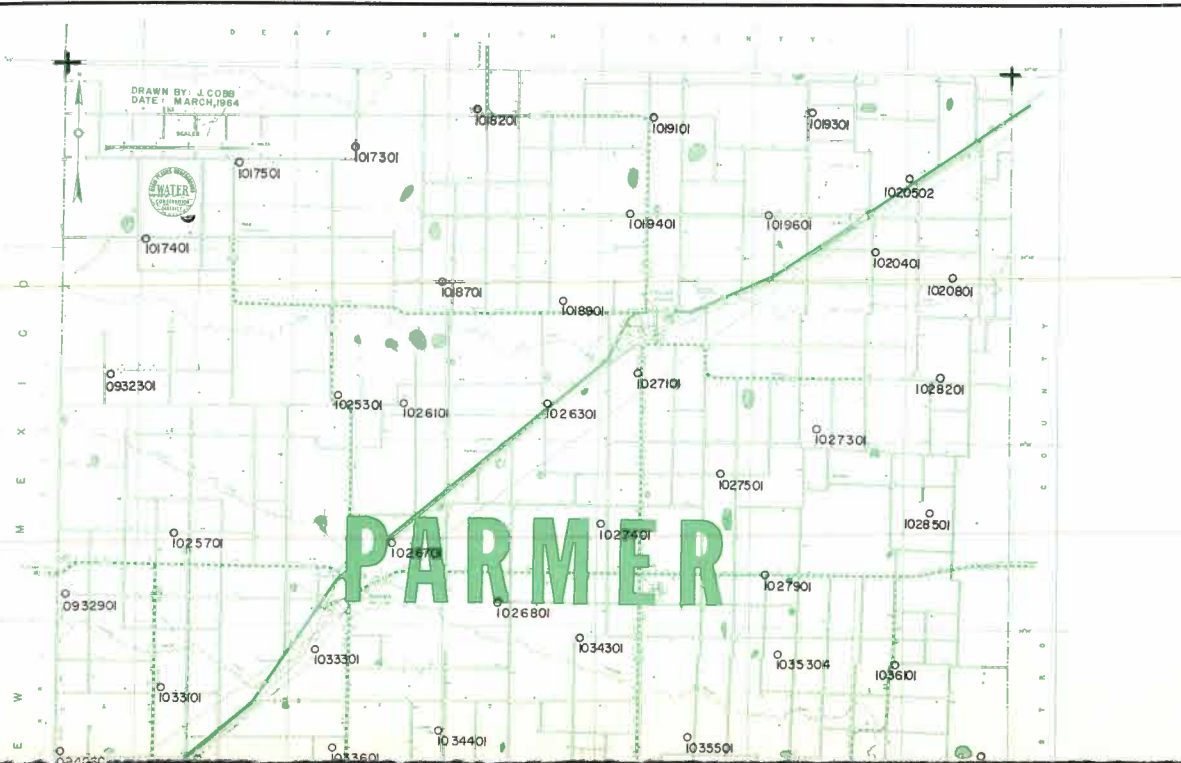
Measurements made in 1959, 1963 and 1964 are shown. Also, the decline for the five-year period 1959-1964 and the one-year period 1963-1964 are shown. The purpose of using these three years is to show what has been happening to the water-level over a several-year period, as well as during the past year.

Measurements are made each year during January, prior to the beginning of extensive pumping for preplant irrigation. All measurements were made by personnel of the Texas Water Commission and the High Plains Underground Water Conservation District.

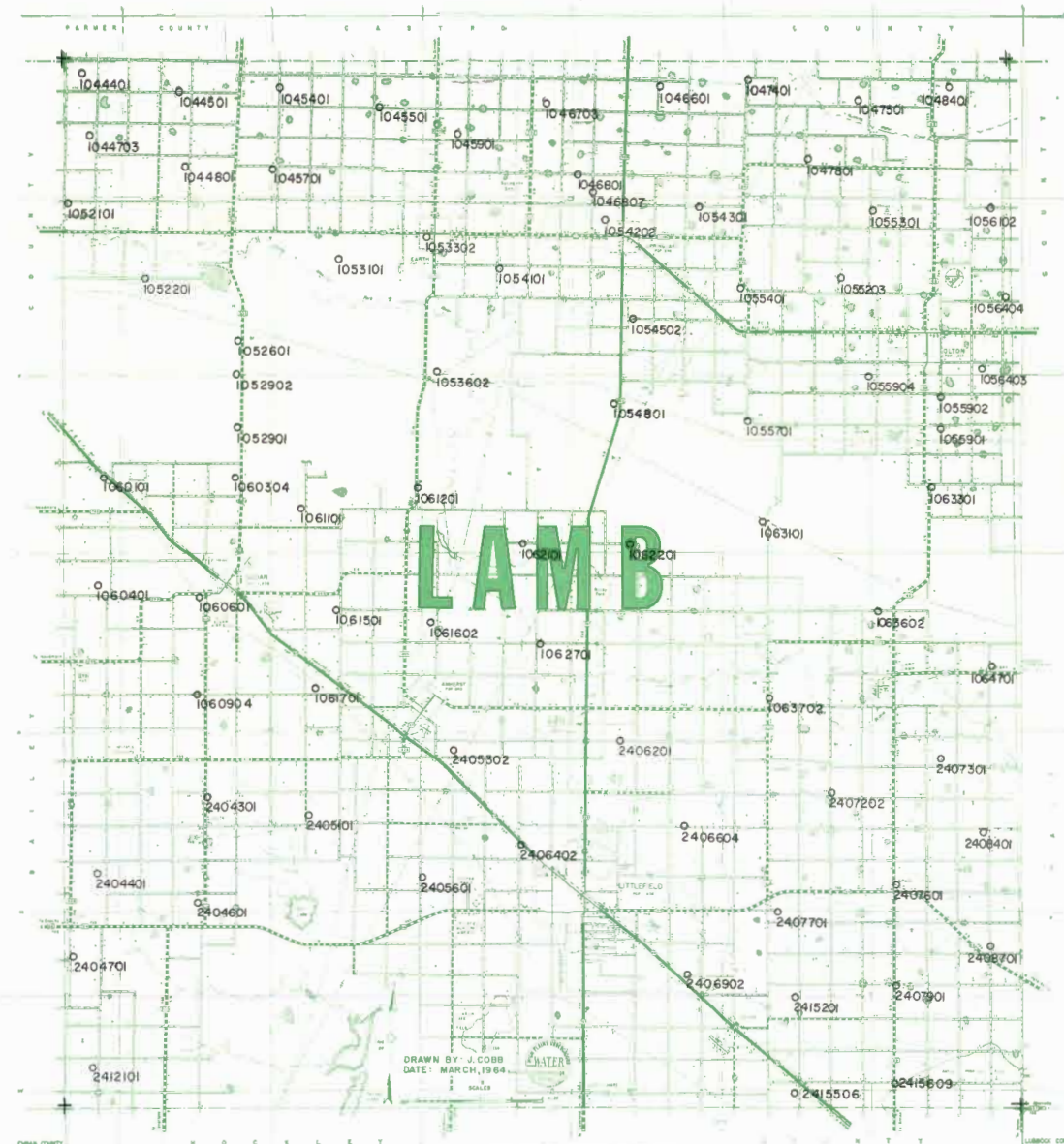
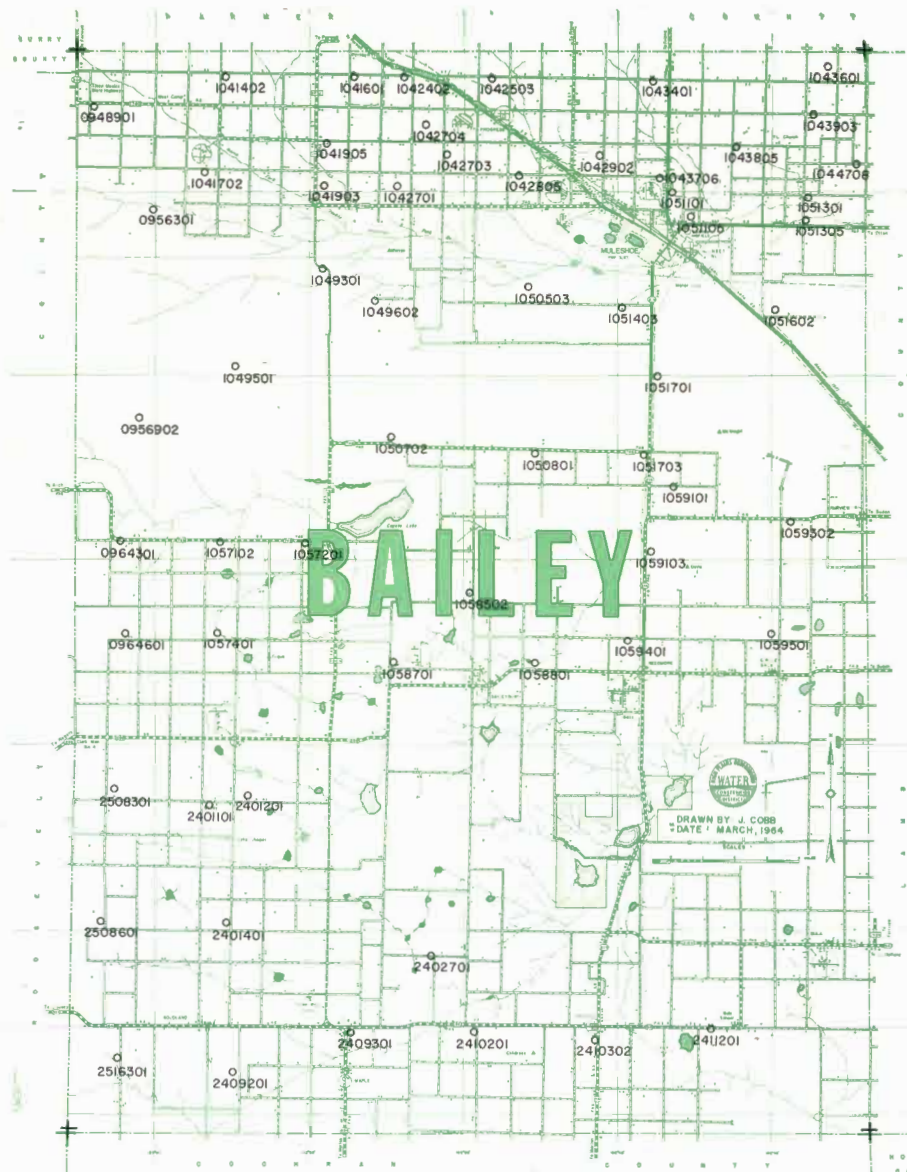


RANDALL COUNTY					
Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
06 49 701	-----	200.32	207.02	-----	6.70
06 49 902	-----	196.37	197.62	-----	1.25
06 50 901	-----	199.84	200.78	-----	0.94
06 57 202	-----	176.52	178.83	-----	2.31
06 57 401	147.75	159.58	160.53	12.78	0.95
06 57 601	145.05	148.40	149.20	4.15	0.80
06 57 802	-----	126.74	129.73	-----	2.99
06 58 201	-----	197.85	201.52	-----	3.67
06 59 101	-----	197.54	197.41	-----	+0.13
07 55 901	-----	161.74	173.89	-----	12.15
07 56 701	160.27	170.73	177.78	17.51	7.05
07 56 702	183.23	192.04	196.51	13.28	4.47
07 56 902	-----	169.33	172.26	-----	2.93
07 63 301	-----	178.75	-----	-----	-----
07 63 601	119.30	124.34	126.37	7.07	2.03
07 63 902	-----	114.56	115.82	-----	1.26
07 64 101	-----	171.86	-----	-----	-----
07 64 302	138.60	139.29	141.12	2.52	1.83
07 64 402	-----	100.08	101.87	-----	1.79
07 64 501	-----	141.17	132.87	-----	+8.30
07 64 903	127.40	140.58	137.41	10.01	+3.17
10 07 301	-----	115.07	118.42	-----	3.35
10 07 601	-----	90.37	95.29	-----	4.92
10 08 102	123.20	133.09	134.69	11.49	1.60
10 16 901	178.77	175.66	178.46	+0.31	2.80
11 01 601	5.50	4.92	4.94	+0.56	0.02
11 09 301	-----	156.63	161.64	-----	5.01
11 09 501	-----	172.81	178.64	-----	5.83
11 09 601	187.08	190.04	195.23	8.15	5.19
11 09 801	174.50	178.99	-----	-----	-----
11 09 901	156.68	170.52	173.31	16.63	2.79
11 10 201	-----	151.32	151.73	-----	0.41
11 10 402	171.02	168.25	175.85	4.83	7.60
11 10 802	-----	160.73	158.09	-----	+2.64
11 11 101	-----	130.03	130.99	-----	0.96
11 11 502	-----	157.66	158.21	-----	0.55
11 11 701	-----	150.51	152.55	-----	2.04
11 11 801	-----	97.08	100.69	-----	3.61
11 11 901	-----	101.99	104.49	-----	2.50

Number of Wells ..... 13 36  
 Average Decline Per Well ..... 8.27 2.45  
 Average Decline Per Year Per Well ..... 1.65 2.45







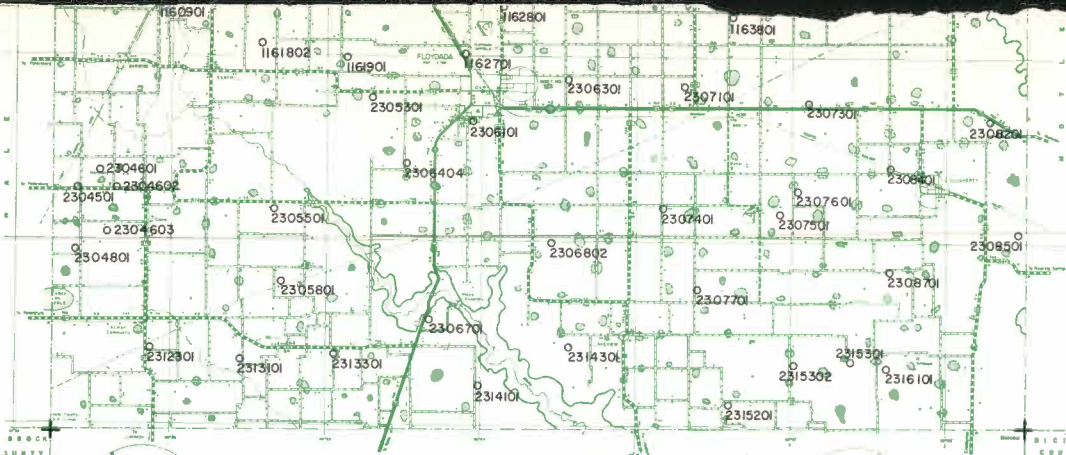
**BAILEY COUNTY**

**LAMB COUNTY**

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
09 48 901	109.06	115.16				10 51 301	46.74		47.25	0.51	
09 56 301		61.28	62.06		0.78	10 51 305	43.42	50.44	50.68	7.26	0.24
09 56 902			39.64			10 51 403		30.65	28.67		+1.98
09 64 301			51.41			10 51 602	29.45	25.89	26.74	+2.71	0.85
09 64 601			132.25			10 51 701		60.50			
10 41 402	114.80	122.78	125.83	11.03	3.05	10 51 703	71.90	82.25	78.36	6.46	+3.89
10 41 601	104.13	111.34	115.67	11.54	4.33	10 57 102			77.87		
10 41 702	68.32	73.81	76.51	8.19	2.70	10 57 201			26.29		
10 41 903	56.70	62.22	63.28	6.58	1.06	10 57 401		111.91	117.17		5.26
10 41 905	78.02	84.12	86.09	8.07	1.97	10 58 502			73.68		
10 42 402	95.94	102.91	106.05	10.11	3.14	10 58 701			46.49		
10 42 503	89.86	96.17	98.25	8.39	2.08	10 58 801			19.21		
10 42 701	59.64	69.41	71.79	12.15	2.38	10 59 101	82.73	116.18	105.76	23.03	+10.42
10 42 703		78.61	81.42		2.81	10 59 103		94.52			
10 42 704			92.64			10 59 302			106.31		
10 42 805	52.49	58.86	62.19	9.70	3.63	10 59 401	100.15	110.73	106.99	6.84	+3.74
10 42 902	60.14	69.58	69.44	9.30	+0.14	10 59 501			102.39		
10 43 401	78.36	91.91	93.71	15.35	1.80	24 01 101	226.75	225.71	225.61	+1.14	+0.10
10 43 601	88.84	87.95	100.98	12.14	13.03	24 01 201	198.30	206.74	206.24	7.94	+0.50
10 43 706	67.25	71.46	71.61	4.36	0.15	24 01 401		169.24	172.63		3.39
10 43 805		66.21	67.31		1.10	24 02 701			59.34		
10 43 903	71.82	78.69	81.56	9.74	2.87	24 09 201		141.07	144.04		2.97
10 44 708	59.32	65.29	68.04	8.72	2.75	24 09 301			89.23		
10 49 301	24.36	26.29				24 10 201			103.19		
10 49 501	73.20	74.25				24 10 302			90.52		
10 49 602	37.28	39.37	40.37	3.09	1.00	24 11 201			107.15		
10 50 503		21.94	37.68		15.74	25 08 301		81.98			
10 50 702			82.94			25 16 301		116.54	119.32		2.78
10 50 801		70.37	73.52		3.15						
10 51 101	61.23	60.61	61.86	0.63	1.25						
10 51 105		44.58	44.88		0.30						
						Number of Wells				25	35
						Average Decline Per Well				7.89	1.88
						Average Decline Per Year Per Well				1.58	1.88

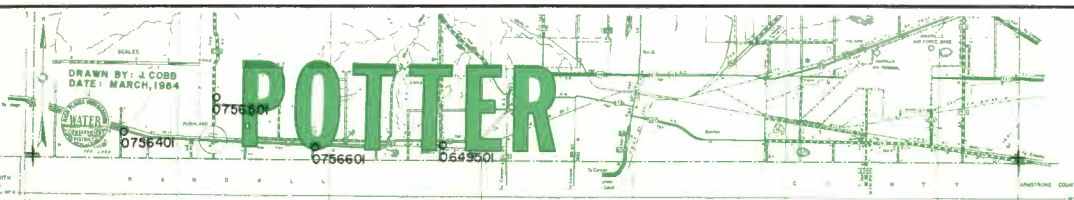
Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
10 44 401	93.65	98.26	115.14	21.49	16.88	10 60 401		126.16	123.47		+2.69
10 44 501			109.54			10 60 601		101.89	101.66		+0.23
10 44 703	72.36	79.10	85.56	13.20	6.46	10 60 904		137.50	138.05		0.55
10 44 801	60.05		67.46	7.41		10 61 101	53.76	61.69	64.93	11.17	3.24
10 45 401		110.50	111.83		1.33	10 61 201	44.45		50.89	6.44	
10 45 501			132.03			10 61 501			160.14		
10 45 701	64.52	72.00	75.79	11.27	3.79	10 61 602			90.18		
10 45 901			132.22			10 61 701			106.23		
10 46 601			149.29			10 62 101		46.33	47.75		1.42
10 46 703	126.63	139.57	143.45	16.82	3.88	10 62 201			92.79		
10 46 801	122.30	133.50				10 62 701	103.18	110.23	112.98	9.80	2.75
10 46 807	122.70	131.56				10 63 101		64.20	64.62		0.42
10 47 401	111.94	122.06	125.33	13.39	3.27	10 63 301	82.18	82.43	86.61	4.43	4.18
10 47 501			119.68			10 63 602			101.39		
10 47 801	133.38	148.05	150.61	17.23	2.56	10 63 702	115.89	124.66	124.28	8.39	+0.38
10 48 401	111.34	129.33	130.15	18.81	0.82	10 64 701			105.79		
10 52 101	58.86	58.40	60.92	2.06	2.52	24 04 301		63.40	53.94		+9.46
10 52 201			37.03			24 04 401			164.86		
10 52 601	26.58	28.78	29.31	2.73	0.53	24 04 601		66.09	65.16		+0.93
10 52 901	55.45	59.49	62.06	6.61	2.57	24 04 701		71.24			
10 52 902						24 05 101		37.60	37.49		+0.11
10 53 101		58.90	50.04		+8.86	24 05 302		98.45	98.64		0.19
10 53 302	58.35	67.00	68.94	10.59	1.94	24 05 601			89.81		
10 53 602	36.90	44.19				24 06 201			117.79		
10 54 101	68.90	74.61	75.18	6.28	0.57	24 06 402	80.37	84.76	84.36	3.99	+0.40
10 54 202	102.87	113.01	114.19	11.32	1.18	24 06 604		107.70	110.01		2.31
10 54 301	121.87	135.02	138.41	16.54	3.39	24 06 902	77.42	86.22	85.18	7.76	+1.04
10 54 502			87.61			24 07 202	126.45	133.26	140.98	14.53	7.72
10 54 801						24 07 301	113.00	116.34	118.39	5.39	2.05
10 55 203	124.60		140.57	15.97		24 07 601	131.85	133.39	138.04	6.19	4.65
10 55 301	135.90	150.65	157.87	21.97	7.22	24 07 701	118.00	126.19	127.87	9.87	1.68
10 55 401			147.06			24 07 901		115.20	102.63		+12.57
10 55 701			72.63			24 08 401			137.53		
10 55 901			101.69			24 08 701			114.98		





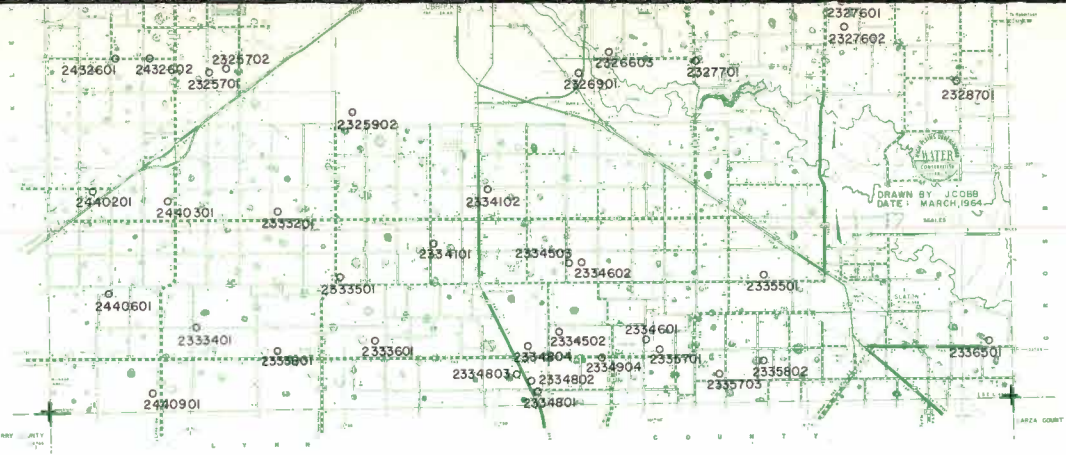
**FLOYD COUNTY**

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
11 44 901	93.10	105.07	109.44	16.34	4.37	11 61 601	38.74	44.14	-----	-----	-----
11 44 902	86.70	99.83	106.73	20.03	6.90	11 61 801	143.74	159.56	170.96	27.22	11.40
11 45 802	120.74	129.75	133.19	12.45	3.44	11 61 802	134.00	144.12	160.57	26.57	16.45
11 45 803	124.61	133.53	137.42	12.81	3.89	11 61 901	133.24	153.57	161.93	28.69	8.36
11 45 902	140.30	144.81	158.09	17.79	13.28	11 62 201	-----	133.63	135.73	-----	2.10
11 46 701	-----	164.17	167.87	-----	3.70	11 62 401	-----	55.80	-----	-----	-----
11 46 801	-----	207.58	212.84	-----	5.26	11 62 601	-----	147.06	147.89	-----	0.83
11 47 701	-----	214.80	220.52	-----	5.72	11 62 701	113.68	116.73	117.44	3.76	0.71
11 52 301	103.90	112.94	118.48	14.58	5.54	11 62 702	-----	94.31	95.39	-----	1.08
11 52 302	100.06	119.36	125.11	25.05	5.75	11 62 801	-----	89.66	92.08	-----	2.42
11 52 303	126.60	145.90	151.97	25.37	6.07	11 62 901	-----	171.26	-----	-----	-----
11 52 304	107.41	128.27	138.17	30.76	9.90	11 63 101	-----	155.66	155.98	-----	0.32
11 52 601	141.05	140.53	143.52	2.47	2.99	11 63 801	-----	192.54	194.96	-----	2.42
11 52 603	126.00	142.12	144.89	18.89	2.77	11 64 101	-----	210.32	217.49	-----	7.17
11 52 604	109.50	135.04	-----	-----	-----	11 64 401	235.42	235.86	236.16	0.74	0.30
11 52 801	-----	134.76	137.52	-----	2.76	11 64 502	-----	263.78	-----	-----	-----
11 52 901	141.93	143.79	154.53	12.60	5.74	23 04 501	130.69	150.80	158.61	27.92	7.81
11 52 902	134.60	138.70	149.43	14.83	10.73	23 04 601	127.22	145.15	150.74	23.52	5.59
11 52 903	134.50	146.33	149.22	14.72	2.89	23 04 602	135.64	154.50	158.61	22.97	4.11
11 52 905	139.85	148.83	151.83	11.98	3.00	23 04 603	129.11	153.48	161.69	32.58	8.21
11 53 101	118.61	129.02	148.41	29.80	19.39	23 04 801	104.57	135.04	143.45	38.88	8.41
11 53 201	123.40	131.53	134.33	10.93	2.80	23 05 301	142.68	157.70	164.86	22.18	7.16
11 53 202	121.77	127.63	136.27	14.50	8.64	23 05 501	-----	176.86	185.03	-----	8.17
11 53 203	-----	132.66	139.36	-----	6.70	23 05 801	172.70	-----	-----	-----	-----
11 53 402	144.63	147.46	149.51	4.88	2.05	23 06 101	147.01	151.15	152.96	5.95	1.81
11 53 501	151.42	163.51	167.43	16.01	3.92	23 06 301	152.97	155.19	158.32	5.35	3.13
11 53 701	-----	149.68	152.60	-----	2.92	23 06 404	163.13	175.34	181.91	18.78	6.57
11 53 702	127.40	138.28	141.85	14.45	3.57	23 06 701	168.40	184.64	186.96	18.56	2.32
11 53 703	135.80	145.90	148.82	13.02	2.92	23 06 802	178.09	188.58	196.40	18.31	7.82
11 53 704	146.29	156.73	157.83	11.54	1.10	23 07 101	-----	203.97	208.99	-----	5.02
11 54 301	215.55	-----	223.87	8.32	-----	23 07 301	-----	222.58	-----	-----	-----
11 54 401	-----	166.29	168.71	-----	2.42	23 07 401	-----	233.45	231.71	-----	+1.74
11 54 901	-----	207.49	210.88	-----	3.39	23 07 501	234.69	241.18	267.88	33.19	26.70
11 55 701	-----	216.54	220.57	-----	4.03	23 07 601	236.80	243.13	259.16	22.36	16.03
11 55 901	-----	267.16	267.15	-----	+0.01	23 07 701	-----	213.24	195.64	-----	+17.60
11 60 301	126.17	136.42	138.22	12.05	1.80	23 08 201	-----	264.86	263.61	-----	+1.25
11 60 302	-----	142.22	144.46	-----	2.24	23 08 401	-----	265.53	263.64	-----	+1.89
11 60 303	131.87	140.12	142.04	10.17	1.92	23 08 501	-----	252.50	252.57	-----	0.07
11 60 501	110.64	124.97	128.31	17.67	3.34	23 08 701	-----	261.18	264.80	-----	3.62
11 60 601	128.85	139.74	143.33	14.48	3.59	23 12 301	126.00	144.89	154.36	28.36	9.47
11 60 602	120.05	131.60	138.87	18.82	7.27	23 13 101	-----	159.86	163.39	-----	3.53
11 60 901	109.54	126.83	127.70	18.16	0.87	23 13 301	-----	174.23	179.02	-----	4.79
11 61 101	140.65	151.50	157.36	16.71	5.86	23 14 101	-----	194.25	198.96	-----	4.71
11 61 102	144.58	154.31	160.17	15.59	5.86	23 14 301	-----	201.91	194.73	-----	+7.18
11 61 104	130.20	142.57	145.36	15.16	2.79	23 15 201	-----	243.93	246.17	-----	2.24
11 61 105	134.72	147.49	151.90	17.18	4.41	23 15 301	-----	267.54	266.13	-----	+1.41
11 61 203	149.24	162.95	167.73	18.49	4.78	23 15 302	253.80	255.86	262.87	9.07	7.01
11 61 204	141.42	155.26	160.03	18.61	4.77	23 16 101	259.81	265.41	271.98	12.17	6.57
11 61 301	37.99	38.60	39.31	1.32	0.71	Number of Wells				61	92
11 61 401	135.94	153.92	159.63	23.69	5.71	Average Decline per Well				17.52	4.55
11 61 403	128.97	148.60	153.61	24.64	5.01	Average Decline per Year per Well				3.50	4.55
11 61 404	134.37	153.56	159.39	25.02	5.83						



**POTTER COUNTY**

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change		
06 49 501	-----	176.57	178.98	-----	2.39	Number of Wells	
07 56 401	-----	204.76	210.88	-----	6.12	Average Decline Per Well	
07 56 501	-----	200.21	204.18	-----	3.97	5.22	
07 56 601	-----	183.89	192.31	-----	8.42	Average Decline Per Year Per Well	
						5.22	

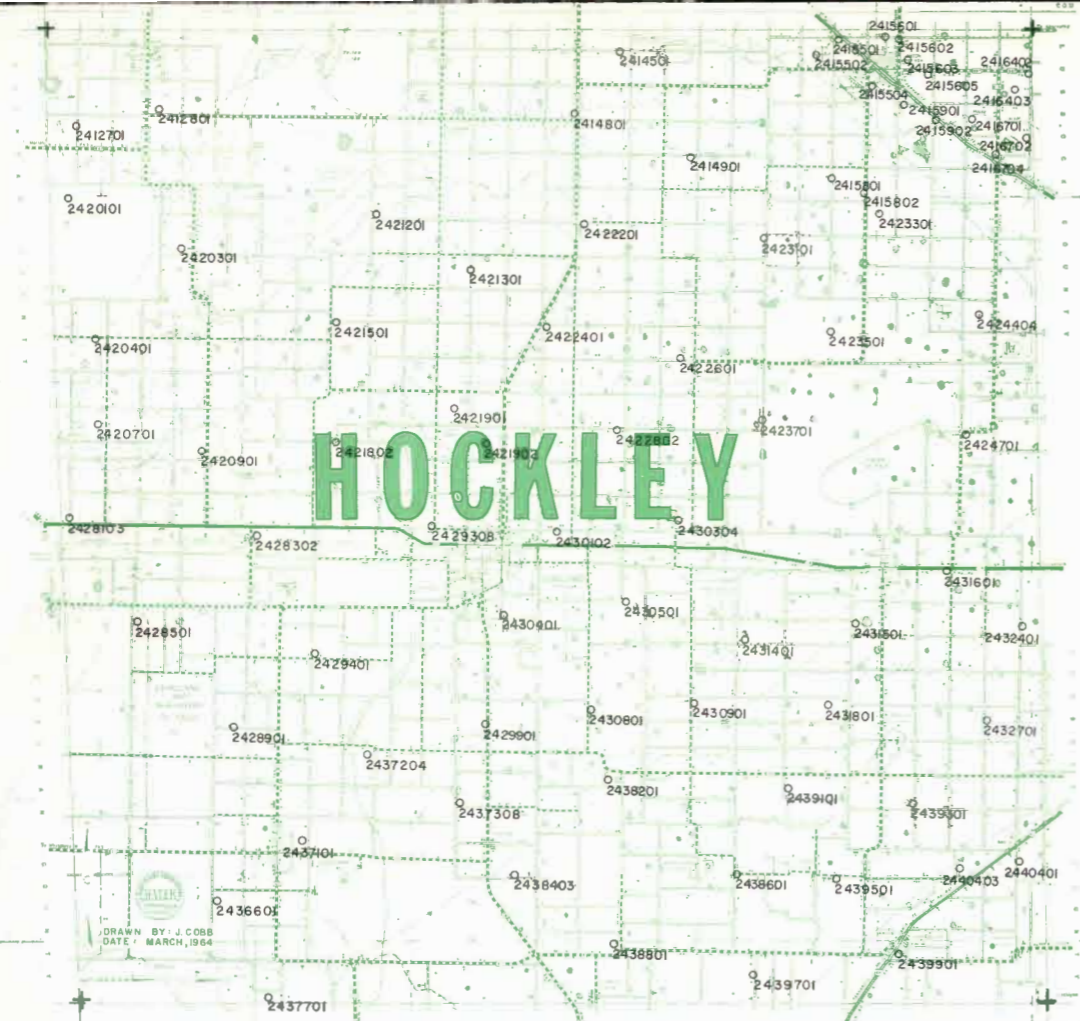


**LUBBOCK COUNTY**

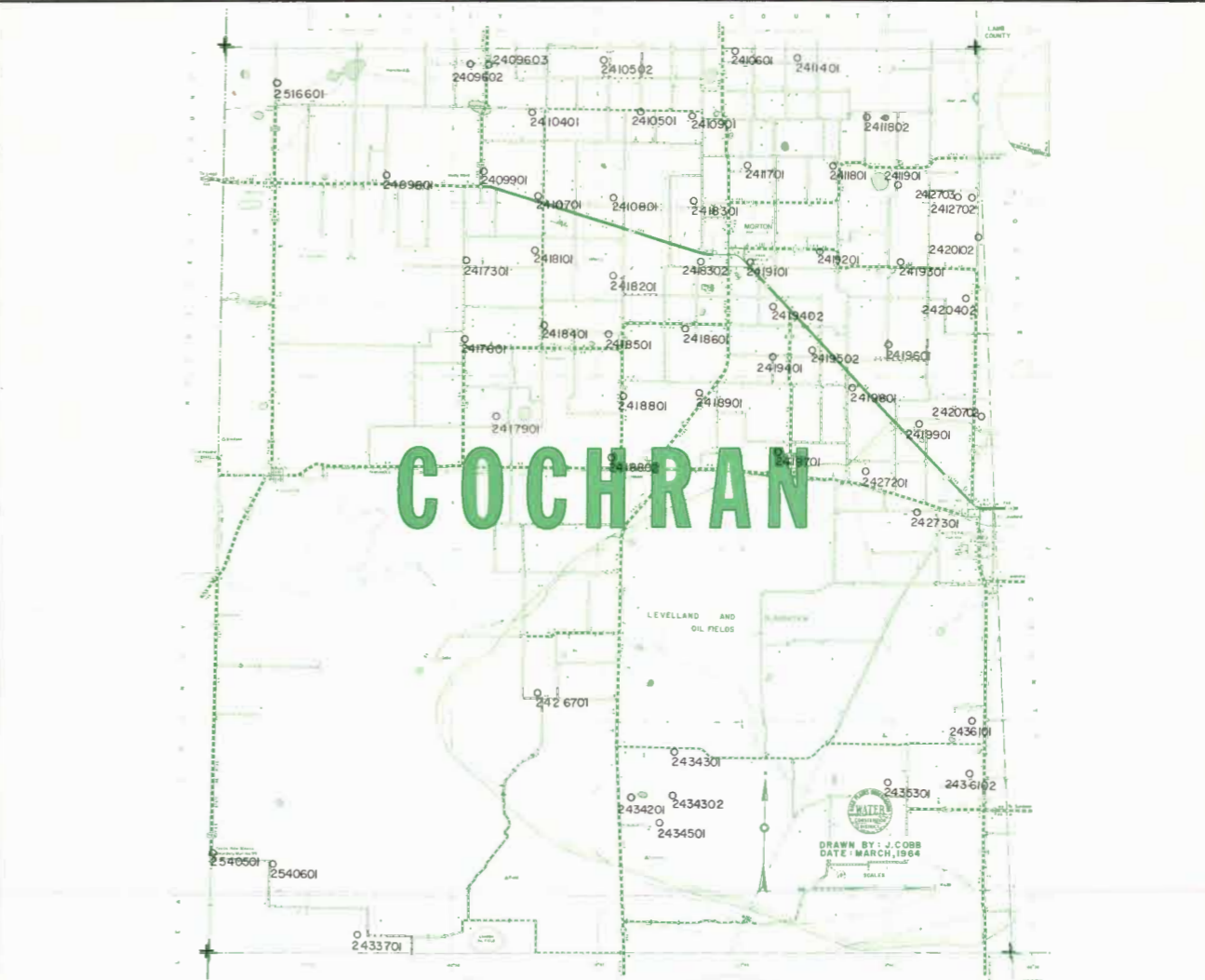
Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
23 09 501	134.05	147.14	147.31	13.26	0.17	23 25 701	106.56	114.59	116.47	9.91	1.88
23 09 601	116.10	128.94	131.81	15.71	2.87	23 25 702	100.78	109.32	-----	-----	-----
23 09 701	-----	138.69	140.77	-----	2.08	23 25 902	105.95	109.76	108.33	2.38	+1.43
23 09 901	160.75	170.86	172.17	11.42	1.31	23 26 101	74.20	74.35	-----	-----	-----
23 09 902	-----	144.30	150.01	-----	5.71	23 26 201	93.84	-----	-----	-----	-----
23 10 501	154.05	163.10	167.03	12.98	3.93	23 26 301	87.52	92.56	92.20	4.68	+0.36
23 10 702	-----	-----	154.81	-----	-----	23 26 603	27.57	-----	8.00	+19.57	-----
23 10 801	139.45	148.48	152.74	13.29	4.26	23 26 901	53.25	50.45	50.56	+2.69	0.11
23 11 401	142.30	161.65	159.94	17.64	+1.71	23 27 101	86.85	91.71	93.52	6.67	1.81
23 11 601	139.53	149.81	152.51	12.98	2.70	23 27 201	80.42	83.61	85.03	4.61	1.42
23 11 701	140.03	152.82	157.17	17.14	4.35	23 27 202	72.54	77.61	78.30	5.76	0.69
23 11 702	136.96	146.40	150.98	14.02	4.58	23 27 203	74.33	80.22	80.02	5.69	+0.20
23 11 901	119.95	131.78	136.21	16.26	4.43	23 27 204	77.60	80.19	81.42	3.82	1.23
23 11 902	137.47	145.91	147.98	10.51	2.07	23 27 302	67.50	69.58	73.14	5.64	3.56
23 11 903	119.13	133.68	137.72	18.59	4.04	23 27 303	53.95	-----	-----	-----	-----
23 12 401	140.98	152.98	156.23	15.25	3.25	23 27 601	75.11	77.68	81.48	6.37	3.80
23 12 402	144.65	153.28	157.57	12.92	4.29	23 27 602	85.08	87.35	93.82	8.74	6.47
23 12 803	131.64	141.35	146.80	15.16	5.45	23 27 701	-----	-----	96.93	-----	-----
23 17 201	123.23	132.25	133.07	9.84	0.82	23 28 701	61.80	61.02	63.14	1.34	2.12
23 17 202	-----	129.06	132.25	-----	3.19	23 33 201	121.30	128.31	-----	-----	-----
23 17 501	107.18	113.73	118.11	10.93	4.38	23 33 401	99.26	102.05	102.32	3.06	0.27
23 17 701	95.70	101.85	99.87	4.17	+1.98	23 33 501	102.91	106.22	108.82	5.91	2.60
23 17 703	88.25	88.79	89.07	9.82	0.82	23 33 601	99.65	104.05	106.08	6.43	2.03
23 17 704	74.42	71.71	71.70	+2.72	+0.01	23 33 801	94.94	99.09	96.21	1.27	+2.88
23 17 705	77.49	79.66	82.83	5.35	3.17	23 34 101	109.60	113.24	113.58	3.98	0.34
23 17 706	77.82	88.88	88.02	10.20	+0.86	23 34 102	103.26	-----	-----	-----	-----
23 17 801	73.98	-----	77.94	3.96	-----	23 34 502	124.44	125.21	126.55	2.11	1.34
23 17 802	55.31	58.90	57.32	2.01	+1.58	23 34 503	106.89	112.17	114.59	7.70	2.42
23 17 901	75.29	74.91	79.81	4.52	4.90	23 34 601	110.95	112.16	114.68	3.73	2.52
23 18 201	124.80	135.16	138.27	13.47	3.11	23 34 602	118.14	115.50	-----	-----	-----
23 18 301	-----	157.92	155.50	-----	+2.42	23 34 801	125.80	131.38	135.41	9.61	4.03
23 18 401	51.07	56.42	-----	-----	-----	23 34 802	122.76	127.78	131.40	8.64	3.62
23 18 402	108.54	117.65	121.52	12.98	3.87	23 34 903	121.45	128.32	131.16	9.71	2.84
23 18 403	108.55	115.43	117.05	8.50	1.62	23 34 804	121.29	128.35	-----	-----	-----
23 18 404	111.88	121.43	125.27	13.39	3.84	23 34 902	118.92	121.50	123.39	4.47	1.89
23 18 502	-----	-----	110.83	-----	-----	23 34 904	-----	124.08	126.31	-----	2.23
23 18 601	114.15	123.81	129.47	15.32	5.66	23 35 501	-----	88.01	-----	-----	-----
23 18 701	65.78	-----									



10 55 901	98.90	101.00	2.12	2.04	24 12 101	69.21	69.92	0.71	0.71
10 55 902	117.92	120.96	3.04	1.93	24 15 201	104.80	105.16	0.36	0.36
10 56 102	140.38	153.12	12.74	5.56	24 15 506	66.28	72.12	5.84	6.49
10 56 403	140.77	145.28	4.51	4.51	24 15 609	110.33	118.36	8.03	8.61
10 56 404	135.08	151.47	16.39	6.32	Number of Wells _____ 33 50				
10 60 101	109.38	111.70	2.32	0.13	Average Decline Per Well _____ 10.92 1.62				
10 60 304	67.80	68.66	0.86	0.86	Average Decline Per Year Per Well _____ 2.18 1.62				

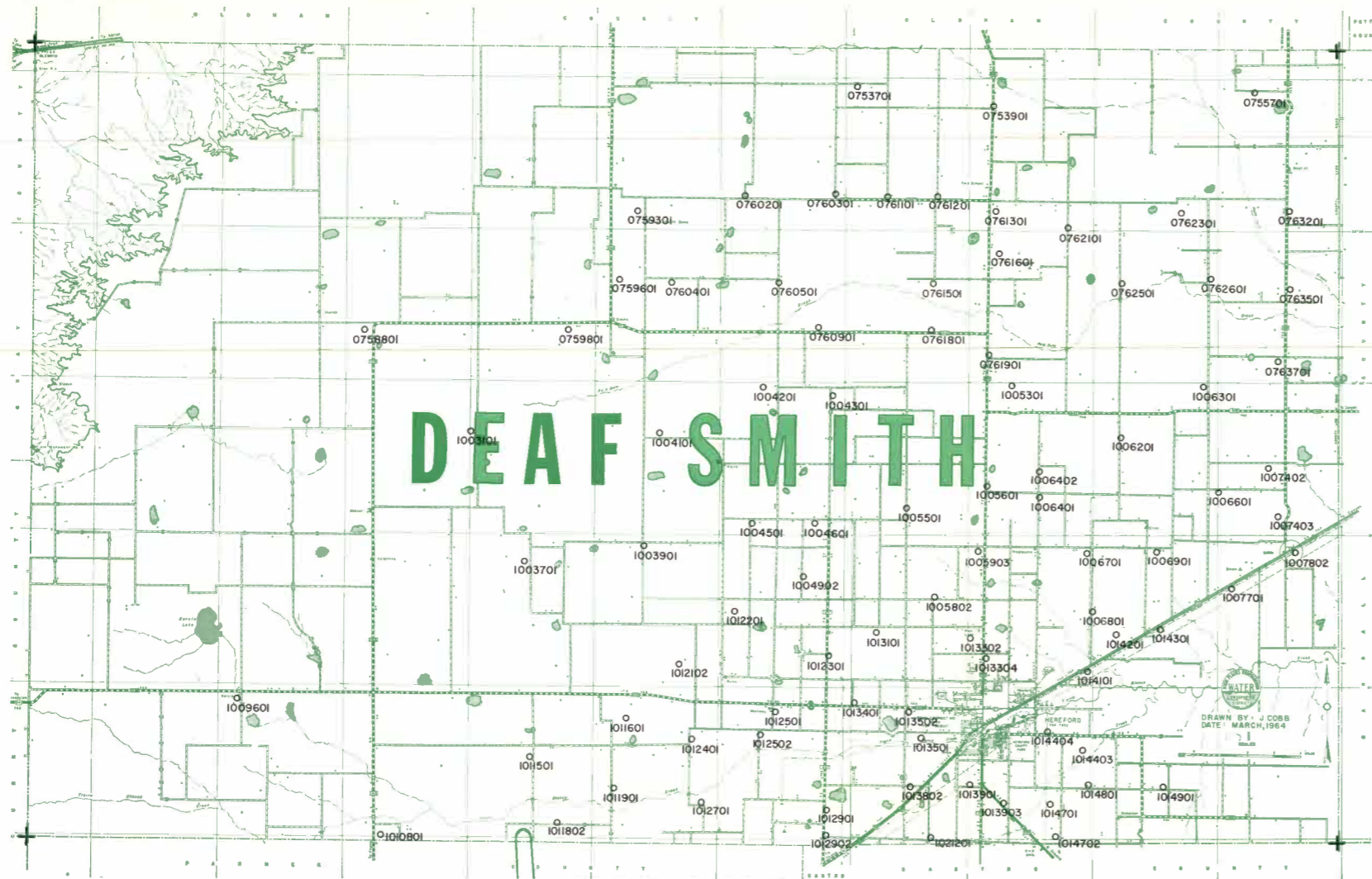


HOCKLEY COUNTY												
Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	
15 701	77.53	78.00	78.57	1.04	0.57	24 24 404	131.20	139.96	142.18	10.98	2.22	
14 801	55.05	50.84	50.10	+4.95	+0.74	24 24 701	---	124.28	124.75	---	0.47	
14 901	95.93	96.37	96.37	---	0.44	24 28 103	---	138.71	138.87	---	0.16	
15 501	59.75	66.32	66.06	6.31	+0.26	24 28 302	---	127.90	126.14	---	+1.76	
15 502	65.94	74.90	73.13	7.19	+1.77	24 28 501	---	143.96	143.40	---	+0.56	
15 504	59.77	63.38	64.10	4.33	0.72	24 28 901	---	150.97	150.55	---	+0.42	
15 601	92.96	94.26	94.26	1.30	---	24 29 308	---	131.44	133.80	---	2.36	
15 602	97.40	105.85	105.17	8.81	0.42	24 29 401	---	139.07	138.82	---	+0.25	
15 603	96.36	104.75	105.17	8.81	0.42	24 29 901	171.05	173.67	175.30	4.25	1.63	
15 605	76.80	84.48	84.48	---	---	24 30 102	---	124.65	125.96	---	1.31	
15 801	126.30	133.00	133.00	6.70	---	24 30 304	---	96.08	97.11	---	1.03	
15 802	167.95	174.60	171.29	3.34	+3.31	24 30 401	117.43	119.95	121.14	3.71	1.19	
15 901	42.75	41.96	42.00	+0.75	0.04	24 30 501	---	112.23	114.27	---	2.04	
15 902	42.26	43.29	43.09	0.83	+0.20	24 30 801	---	162.80	161.67	---	+1.13	
16 402	114.24	123.26	124.22	9.98	0.96	24 30 901	---	145.16	146.87	---	1.71	
16 403	90.79	98.77	98.17	7.38	+0.60	24 31 401	---	117.51	119.45	---	1.94	
16 701	56.88	60.23	60.70	3.82	0.47	24 31 501	---	73.66	75.51	---	1.85	
16 702	82.55	88.15	88.65	6.10	0.50	24 31 601	111.47	115.95	116.78	5.31	0.83	
16 704	99.20	104.20	105.50	6.30	1.30	24 31 801	---	141.45	142.31	---	0.86	
20 101	---	134.40	138.30	---	3.90	24 32 401	93.18	---	101.15	7.96	---	
20 301	---	118.99	121.60	---	2.61	24 32 701	---	111.79	111.78	---	+0.01	
20 401	---	115.01	114.30	---	+0.71	24 36 601	---	143.90	143.24	---	+0.66	
20 701	---	145.10	144.30	---	+0.80	24 37 101	---	135.09	135.29	---	0.20	
20 901	---	124.85	124.85	---	---	24 37 204	---	---	137.71	---	---	
21 201	---	38.55	39.66	---	1.11	24 37 308	---	130.55	131.75	---	1.20	
21 301	83.85	83.16	84.94	1.09	1.78	24 37 701	150.80	150.76	150.25	+0.55	+0.51	
21 501	136.30	141.24	143.20	6.90	1.96	24 38 201	---	154.46	156.67	---	2.21	
21 802	---	143.26	144.72	---	1.46	24 38 403	---	151.79	153.35	---	1.56	
21 901	138.14	144.42	146.52	8.38	2.10	24 38 601	118.39	124.27	124.09	5.70	+0.18	
21 902	147.98	149.80	152.78	4.80	2.98	24 38 801	---	155.91	157.15	---	1.24	
22 201	---	74.53	75.08	---	0.55	24 39 101	---	146.34	148.30	---	1.96	
22 401	---	84.41	82.80	---	+1.61	24 39 301	---	142.30	142.79	---	0.49	
22 601	---	98.34	96.80	---	+1.54	24 39 501	---	129.79	130.81	---	1.02	
22 802	---	114.94	116.55	---	1.61	24 39 701	---	107.07	107.84	---	0.77	
23 101	---	105.45	105.78	---	0.33	24 39 901	---	89.15	91.65	91.89	2.74	0.24
23 301	163.52	179.45	182.97	19.45	3.52	24 40 401	141.15	134.65	135.00	+6.15	0.35	
23 501	---	100.96	102.99	---	2.03	24 40 403	133.65	139.77	141.30	7.65	1.53	
23 701	---	99.36	98.67	---	+0.69	Number of Wells _____ 31 70						
					Average Decline Per Well _____ 4.84 0.66							
					Average Decline Per Year Per Well _____ 0.97 0.66							



COCHRAN COUNTY											
Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
24 09 602	103.55	106.95	106.95	---	---	24 19 101	127.55	133.31	133.31	---	---
24 09 603	99.05	102.98	102.98	---	---	24 19 201	135.46	138.86	139.10	3.64	0.24
24 09 801	120.89	121.74	122.40	1.51	0.66	24 19 301	149.86	153.25	153.52	3.66	0.27
24 09 901	92.89	94.47	96.50	3.61	2.03	24 19 401	136.44	143.73	145.57	9.13	1.84
24 10 401	106.22	107.76	108.45	2.23	0.69	24 19 402	129.74	135.52	137.48	7.74	1.96
24 10 501	94.10	93.97	94.35	0.25	0.38	24 19 502	148.30	155.46	156.55	8.25	1.09
24 10 502	87.54	86.97	87.23	+0.31	0.26	24 19 601	141.17	146.53	146.90	5.73	0.37
24 10 601	87.84	89.60	90.17	2.33	0.57	24 19 701	144.20	147.37	158.30	14.10	10.93
24 10 701	147.58	151.97	153.14	5.56	1.17	24 19 801	143.43	146.70	147.83	4.40	1.13
24 10 801	---	125.83	126.76	---	0.93	24 19 901	126.20	125.62	125.19	+1.01	+0.43
24 10 901	92.82	92.78	93.48	0.66	0.70	24 20 102	115.25	124.26	128.80	13.55	4.54
24 11 401	125.65	132.27	132.27	---	---	24 20 402	131.98	137.26	138.36	6.38	1.10
24 11 701	---	123.28	124.05	---	0.77	24 20 702	141.55	145.38	146.13	4.58	0.75
24 11 801	---	104.41	105.38	---	0.97	24 26 701	181.63	181.15	181.20	+0.43	0.05
24 11 802	96.63	101.06	101.81	5.18	0.75	24 27 201	169.10	170.10	170.50	1.40	0.40
24 11 901	110.70	117.14	118.17	7.47	1.03	24 27 301	---	178.04	178.40	---	0.36
24 12 702	114.73	125.61	130.26	15.53	4.65	24 33 701	130.40	130.44	130.72	0.32	0.28
24 12 703	112.82	123.24	126.00	13.18	2.76	24 34 201	160.66	159.63	160.12	+0.54	0.49
24 17 301	126.49	128.92	131.00	4.51	2.08	24 34 301	---	180.30	180.87	---	0.57
24 17 601	131.85	138.80	140.60	8.75	1.80	24 34 302	---	158.62	160.05	---	1.43
24 17 901	157.40	161.55	162.26	4.86	0.71	24 34 501	---	164.30	165.38	---	1.08
24 18 101	139.95	144.68	145.31	5.36	0.63	24 35 301	---	171.53	171.03	---	+0.50
24 18 201	153.06	159.91	161.78	8.72	1.87	24 36 101	---	173.23	174.27	---	1.04
24 18 301	---	127.56	128.40	---	0.84	24 36 102	---	168.25	171.06	---	2.81
24 18 302	140.85	145.32	147.30	6.42	1.98	25 16 601	57.94	56.17	57.15	+0.79	0.98
24 18 401	135.00	142.00	141.65	6.65	+0.35	25 40 501	135.91	135.93	134.75	+1.16	+1.18
24 18 501	180.20	185.40	183.62	3.42	+1.78	25 40 601	144.02	146.79	146.55	2.53	+0.24
24 18 601	153.67	158.49	160.00	6.33	1.51	Number of Wells _____ 43 54					
24 18 801	169.28	176.22	180.80	11.52	4.58	Average Decline Per Well _____ 4.80 1.23					
24 18 802	162.35	164.20	165.05	2.70	0.85	Average Decline Per Year Per Well _____ 0.96 1.23					
24 18 901	118.60	115.17	117.03	+1.57	1.86						





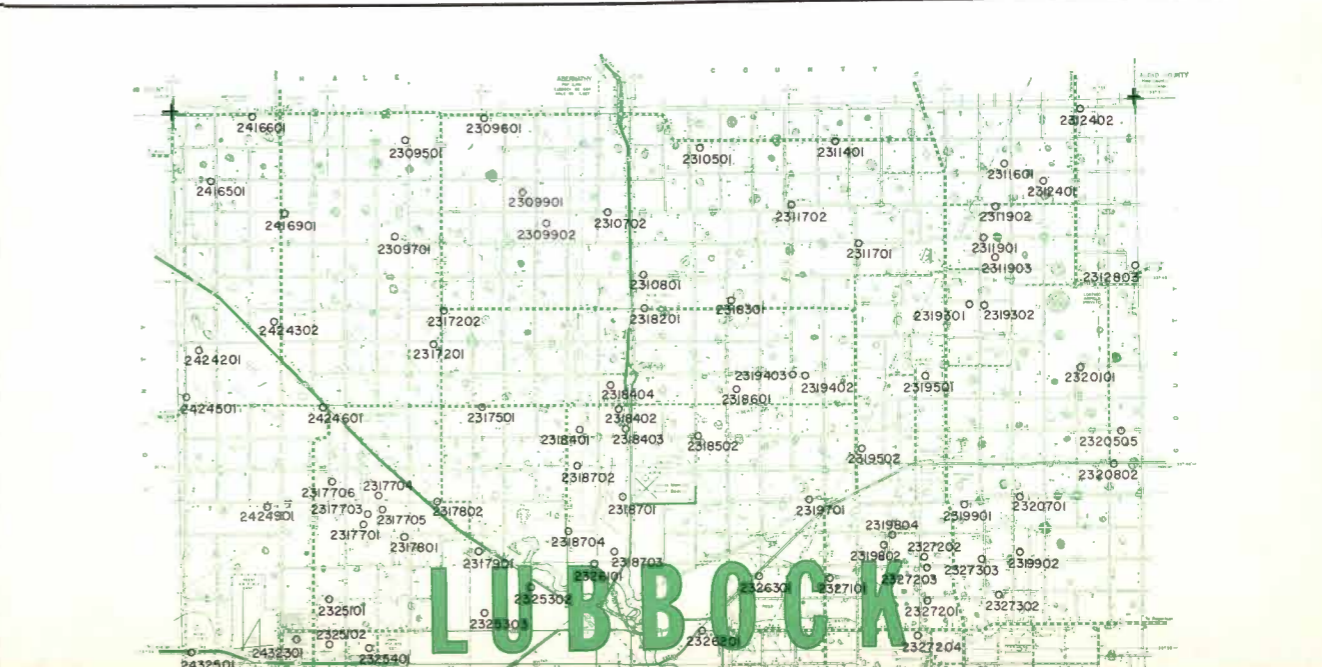
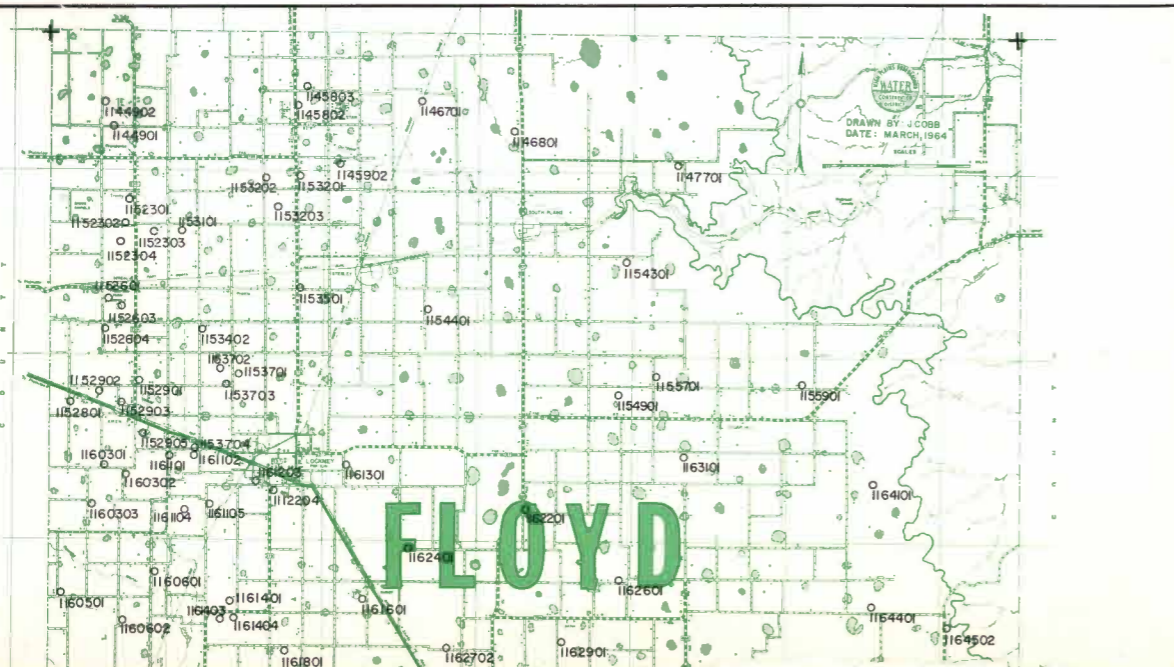
Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
10 04 201	---	235.32	241.28	---	5.96
10 04 301	---	230.14	235.52	---	5.38
10 04 501	208.58	222.57	---	---	---
10 04 601	---	195.68	199.78	---	4.10
10 04 902	---	---	159.81	---	---
10 05 301	---	136.26	138.91	---	2.65
10 05 501	136.70	140.74	145.96	9.26	5.22
10 05 601	---	117.04	120.76	---	3.72
10 05 802	---	125.52	130.53	---	5.01
10 05 903	---	---	132.52	---	---
10 06 201	---	---	126.32	---	---
10 06 301	---	132.38	---	---	---
10 06 401	---	128.91	132.41	---	3.50
10 06 402	118.40	131.94	135.71	17.31	3.77
10 06 601	107.62	128.10	125.78	18.16	+2.32
10 06 701	46.90	52.02	57.64	10.74	5.62
10 06 801	55.36	69.46	73.03	17.67	3.57
10 06 901	99.42	108.18	109.60	10.18	1.42
10 07 402	107.96	115.70	119.27	11.31	3.57
10 07 403	89.98	100.40	103.80	13.82	3.40
10 07 701	84.68	101.51	100.84	16.16	+0.67
10 07 802	122.26	126.35	129.40	7.14	3.05
10 09 601	---	57.23	61.19	---	3.96
10 10 801	---	187.57	189.81	---	2.24
10 11 501	165.98	175.85	175.78	9.80	+0.07
10 11 601	---	155.53	---	---	---
10 11 802	---	166.60	170.58	---	3.98
10 11 901	---	178.48	180.87	---	2.39
10 12 102	---	143.37	143.96	---	0.59
10 12 201	80.40	68.82	68.68	+11.72	+0.14
10 12 301	122.01	132.93	139.75	17.74	6.82
10 12 401	---	151.98	153.15	---	1.17
10 12 501	149.35	159.84	164.66	15.31	4.82
10 12 502	105.80	115.18	118.74	12.94	3.56
10 12 701	---	124.12	125.89	---	1.77
10 12 901	---	115.34	---	---	---
10 12 902	141.30	152.18	154.30	13.00	2.12
10 13 101	---	136.27	140.61	---	4.34
10 13 302	---	---	108.06	---	---
10 13 304	110.14	117.14	125.15	15.01	8.01
10 13 401	---	120.69	124.30	---	3.61
10 13 501	88.66	96.67	---	---	---
10 13 502	129.26	141.09	138.36	9.10	+2.73
10 13 802	99.75	110.01	---	---	---
10 13 901	111.95	124.74	126.25	14.30	1.51
10 13 903	118.12	130.95	130.82	12.70	+0.13
10 14 101	66.54	74.54	78.35	11.81	3.81
10 14 201	---	81.71	---	---	---
10 14 301	73.56	73.57	74.89	1.33	1.32
10 14 403	88.76	95.74	99.50	10.74	3.76
10 14 404	---	94.14	---	---	---
10 14 701	---	141.67	148.08	---	6.41
10 14 702	134.92	143.34	149.43	14.51	6.09
10 14 801	115.85	125.34	130.46	14.61	5.12
10 14 901	106.86	102.89	104.41	+2.45	1.52
10 21 201	---	153.90	159.28	---	5.38

Number of Wells ..... 33  
 Average Decline Per Well ..... 10.47  
 Average Decline Per Year Per Well ..... 2.09

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
07 53 701	---	215.03	---	---	---
07 53 901	---	192.06	201.12	---	9.06
07 55 701	178.00	181.89	183.14	5.14	1.25
07 58 801	246.63	247.24	246.77	0.14	+0.47
07 59 301	---	291.97	295.55	---	3.58
07 59 601	---	297.24	---	---	---
07 59 801	---	253.97	254.45	---	0.48
07 60 201	---	260.73	262.00	---	1.27
07 60 301	---	231.63	233.53	---	1.90
07 60 401	---	280.97	293.86	---	12.89

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
07 60 501	---	213.64	218.22	---	4.58
07 60 901	---	---	196.36	---	---
07 61 101	192.98	198.37	199.84	6.86	1.47
07 61 201	181.73	---	205.48	23.75	---
07 61 301	---	188.31	---	---	---
07 61 501	---	163.91	168.93	---	5.02
07 61 601	---	160.32	163.61	---	3.29
07 61 801	---	163.98	163.87	---	+0.11
07 61 901	147.83	142.55	144.40	+3.43	1.85
07 62 101	---	---	178.67	---	---

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
07 62 301	---	168.54	164.63	---	+3.91
07 62 501	---	135.64	138.76	---	3.12
07 62 601	---	140.32	142.36	---	2.04
07 63 201	143.40	---	155.33	11.93	---
07 63 501	---	110.90	---	---	---
07 63 701	124.47	131.96	135.18	10.71	3.22
10 03 101	---	287.68	291.54	---	3.86
10 03 701	---	226.23	226.81	---	0.58
10 03 901	---	216.05	218.37	---	2.32
10 04 101	---	277.97	283.27	---	5.30







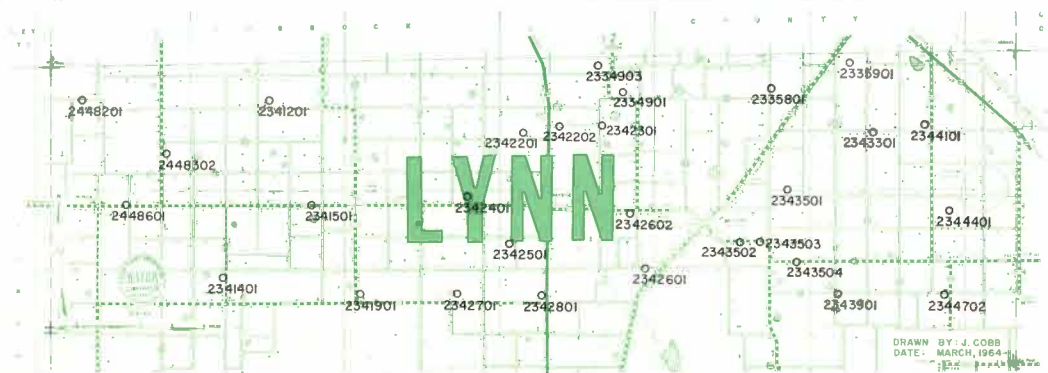
**PARMER COUNTY**

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	
09 32 301	-----	323.00	-----	-----	-----	10 33 101	235.58	253.41	253.48	17.90	0.07	
09 32 901	-----	-----	246.54	-----	-----	10 33 301	-----	-----	211.85	-----	-----	
09 40 601	231.87	242.18	-----	-----	-----	10 33 401	234.40	245.08	249.00	14.60	3.92	
09 40 901	-----	229.28	234.74	-----	5.46	10 33 601	228.55	242.61	248.82	20.27	6.21	
09 40 902	-----	202.78	205.97	-----	3.19	10 33 801	186.44	210.46	220.20	33.76	9.74	
09 40 903	202.42	221.16	213.25	10.83	+7.91	10 33 802	-----	-----	177.66	-----	-----	
09 48 301	-----	-----	204.95	-----	-----	10 33 901	157.20	170.88	175.02	17.82	4.14	
10 17 301	-----	-----	191.00	-----	-----	10 34 301	172.70	200.65	186.20	13.50	+14.45	
10 17 401	232.88	-----	256.90	24.02	-----	10 34 401	226.12	240.75	244.83	18.71	4.08	
10 17 501	218.90	234.29	240.70	21.80	6.41	10 34 801	166.85	-----	183.77	16.92	-----	
10 18 201	288.95	-----	-----	-----	-----	10 34 802	189.75	202.91	206.46	16.71	3.55	
10 18 701	198.70	210.83	216.32	17.62	5.49	10 35 304	-----	-----	181.75	-----	-----	
10 18 901	196.82	208.78	220.16	23.34	11.38	10 35 401	196.75	207.98	-----	-----	-----	
10 19 101	224.45	236.40	241.05	16.60	4.65	10 35 501	-----	199.31	-----	-----	-----	
10 19 301	-----	-----	239.90	-----	-----	10 35 601	169.40	173.55	177.05	7.65	3.50	
10 19 401	-----	-----	191.50	-----	-----	10 35 701	175.50	192.60	194.51	19.01	1.91	
10 19 601	184.73	201.28	207.12	22.39	5.84	10 35 901	-----	206.05	214.18	-----	8.13	
10 20 401	175.69	-----	196.36	20.67	-----	10 35 902	186.84	205.83	-----	-----	-----	
10 20 502	137.15	151.11	153.11	15.96	2.00	10 36 101	159.88	170.10	177.06	17.18	6.96	
10 20 801	135.98	150.49	157.10	21.12	6.61	10 36 601	-----	-----	164.25	-----	-----	
10 25 301	265.87	278.62	279.87	14.00	1.25	10 36 801	149.06	160.65	165.51	16.45	4.86	
10 25 701	202.28	-----	223.56	21.28	-----	10 41 201	-----	140.32	-----	-----	-----	
10 26 101	281.80	303.92	299.99	18.19	+3.93	10 41 202	117.35	126.98	130.44	13.09	3.46	
10 26 301	-----	269.46	275.32	-----	5.86	10 42 101	133.62	141.50	146.43	12.81	4.93	
10 26 701	176.20	186.56	186.30	10.10	+0.26	10 42 202	-----	-----	174.23	-----	-----	
10 26 801	-----	-----	198.05	-----	-----	10 42 501	119.40	126.99	130.20	10.80	3.21	
10 27 101	212.90	230.52	236.59	23.69	6.07	10 42 601	105.35	-----	-----	-----	-----	
10 27 301	239.25	256.22	263.55	24.30	7.33	10 43 201	-----	170.56	180.30	-----	9.74	
10 27 401	233.00	248.01	251.83	18.83	3.82	10 44 101	-----	-----	152.60	-----	-----	
10 27 501	-----	-----	295.37	-----	-----	10 44 201	156.95	168.26	175.20	18.25	6.94	
10 27 901	198.58	213.31	218.80	20.22	5.49	Number of Wells					35	36
10 28 201	-----	-----	245.82	-----	-----	Average Decline Per Well					18.01	3.88
10 28 501	-----	-----	246.46	-----	-----	Average Decline Per Year Per Well					3.60	3.88



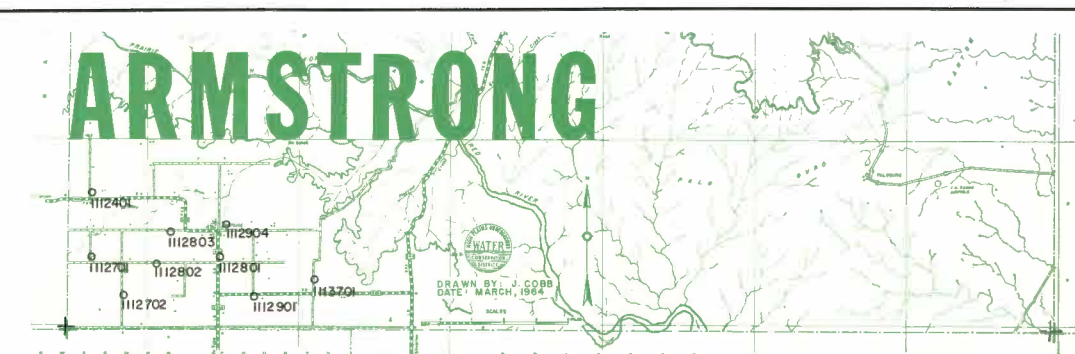
**CASTRO COUNTY**

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	
10 21 401	-----	112.63	119.42	-----	6.79	10 31 701	186.99	205.00	-----	-----	-----	
10 21 501	-----	115.73	118.68	-----	2.95	10 31 801	178.85	203.00	-----	-----	-----	
10 21 601	107.38	149.24	146.06	38.68	+3.18	10 32 201	-----	146.04	149.97	-----	3.93	
10 21 701	-----	168.40	178.79	-----	10.39	10 32 501	-----	126.81	129.20	-----	2.39	
10 21 801	-----	150.04	155.22	-----	5.18	10 32 701	172.49	183.72	185.90	13.41	2.18	
10 21 901	-----	126.22	131.73	-----	5.51	10 32 801	-----	171.65	176.42	-----	4.77	
10 22 101	-----	142.00	144.12	-----	2.12	10 37 201	146.73	163.51	-----	-----	-----	
10 22 201	-----	144.98	146.73	-----	1.75	10 37 401	-----	137.30	135.55	-----	+1.75	
10 22 301	-----	108.02	109.74	-----	1.72	10 37 601	108.17	115.37	124.13	15.96	8.76	
10 22 401	98.81	109.91	111.58	12.77	1.67	10 37 901	-----	118.24	122.96	-----	4.72	
10 22 501	-----	119.12	118.48	-----	+0.64	10 38 401	-----	128.69	128.76	-----	0.07	
10 22 601	-----	93.02	93.61	-----	0.59	10 38 403	122.44	124.54	-----	-----	-----	
10 22 801	-----	121.76	127.24	-----	5.48	10 38 601	-----	118.80	128.90	-----	10.10	
10 22 901	118.85	128.23	-----	-----	-----	10 38 701	119.66	126.39	130.75	11.09	4.36	
10 23 701	99.50	-----	114.24	14.74	-----	10 38 801	118.20	128.40	133.20	15.00	4.80	
10 23 801	150.10	148.50	148.44	+1.66	+0.06	10 38 901	106.90	118.14	123.95	17.05	5.81	
10 24 201	-----	168.84	170.04	-----	1.20	10 39 101	-----	157.22	161.12	-----	3.90	
10 24 401	174.13	180.76	180.16	6.03	+0.60	10 39 401	-----	-----	146.42	-----	-----	
10 24 601	-----	-----	172.80	-----	-----	10 39 501	-----	134.14	141.90	-----	7.76	
10 24 701	-----	176.23	-----	-----	-----	10 39 701	-----	117.90	123.83	-----	5.93	
10 24 801	151.48	163.16	-----	-----	-----	10 39 801	-----	129.08	138.42	-----	9.34	
10 28 301	-----	234.50	246.85	-----	12.35	10 40 401	127.92	144.21	152.75	24.83	8.54	
10 29 302	-----	216.29	221.58	-----	5.29	10 40 501	157.26	176.31	189.31	32.05	13.00	
10 29 601	187.99	200.68	201.25	13.26	0.57	10 40 702	123.98	148.92	148.92	24.94	-----	
10 29 701	188.80	213.27	220.80	32.00	7.53	10 40 801	136.60	154.12	163.14	26.54	9.02	
10 29 901	171.78	185.18	-----	-----	-----	10 45 101	129.07	137.93	141.98	12.91	4.05	
10 30 101	-----	190.32	191.34	-----	1.02	10 45 301	147.90	145.25	147.12	+0.78	1.87	
10 30 201	-----	191.68	198.24	-----	6.56	10 46 301	47.86	56.06	60.50	12.64	4.44	
10 30 401	-----	216.90	-----	-----	-----	10 46 405	127.48	139.20	147.02	19.54	7.82	
10 30 505	-----	202.88	199.37	-----	+3.51	10 47 101	-----	108.55	112.24	-----	3.69	
10 30 601	170.67	-----	191.00	20.33	-----	10 47 201	-----	139.00	145.45	-----	6.45	
10 30 801	-----	183.78	180.92	-----	+2.86	10 47 302	-----	125.64	131.26	-----	5.62	
10 30 901	-----	194.43	198.70	-----	4.27	10 48 501	-----	116.03	120.64	-----	4.61	
10 31 201	-----	142.70	148.89	-----	6.19	10 48 301	103.20	119.38	129.20	26.00	9.82	
10 31 301	-----	163.54	166.79	-----	3.25	Number of Wells					22	57
10 31 501	-----	189.98	191.93	-----	1.95	Average Decline Per Well					17.61	4.27
10 31 601	-----	135.24	139.14	-----	3.90	Average Decline Per Year Per Well					17.61	4.27

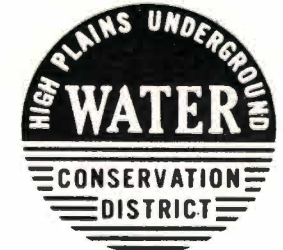


**LYNN COUNTY**

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	Well No.	1959	1963	1964	5-yr. Change	1-yr. Change	
23 34 901	118.07	125.47	123.93	5.86	+1.54	23 42 801	77.04	68.07	73.08	+3.96	5.01	
23 34 903	132.54	136.89	137.57	5.03	0.68	23 43 301	33.17	29.92	25.24	+7.93	+4.68	
23 35 801	81.82	-----	82.64	0.82	-----	23 43 501	69.19	70.44	70.41	1.22	+0.03	
23 35 901	86.09	88.49	89.95	3.86	1.46	23 43 502	74.38	75.72	74.92	0.54	+0.80	
23 41 201	92.56	98.95	96.79	4.23	+2.16	23 43 503	-----	82.75	84.65	-----	1.90	
23 41 401	83.36	85.46	88.17	4.81	2.71	23 43 504	80.24	78.02	77.54	+2.70	+0.48	
23 41 501	71.80	70.86	66.76	+5.04	+4.10	23 43 901	64.02	66.28	65.21	1.19	+1.07	
23 41 901	120.17	125.28	123.08	2.91	+2.20	23 44 101	63.15	60.09	58.38	+4.77	+1.71	
23 42 201	125.41	129.42	127.64	2.23	+1.78	23 44 401	58.77	58.57	54.38	+4.39	+4.19	
23 42 202	119.50	120.93	120.43	0.93	+0.50	23 44 702	37.73	39.69	40.83	3.10	1.14	
23 42 301	104.12	99.49	98.08	+6.04	+1.41	24 48 201	93.27	94.22	94.25	0.98	0.03	
23 42 401	106.94	111.11	111.01	4.07	+0.10	24 48 302	108.67	104.52	102.51	+6.16	+2.01	
23 42 501	92.80	93.25	92.06	+0.74	+1.19	24 48 601	86.64	85.59	86.55	+0.09	0.96	
23 42 601	46.50	45.51	43.11	+3.39	+2.40	Number of Wells					28	28
23 42 502	77.40	80.78	80.71	3.31	+0.07	Average Decline Per Well					+0.14	+0.95
23 42 701	93.05	97.13	89.11	+3.94	+8.02	Average Decline Per Year Per Well					+0.03	+0.95



**PUBLISHED BY**



MARCH 1964

**ARMSTRONG COUNTY**

Well No.	1959	1963	1964	5-yr. Change	1-yr. Change
11 12 401	-----	108.19	109.72	-----	1.53
11 12 701	-----	114.27	118.66	-----	4.39
11 12 702	-----	123.18	128.76	-----	5.58
11 12 801	-----	123.05	124.14	-----	1.09
11 12 802	-----	125.26	-----	-----	-----
11 12 803	-----	108.82	112.50	-----	3.68
11 12 901	-----	110.40	111.93	-----	1.53
11 12 904	-----	100.06	102.38	-----	2.32
11 13 701	-----	97.08	100.90	-----	3.82
Number of Wells					8
Average Decline Per Well					2.99
Average Decline Per Year Per Well					2.99



# WELL DEVELOPMENT PROBLEMS

(Continued From Page 1)

Biological pollution occurs principally during pump installation or later by infiltration around the well. The only way to control the development and growth of the organic plugging agents is to (1) cut off the source of the pollution, which is difficult to do, (2) deny them a food source, or (3) produce an environment in which they cannot live.

The food source for bacteria is probably from pump lubricants, algal masses which usually are involved in the pollution, and/or from secondary products formed by interactions of the various organisms. Some of the algae in turn use phosphate and nitrogen, which can be gained from fertilizers. In short, an everbroadening food chain results in volumetric increases in the organic matter.

The commonly occurring organisms cannot live in a highly acid or alkaline environment; hence, chemicals can be used to produce conditions unfavorable to their growth. Chlorine, Quaternary Ammonium Compounds or similarly acting chemicals are commonly used to destroy the organisms. Although chlorine is cheaper than several of the common acid and alkaline compounds, it is not always the most effective. Chlorine kills the organisms but does not dissolve them. Also, chlorine is corrosive to several metals used in pumping equipment, and may not have the staying power necessary for long term results. Detergents, as such, will not solve biological plugging problems. The best chemicals to use should (1) kill the organisms, (2) dissolve the matter for easy removal, (3) be non-toxic to future water users, (4) non-contaminating, and (5) non-corrosive.

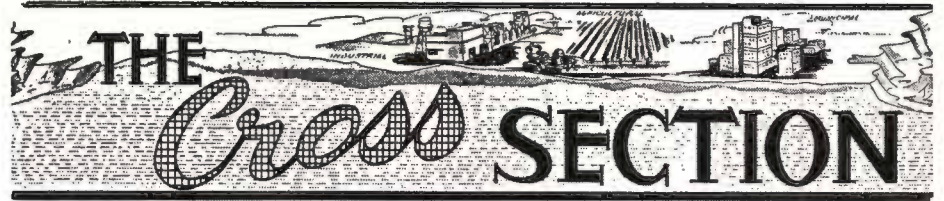
An easy and inexpensive preventive treatment is to pour the selected chemical(s) down a well after each pumping season. Backwash to make sure the chemical is inside and outside the pump column. More than one preventative treatment per year is recommended. A preventative treatment has advantages in that (1) the water-user can apply the chemical(s), and (2) the costs are less than they usually would be after severe pollution has occurred. If pollution has occurred but not progressed too far, the same procedure used for preventative treatment can be followed without pulling the pump. In extreme cases it may be necessary to pull the pump, steam clean and then treat chemically.

Secondary mechanical plugging by clay minerals is another common cause of reduced yields in wells. Although clay induced at time of drilling is removed from a formation during proper well completion, clay detached from the aquifer during pumping may still cause plugging. Individual clay minerals are exceedingly small but have the ability to adhere to each other to form clay globules and balls. These coagulants collect behind the screening and within the pores of the formation and screening materials. There is only so much space available in a rock or so many openings in the screening material. The more space the clay takes the less room there is for water to exist and to move. The problem then is to disaggregate and disperse the clay balls so they can be flushed through the pores in the formation and screening materials. The inherent capacity of clays to disperse or coagulate is primarily a function of size and of electrical charges carried by individual clay minerals. Commercial chemicals capable of combating the tendency for clays to coagulate, are available.

Clay minerals are not the only mechanical plugging agents. Insoluble sand and rock fragments are indeed common and are not easily dealt with. Surging and backwashing will sometimes dislodge insoluble fragments. If a well is completely stopped up, about the only substitute is to pull the pump and clean out the hole.

In the High Plains region, plugging of wells is usually due to several interdependent factors. In selecting substances for well development, one should choose all-purpose compounds that will (1) dissolve soluble grains, cement, and secondarily deposited substances, (2) disperse and disintegrate clay coagulants, and (3) kill and dissolve organic growths. The quantities and detailed methods of application are different for various compounds; therefore, one should confer with a knowledgeable dealer for directions. NOTE-- a detergent will not meet all the requirements needed for an all-purpose treating agent. A proper chemical treatment will stimulate a well ONLY if plugging is directly or indirectly caused by soluble organic or inorganic material.

Criteria that one can sometimes use to determine if lost production is caused by plugging, are as follows: (1) above normal seasonal rates of decrease



A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas  
Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

CLAUDETTE McINNIS  
Editor

BOARD OF DIRECTORS  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President 2806 21st St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom Morton, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)  
John Gammon, President Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer Rt. 3  
Hereford, Texas

Precinct 5  
(FLOYD COUNTY)

Chester Mitchell Lockney, Texas  
District Office, Lubbock

Tom McFarland District Manager  
H. G. Wells Attorney  
Donald L. Reddell Engineer  
Wayne Wyatt Field Representative



David Cunningham Field Representative  
Dana Wacasey Bookkeeper  
Claudette McInnis Cross Section and Education  
Melba Wright Secretary  
Jayne Cobb Draftsman

in yield, (2) sudden decreases in yield, (3) above normal drawdown, (4) unusual odor or taste to water, (5) excessive muddiness of water, (6) suspensions of scum and slimy material in water, (7) out of the ordinary coloring in water, and/or (8) pulling of pump equipment.

A conservative estimate of the dollar-value of water production will illustrate the gain-or-loss expected as a result of increasing or decreasing production, respectively. The following figures are based on an average water value of \$40/acre-foot, and a 100-day pumping season.

Original Yield GPM AF/day	Value (\$40/AF) Per day 100 days	Increase or Decrease Yield—10%		Dollar Gain or Loss	
		GPM AF/day	Per day 100 days	Per day 100 days	Per day 100 days
300	1.32	30	5280	5.28	528
400	1.76	40	7040	7.04	704
500	2.20	50	8800	8.80	880
600	2.64	60	10,560	10.56	1,056
800	3.52	80	14,080	14.08	1,408

Reference to the accompanying table readily shows, for example, that \$100 spent on improving production can be regained in a few days of one pumping season. If production of a well is raised by 1 gallon/minute, it will increase the value of production 17c/day. A 100-day pumping season would result in a \$17.00 water-value increase.

What are the consequences if production of a 400 GPM well drops off 10%? The 10% decrease over a 100-day pumping season would result in 17.6 acre-feet less than the quantity desired. This means that the well will have to be produced approximately eleven more days to get the desired quantity of water. Eleven days of pumping a well at a fuel cost of \$2.50/acre-foot of water would cost an additional \$44. What about eleven days of labor and depreciation? Small increases in well efficiency will more than pay for the cost!

## WATER IS YOUR FUTURE CONSERVE IT





A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 10—No. 11

"THERE IS NO SUBSTITUTE FOR WATER"

April 1964

## FIFTY YEARS OF TEXAS WATER DEVELOPMENT RECAPPED IN COMMISSION BULLETIN

The last fifty years of water development in Texas have been recapped in a new bulletin released by the Texas Water Commission in Austin. With the substantial increase in population in the State over the last half-century, water demands have grown tremendously. These demands will grow even more in the next 50 years when the population of Texas is expected to be 2-1/2 times its present 10 million.

The publication, entitled "Fifty Years of Water Development in Texas," by S. D. Breeding, P. B. Jones, R. W. Harden, H. M. Cook, and J. P. Dougherty, all with the Water Commission, was prepared to meet a growing public interest in the future of the State's water resources program.

Three programs are surveyed in the publication: surface water, ground water, and topographic mapping, which is a necessary first step in the planning of reservoirs.

The surface-water program, covering the 15 major river basins and 8 coastal drainage areas in the State, includes research and planning for new reservoirs as well as study of those existence, evaporation retardation, flood control and streamflow measurement. The program also entails continuing study of sedimentation, and checks on the chemical quality of water.

Ground water has been developed rapidly in the last 50 years, the report explains. In early times, the main use of ground water was in meeting smallscale domestic and livestock needs in rural areas. The population

growth, the influx of industry, and the need for more irrigation have affected the ground water program, too. Currently, about three-fourths of the municipal facilities in the State depend on ground water for their supply. The ground-water discussion in the publication presents more than the history of development; it presents data on the current water level observation and water availability programs in the State as well.

Topographic mapping in Texas was begun in the 1880's, the report states. As the need for more maps grew,

both State and Federal agencies urged increased appropriations for their programs. This expansion became a necessity when population increases brought extreme changes to the State, and old maps no longer served a useful purpose. The publication points out the changes in mapping techniques, also, and presents a description of the three classes of maps now covering various areas of the State.

For a free copy of Bulletin 6403, you may write the Texas Water Commission, P. O. Box 12311, Austin, Texas 78711.

## Alaskan Earthquake Damages Water Wells

Numerous reports have been received indicating that damage to High Plains water wells occurred during the Alaskan earthquake of March 27, 1964. In most instances the damage was temporary. Several cases of pumping sand, and even blocking have been reported. Also, fluctuations of water levels in wells and on the surface have been received.

A survey is being conducted by William D. Miller, Texas Tech Geoscience Department, and Don L. Reddell, High Plains Water District, to determine the extent and amount of damage over the Texas Panhandle Region. Any information relating changes in surface or ground water conditions to the Alaskan earthquake would be appreciated.

The following information should be sent to Dr. William D. Miller, Geoscience Department, Texas Tech, Lubbock, Texas: The person's name, address and phone number, observing the phenomena; location of observation (legal description if possible, or area description—town, direction from town, etc.); hour, date and duration of observation; and what happened. Any changes in pumping rate or water level, sand pumping, etc. should be reported.

## Judge Sturrock Receives Conservation Award

Judge J. E. Sturrock, General Manager of the Texas Water Conservation Association, was recently presented the 1964 Interior Department Conservation Service Award by Secretary of the Interior Stewart L. Udall in the Secretary's office in Washington, D. C.

The judge has filled a central role in paving the way for statewide coordination expressed in a basic Texas water plan now accepted by all active water development agencies operating within the state.

A coordination of water development programs in Texas, which has been Judge Sturrock's life work, has been the product of an extraordinary combination of patience, per-

sistence and pertinacity. It has been an achievement of character; for no accident of circumstances pointed him along the road which he has followed throughout his 63 years.

Judge Sturrock was born and reared at Woodville, Texas. As a youth out of high school and looking for a job, he went to a commercial college; out of commercial college he soon became assistant tax collector; from the tax collector's office he became County Judge of Tyler County. As County Judge he turned to a serious study of the law and passed his bar exam. Simultaneously as chief administrator of the county during the early 30's, it was brought home to

(Continued on Page 4)

**Water Is Your  
Future,  
Conserve It!**

## Drilling Statistics for First Three Months Of 1964

County	Permits Issued				New Wells Drilled			Replacement Wells			Dry Holes			Total Wells Drilled			
	Jan	Feb	March	Total	Jan	Feb	March	Jan	Feb	March	Jan	Feb	March	Jan	Feb	March	Total
Armstrong	0	2	0	2	3	2	0	0	0	0	0	0	0	3	2	0	5
Bailey	0	2	0	2	0	2	3	0	0	0	0	0	2	0	2	3	5
Castro	11	38	24	73	11	1	24	0	0	5	1	1	1	11	1	24	36
Cochran	11	8	12	31	0	10	12	0	1	0	0	1	0	0	10	12	22
Deaf Smith	53	11	44	108	25	9	13	1	4	1	0	0	0	25	9	13	47
Floyd	48	34	27	109	18	8	51	2	0	1	0	0	1	18	8	51	77
Hockley	34	43	33	110	12	18	37	0	0	0	0	1	0	12	18	37	67
Lamb	22	25	24	71	14	12	19	0	0	1	0	0	2	14	12	19	45
Lubbock	64	47	43	154	14	22	29	2	0	2	3	5	2	14	22	29	65
Lynn	17	19	3	39	2	6	19	0	0	0	0	2	0	2	6	19	27
Parmer	28	22	21	71	18	10	7	2	1	3	0	0	0	18	10	7	35
Potter	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0	0
Randall	6	9	10	25	2	1	6	0	0	0	1	0	0	2	1	6	9
Totals	294	260	241	795	119	101	220	7	6	13	4	10	7	119	101	220	440



# THE Cross SECTION

A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas  
Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

CLAUDETTE McINNIS  
Editor

BOARD OF DIRECTORS  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President 2806 21st St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom Morton, Texas

Precinct 3

(BAILEY, CASTRO and FARMER COUNTIES)  
John Gammon, President Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer Rt. 3  
Hereford, Texas

Precinct 5

(FLOYD COUNTY)

Chester Mitchell Lockney, Texas

District Office, Lubbock

Tom McFarland District Manager  
H. G. Wells Attorney  
Donald L. Reddell Engineer  
Wayne Wyatt Field Representative  
David Cunningham Field Representative  
Dana Wacasey Bookkeeper  
Claudette McInnis Cross Section and Education  
Melba Wright Secretary  
Jayne Cobb Draftsman  
Mrs. Doris Hagens Secretary

Field Office, Hereford

Mrs. Mattie K. Robinson Secretary

Field Office, Muleshoe

David Cunningham Field Representative  
Mrs. Bertha Daniel Secretary

COUNTY COMMITTEEMEN

Armstrong County

Robert Adams, 1965 Wayside, Texas  
Foster Parker, 1967 Route 1, Happy  
Dewitt McGehee, 1966 Wayside, Texas  
John Patterson, 1965 Rt. 1, Happy, Texas  
Jack McGehee, 1967 Wayside

Bailey County

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe

Doyle Davis, 1965 Goodland, Texas  
James P. Wedel, 1967 Rt. 2, Muleshoe  
Leon Lewis, 1965 Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 Star Rt., Maple  
J. W. Witherspoon, 1966 Box 261  
Muleshoe, Texas

Committee meets last Friday of each month  
at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

Castro County

E. B. Noble

City Hall, Dimmitt

Ray Riley, 1967 71 W. Lee, Dimmitt  
Frank Wise, 1967 716 W. Grant, Dimmitt  
Lester Dowell, 1966 Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 Star Rt., Hereford, Texas  
H. E. Henley, 1965 Rt. 3, Dimmitt, Texas  
Committee meets on the last Saturday of each  
month at 10:00 a.m., City Hall, Dimmitt, Texas.

Cochran County

W. M. Butler, Jr.

Western Abstract Co., Morton

D. A. Ramsey, 1967 Star Rt. 2, Morton  
Ira Brown, 1965 Box 774, Morton, Texas  
Willard Henry, 1966 Rt. 1, Morton, Texas  
H. B. Barker, 1967 602 E. Lincoln, Morton  
L. L. Taylor, 1965 Rt. 1, Morton, Texas  
Committee meets on the second Wednesday  
of each month at 8:00 p.m., Western Abstract  
Co., Morton, Texas.

Deaf Smith County

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford

L. E. Ballard, 1966 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 807 N. Main  
Hereford, Texas  
J. E. McCathern, Jr., 1967 Rt. 5, Hereford  
Hereford, Texas  
Rilly B. Moore, 1965 Wildorado, Texas  
Charles Packard, 1967 Rt. 3, Hereford  
Committee meets the first Monday of each  
month at 7:30 p.m., High Plains Water District  
office, Hereford, Texas.

Floyd County

Donna Sammon

325 E. Houston St., Floydada

Bill Sherman, 1967 Rt. 4, Floydada  
J. S. Hale, Jr., 1966 Rt. 1, Floydada, Texas  
Tate Jones, 1967 Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 Silverton Star  
Route, Floydada, Texas  
L. D. "Buster" Simpson, 1965 832 W. Tenn.  
Street, Floydada, Texas  
Committee meets on the first Tuesday of each  
month at 10:00 a.m., Farm Bureau Office, Floy-  
dada, Texas.



Hockley County

Mrs. Phillis Reynolds  
917 Austin Street, Levelland

Bryan Daniel, 1967 Rt. 2, Levelland  
Preston L. Darby, 1965 Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 Rt. 3, Levelland  
Earl G. Miller, 1965 Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 Rt. 2  
Levelland, Texas

Committee meets first and third Fridays of  
each month at 1:30 p. m. 917 Austin Street,  
Levelland, Texas.

Lamb County

Calvin Price  
620 Hall Ave. Littlefield

Willie Green, 1967 Box 815, Olton  
Roger Haberer, 1965 Earth, Texas  
W. B. Jones, 1966 Rt. 1, Anton, Texas  
Troy Moss, 1965 Rt. 1, Littlefield, Texas

Committee meets on the first Monday of each  
month at 7:30 p. m., Fisher's Cafe, Littlefield,  
Texas.

Lubbock County

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Weldon M. Boyd, 1967 Rt. 1, Idalou  
Bill Hardy, 1965 Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 Rt. 4, Lubbock, Texas

Committee meets on the first and third Mon-  
days of each month at 1:30 p.m., 1628 15th  
Street, Lubbock, Texas.

Lynn County

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Hubert Tienert, 1967 Wilson  
Robbie Gill, 1965 Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 Wilson, Texas  
Oscar H. Lowery, 1967 Rt. 4, Tahoka  
T. J. Swann, 1965 Rt. 1, Wilson, Texas

Committee meets on the third Tuesday of each  
month at 10:00 a.m., 1628 15th Street, Lubbock,  
Texas.

Parmer County

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina

Wendol Christian, 1966 RFD, Farwell, Texas  
Henry Ivy, 1967 Rt. 1, Friona  
Walter Kaltwasser, 1967 RFD, Farwell  
Walter Kaltwasser, 1964 RFD, Farwell, Texas  
Carl Rea, 1965 Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 Friona, Texas

Committee meets on the first Thursday of  
each month at 8:00 p.m., Wilson & Brock Insur-  
ance Agency, Bovina, Texas.

Potter County

E. L. Wilson, 1967 Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 Bushland, Texas  
L. C. Moore, 1965 Bushland, Texas  
Temple Rogers, 1965 Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 Rt. 1, Amarillo

Randall County

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon

R. B. Gist, Jr., 1965 Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 Rt. 2, Canyon, Texas  
A. C. Evers, 1965 Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 Rt. 1 Canyon  
Ed Wieck, 1967 Rt. 1, Canyon

Committee meets on the first Monday of each  
month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

# Water Well Com

By WILLIAM D MILLER, Ph.D.

Geoscience Department  
Texas Technological College  
Lubbock, Texas



EDITOR'S NOTE: This is the second  
in a series of articles to focus ad-  
ditional attention to some common  
well development problems encoun-  
tered in the High Plains Region.

The way in which a water well is completed controls to a considerable degree the quantity of water any given well will produce. Unfortunately, not enough attention is paid to the proper completion and development of a newly drilled well. As with an old well, a newly drilled "dry hole" should not be abandoned unless all economically feasible procedures to produce water have been exhausted.

An aquifer such as the Ogallala Formation fundamentally consists of: grains (sand, gravel), matrix (clay, silt), cement, and pores (see diagram).

Silt and clay, and/or cement fill spaces (pores) between grains. Silt and clay matrix, cement, and water "compete" for pore space between grains. In any given rock, a decrease in the quantity of matrix and/or cement will increase the available space for water. Also, larger openings between grains allow more water per unit of time to move through a given area around the bore hole. The following discussion concerns methods of obtaining the maximum develop-



Abandoned wells like the ones pictured are hazards that can and will cost a life if not properly closed.





# Completion Can Control Production

ment and maintenance of openings in the formation around the bore hole.



Grains — large dark areas; Matrix — small dark areas; Cement — "lined" areas; Pores — "open" white areas —



Same rock sample treated with acid to remove cement. Note the increase in pore space.

The natural relationships existing among the constituent parts (grains, matrix, cement) of an aquifer are disturbed during the drilling process. The disturbance usually occurs regardless of who is drilling or what drilling method is used. This imbalance or disturbance of the aquifer is due principally to pressures exerted at the interface between the drilling tool and the formation being drilled, and to differential hydrostatic pressure (wt. of mud column minus wt. of column of formation water) between drilling fluid and formation water. Drill bit and drilling-fluid pressure force clay and silt into the pores of the aquifer around the drill hole.

Most rotary drillers in the High Plains Region "make-up" the drilling mud with natural clays from the formation, during the drilling process. Drilling mud is necessary to remove cuttings, to build a mud cake around the hole to prevent excessive loss of drilling fluid to the formation, and to prevent caving. The lack of control over mud consistency causes wide fluctuations in drilling fluid weight. In a bore hole, fluid pressure (weight of water plus mud) is directed from bore hole to formation; water in the aquifer exerts pressure directed from formation to bore hole; and, the mud cake serves as a balance between the two. Due to variable characteristics of the Ogallala, and fluctuations in mud weight during drilling, a higher pressure is usually directed from the hole to the formation rather than from formation to bore hole. The unbalanced pressure directed toward the formation causes mud to be forced into the pores of the aquifer.

The accompanying table gives an illustration of the pressures exerted

at different depths of a hole, assuming a hypothetical constant mud weight of 12 lbs/gal, and an homogeneous aquifer under water table conditions.

Hole Depth (Ft) Mud Column Height (feet of mud)	Static Water Level (SWL) (feet)	Bottom-Hole Pressure		Pressure at SWL		Differential Pressure-Mud at SWL	
		Mud lbs/in <sup>2</sup>	Fm. Water lbs/in <sup>2</sup>	Mud lbs/in <sup>2</sup>	Fm. Water lbs/in <sup>2</sup>	Bottom-Hole lbs/in <sup>2</sup>	Bottom-Hole lbs/in <sup>2</sup>
100	50	62	22	31	0	31	40
200	100	124	43	62	0	62	81
400	100	248	130	62	0	62	118

Although the absolute values are not important, it is significant to note that a considerable differential bottom-hole pressure (last column in table) exists in favor of movement of mud from the bore hole into the aquifer. Thus, plugging of pores by mud induced into the formation during drilling lowers the potential yield of a well. However, mud that penetrates a formation during drilling and mud-cake smeared around the bore hole can and must be removed prior to setting of down-hole equipment. No material should be emplaced in the hole before all effort has been expended to remove mud cake and filtrate.

Mechanical methods (bailing, surging, pumping, etc.) of removing mud are sometimes inefficient because they tend to dislodge only the loosely adhering material, and tend to force the particles further into the formation. In many cases, chemical agents capable of disintegrating and dispersing mud, used in conjunction with mechanical treatment, are the most effective methods for developing maximum yields from wells. Chemical solvents also serve as a bonus in developing the maximum permeability around holes drilled in soluble rock material.

Some wells in the High Plains region produce water from limestone formations or from other aquifers containing high percentages of soluble rock material and/or cement. Many wells drilled to aquifers lying between the "blue clay" and "red beds" yield water from limestones. This zone lies stratigraphically below the principal aquifer of the High Plains, the Ogallala Formation.

Wells producing from limestone

plus others producing from "caliche", and from sands and gravels containing soluble grains, matrix, and/or cement, are prime targets for chemical treatment during completion and

the passing of the most frequently occurring grain-sizes in the formation being drilled. Improper packing and screening drastically reduce water flow, and result in unnecessary and

development.

Rock samples from every newly drilled well should be checked with an acid to see if the potential producing formation contains soluble material. A rock chip dropped in a dilute solution (10-15 percent) of hydrochloric acid or in acetic acid (vinegar) will effervesce or "fizz" if the material is soluble. An eye dropper bottle of dilute hydrochloric acid can be obtained from a druggist for a few cents. Best results are sometimes obtained by scratching or crushing a small sample and putting acid on it. Limestone and "caliche" will dissolve in the acids mentioned previously.

Caution must be exercised in testing a sample of quartz sand and gravel to make sure cement is included rather than an individual grain. Grains of quartz sand and gravel will not dissolve in acid, however some of the cementing material that holds the grains together may be soluble. If the grains in a sample from the Ogallala Formation cannot be scratched with a knife blade, the grains are probably insoluble quartz or rock fragments.

The accompanying diagrams illustrate how a chemical treatment of rocks containing dissolvable material will increase the effective pore space. A small percentage increase in the transmissibility of an aquifer is worth the expense, as will be demonstrated later.

During the drilling process, the pressure of the drill bit decreases the size and number of openings between grains. Compaction of the formation around the hole can be minimized during drilling. Also, a proper completion job may restore some of the original permeability destroyed by the bit.

Improper selection of screens and grain-size of packing are other mistakes commonly made in well completion. Screening and packing is used in a well to permit ready flow of water into the hole with a minimum removal of sand grains and gravel. The proper screening and packing should be such that the openings in screens and between packing-grains are small enough to prevent

expensive wear on pumps.

It should always be kept in mind to consider completion procedures separately for each well. This is particularly true for the Ogallala because formation characteristics that control fluid flow are variable. What is good for one well may not necessarily hold for any or all nearby wells!

The following information is revised from a previous article by the writer (The CROSS SECTION, March, 1964). A conservative estimate of the dollar-value of water production will illustrate the gain-or-loss expected as a result of increasing or decreasing production, respectively. The following figures are based on an average water value of \$40/acre-foot, and a 100-day pumping season.

Reference to the accompanying table readily shows, for example, that \$100 spent on improving production can be regained in a few days of one pumping season. If production of a well is raised by 1 gallon/minute, it will increase the value of production 17c/day. A 100-day pumping season would result in a \$17.00 water-value increase.

What are the consequences if the initial potential of a well is not developed to its maximum? A 10 percent loss in potential of a 400 GPM well over a 100-day pumping season would result in 17.6 acre-feet less water than the quantity desired. This means that the well will have to be produced approximately eleven more days to get the desired quantity of water. Eleven days of pumping a well at an average fuel cost of \$2.50/acre foot of water would cost an additional \$44. What about eleven days of labor and depreciation?

Another way of equating the value of a well is to consider the estimated worth of an acre/foot of water. As an example, a new or old well stimulated an additional 10 gallons per minute over a 100 day pumping season will produce an increase of \$175 worth of water.

Development of the maximum potential from each well may reduce the total number of wells needed for a particular job.

**"CHIEF RUNNING WATER," SAYS—**

"Make 'um sure measurements on drilling permits are correct— Save heap trouble. Water is your future. Conserve 'Um."



Original Yield GPM AF/day	Value (40/AF) Per day 100 days	Increase or Decrease		Dollar Gain or Loss	
		Yield—10% GPM AF/day	Per day 100 days	Per day 100 days	Per day 100 days
300 1.32	52.80 5280	30 .132	5.28	5.28	528
400 1.79	70.40 7040	40 .176	7.04	7.04	704
500 2.20	88.00 8800	50 .220	8.80	8.80	880
600 2.64	105.60 10,560	60 .264	10.56	10.56	1,056
800 3.52	140.80 14,080	80 .352	14.08	14.08	1,408



# DISTRICT EMPLOYS NEW PERSONNEL



MRS. DORIS HAGENS

A who's who among the women in the District Office in Lubbock is appropriate at this time, since we have four new faces.

Mrs. Doris Hagens, who is District Secretary and County Secretary for Lubbock and Lynn Counties, has been previously associated with the District. She was employed as County Secretary for Bailey County in 1955, 1956, and 1957. She is married to A. E. Hagens a former member of the Lynn County Committee. Mr. Hagens is now employed with Galbraith Steel and Supply.

Mrs. Hagens has one son, who is in the Air Force and is now stationed



MRS. DANA WACASEY

at Selfridge Air Force Base in Michigan.

Prior to coming back to work with the Water District, Mrs. Hagens was employed at the Wilson State Bank and in the Office of J. C. Penny Co.

After five years of absence Mrs. Dana Wacasey has returned as bookkeeper for the District. She is married to Dale Wacasey, and has a son, Des, two months old. Before rejoining the Water District, she worked for Bob Westerburg and Company, a food brokerage firm in Lubbock. Mr. Wacasey is an Administrative Supply Technician for the National Guard in Levelland.

Mrs. Wacasey is a graduate of



JAYNE COBB

Monterey High School in Lubbock and attended Draughon's Business College. They are members of Westminster Presbyterian Church.

Jane Alldredge Cobb, now draftsman for the District, came to work in October 1963. She had previously been employed by Lane Wells Company in Pampa, Texas.

Jayne has worked in the drafting field with Schulemberger, as well as, Lane Wells.

Recently, she plotted the observation well locations that appeared in the Cross Section. She is responsible for all of the map work carried on in the Lubbock Office.

She is a graduate of Lockney High School and now makes her home in Lubbock where she is a member of the Methodist Church.

Mrs. Melba Wright, District Secretary, came to work for the District in December 1963. She went to School in Little Rock, Arkansas, and the Bible Baptist Seminary in Fort Worth.

She is married to Reuben Wright, who works for Hygeia Ozarka Water Company and is pastor of the Grace Baptist Church. Mrs. Wright has pre-



MRS. MELBA WRIGHT

viously worked for Hygeia-Ozarka Water Company and Boling and Griffith, Attorneys. As District Secretary, Mrs. Wright's duties entail processing of permits and keeping records and files.

## Judge Sturrock —

(Continued From Page 1)

him how, though remote and rural, Tyler County depended completely upon the well being of the larger economy of the State and Nation. So in 1935, he came to Austin as Chief Clerk and Attorney for the Texas State Planning Board. In 1939, he became an attorney and statistician for the State Board of Water Engineers. And thus he was embarked on his life work.

In November 1944 when other Texans were hardly aware of the importance of water development to the future of the State, he left the Board of Water Engineers to become General Manager of the Texas Water Conservation Association. Sturrock still holds this position.

**THE CROSS SECTION**

1628 - 15th Street  
Lubbock, Texas

Dear Sirs:

I do not now receive THE CROSS SECTION but would like to have it sent to me each month, free of charge, at the address given below.

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City and State \_\_\_\_\_

(Please cut out and mail to our address)

**A LITTLE LIFE IS WORTH MORE THAN A LITTLE TIME, CLOSE THOSE ABANDONED WELLS!**



# THE Cross SECTION

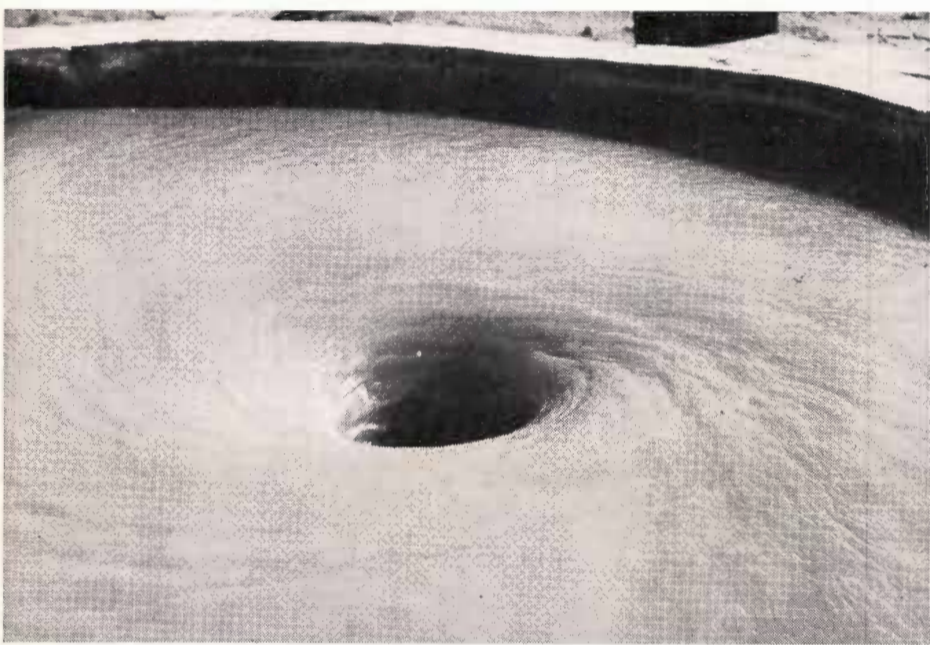
A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 10—No. 12

"THERE IS NO SUBSTITUTE FOR WATER"

May 1964

## THIS MAN WAS CAUGHT! CONSERVING WATER



## Claudette McInnis Resigns From Post As Cross Section Editor



CLAUDETTE McINNIS

Claudette McInnis, director of public information for the Water District and editor of *The Cross Section* has resigned to enter private business. Miss McInnis has been on the dis-

trict staff for the past eight months and her resignation was effective on May 15th.

Miss McInnis plans to make her home in Brownwood.

### A REMINDER

With well drilling activity at a rapid pace, the county secretaries of the High Plains Underground Water Conservation District want to remind all drilling permit holders to review the following information:

If you have received a permit to drill a well, and have drilled the well, it is to your advantage to get the log information to your county office as early as possible. This action will entitle you to a refund of your \$10.00 deposit and will assure the necessary protection of your well. The rules of the district require that if the log is NOT returned to the county office within six (6) months from the approval date of the permit, the deposit will be forfeited.

## Hearing On "Water Depletion" Case Scheduled June 4th

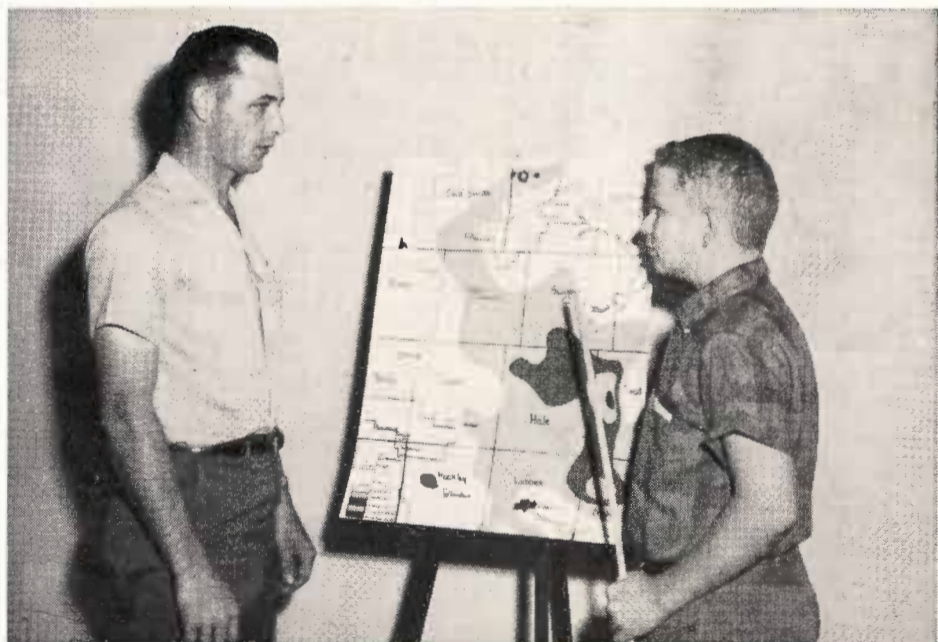
Another chapter in the Marvin Shurbet "water depletion" case, (Marvin Shurbet vs. United States) will unfold on June 4, when the Government appeal of the case will be heard before the Federal Fifth Circuit Court in Houston.

In 1963, the Shurbet case was tried in Federal District Court and resulted in a judgment for the Shurbets. The District Court held that in determining their income tax, the Shurbets were entitled to a "water depletion allowance", thus enabling them to recoup a percentage of their investment

in underground water, as the water in the underground formation is exhausted.

While the case directly involves only the Shurbets, the results of the case will set guide lines for all water users of this area and will in large part determine for all similar water users their right to a depletion allowance. For this reason the appeal in Houston will be watched with great interest by area water users as a significant step toward final determination of their right to depletion allowance.

## Baily County 4-H Club Member Has Winning Demonstration



Clifford Black, member of the Progress 4-H Club in Bailey County points out some significant factors concerning his demonstration to David Cunningham, Bailey County Field Representative for the High Plains Underground Water District. Cunningham provided some of the material Black used in preparing his demonstration.

"Tailwater" is one of the biggest problems that confronts the southern High Plains irrigator" was a statement made by Clifford Black of the Progress 4-H Club in Bailey County.

Clifford used this statement in his winning demonstration on water con-

servation, presented in Lubbock, Sat., May 9, at the District 2 Elimination Contest for the Texas Agricultural Extension Service.

The eighth grade student is now in his fifth year of 4-H Club work (Continued on Page 4)





A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas  
Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

BILL J. WADDLE  
Editor

BOARD OF DIRECTORS  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President ..... 2806 21st St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom ..... Morton, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)  
John Gammon, President ..... Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer ..... Rt. 3  
Hereford, Texas

Precinct 5

(FLOYD COUNTY)  
Chester Mitchell ..... Lockney, Texas

District Office, Lubbock

Tom McFarland ..... District Manager  
H. G. Wells ..... Attorney  
Donald L. Reddell ..... Engineer  
Wayne Wyatt ..... Field Representative  
David Cunningham ..... Field Representative  
Dana Wacasey ..... Bookkeeper  
Bill J. Waddle ..... Cross Section and Education  
Melba Wright ..... Secretary  
Jayne Cobb ..... Draftsman  
Mrs. Doris Hagens ..... Secretary

Field Office, Hereford

Mrs. Mattie K. Robinson ..... Secretary

Field Office, Muleshoe

David Cunningham ..... Field Representative  
Mrs. Bertha Daniel ..... Secretary

COUNTY COMMITTEEMEN

Armstrong County

Robert Adams, 1965 ..... Wayside, Texas  
Foster Parker, 1967 ..... Route 1, Happy  
Dewitt McGehee, 1966 ..... Wayside, Texas  
John Patterson, 1965 ..... Rt. 1, Happy, Texas  
Jack McGehee, 1967 ..... Wayside

Bailey County

Mrs. Bertha Daniel  
High Plains Water District  
Box 504 Muleshoe

Doyle Davis, 1965 ..... Goodland, Texas  
James P. Wedel, 1967 ..... Rt. 2, Muleshoe  
Leon Lewis, 1965 ..... Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 ..... Star Rt., Maple  
J. W. Witherspoon, 1966 ..... Box 261  
Muleshoe, Texas

Committee meets last Friday of each month  
at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

Castro County

E. B. Noble

City Hall, Dimmitt

Ray Riley, 1967 ..... 71 W. Lee, Dimmitt  
Frank Wise, 1967 ..... 716 W. Grant, Dimmitt  
Lester Dowell, 1966 ..... Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 ..... Star Rt., Hereford, Texas  
H. E. Henley, 1965 ..... Rt. 5, Dimmitt, Texas

Committee meets on the last Saturday of each  
month at 10:00 a.m., City Hall, Dimmitt, Texas.

Cochran County

W. M. Butler, Jr.

Western Abstract Co., Morton

D. A. Ramsey, 1967 ..... Star Rt. 2, Morton  
Ira Brown, 1965 ..... Box 774, Morton, Texas  
Willard Henry, 1966 ..... Rt. 1, Morton, Texas  
H. B. Barker, 1967 ..... 602 E. Lincoln, Morton  
L. L. Taylor, 1965 ..... Rt. 1, Morton, Texas  
Committee meets on the second Wednesday  
of each month at 8:00 p.m., Western Abstract  
Co., Morton, Texas.

Deaf Smith County

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford

L. E. Ballard, 1966 ..... 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 ..... 807 N. Main  
Hereford, Texas

J. E. McCathern, Jr., 1967 ..... Rt. 5, Hereford  
Hereford, Texas

Billy B. Moore, 1965 ..... Wildorado, Texas  
Charles Packard, 1967 ..... Rt. 3, Hereford  
Committee meets the first Monday of each  
month at 7:30 p.m., High Plains Water District  
office, Hereford, Texas.

Floyd County

Donna Sammon

325 E. Houston St., Floydada

Bill Sherman, 1967 ..... Rt. 4, Floydada  
J. S. Hale, Jr., 1966 ..... Rt. 1, Floydada, Texas  
Tate Jones, 1967 ..... Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 ..... Silvertown Star  
Route, Floydada, Texas

L. D. "Buster" Simpson, 1965 ..... 832 W. Tenn.  
Street, Floydada, Texas

Committee meets on the first Tuesday of each  
month at 10:00 a.m., Farm Bureau Office, Floy-  
dada, Texas.



Hockley County

Mrs. Phillis Reynolds  
917 Austin Street, Levelland

Bryan Daniel, 1967 ..... Rt. 2, Levelland  
Preston L. Darby, 1965 ..... Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 ..... Rt. 3, Levelland  
Earl G. Miller, 1965 ..... Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 ..... Rt. 2  
Levelland, Texas

Committee meets first and third Fridays of  
each month at 1:30 p. m. 917 Austin Street,  
Levelland, Texas.

Lamb County

Calvin Price  
620 Hall Ave. Littlefield

Willie Green, 1967 ..... Box 815, Olton  
Roger Haberer, 1965 ..... Earth, Texas  
W. B. Jones, 1966 ..... Rt. 1, Anton, Texas  
Troy Moss, 1965 ..... Rt. 1, Littlefield, Texas

Committee meets on the first Monday of each  
month at 7:30 p.m., Fisher's Cafe, Littlefield,  
Texas.

Lubbock County

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Weldon M. Boyd, 1967 ..... Rt. 1, Idalou  
Bill Hardy, 1965 ..... Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 ..... 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 ..... Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 ..... Rt. 4, Lubbock, Texas

Committee meets on the first and third Mon-  
days of each month at 1:30 p.m., 1628 15th  
Street, Lubbock, Texas.

Lynn County

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Hubert Tienert, 1967 ..... Wilson  
Robbie Gill, 1965 ..... Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 ..... Wilson, Texas  
Oscar H. Lowery, 1967 ..... Rt. 4, Tahoka  
T. J. Swann, 1965 ..... Rt. 1, Wilson, Texas

Committee meets on the third Tuesday of each  
month at 10:00 a.m., 1628 15th Street, Lubbock,  
Texas.

Parmer County

Aubrey Brock

Wilson & Brock Insurance Co., Bovina

Wendol Christian, 1966 ..... RFD, Farwell, Texas  
Henry Ivy, 1967 ..... Rt. 1, Friona  
Walter Kaltwasser, 1967 ..... RFD, Farwell  
Walter Kaltwasser, 1964 ..... RFD, Farwell, Texas  
Carl Rea, 1965 ..... Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 ..... Friona, Texas

Committee meets on the first Thursday of  
each month at 8:00 p.m., Wilson & Brock Insur-  
ance Agency, Bovina, Texas.

Potter County

E. L. Wilson, 1967 ..... Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 ..... Bushland, Texas  
L. C. Moore, 1965 ..... Bushland, Texas  
Temple Rogers, 1965 ..... Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 ..... Rt. 1, Amarillo

Committee meets on the first Thursday of each  
month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

Randall County

Mrs. Louise Knox

Randall County Farm Bureau Office, Canyon

R. B. Gist, Jr., 1965 ..... Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 ..... Rt. 2, Canyon, Texas  
A. C. Evers, 1965 ..... Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 ..... Rt. 1 Canyon  
Ed Wieck, 1967 ..... Rt. 1, Canyon

Committee meets on the first Monday of each  
month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

# WHY HAVE WELL PERMITS?

When a day's work is spent trying to get a permit to drill a well, one gets disgusted and asks himself the question "Why?"

The answer to this question is pure and simple "for the protection of the landowner." All of the questions that one has to answer can be complete if the rules and regulations are understood and these are not rules set out to control but rules to protect your water.

First, when applying for a permit one should have the name of the landowner and legal description of the land on which he wishes to drill. This step is so that the well site can be located and pinned on the county map to check spacing from other permits that have been issued.

Second, the applicant must have the measured yards from the well site to the two nearest property lines, quarter section lines, or labor lines. This step is also for location purposes.

The third and final step to be taken in obtaining an application, is to have the measured yards from your well site to the three nearest wells that are within 440 yards. This includes applications for wells as shown by County Committee records, but does not include wells that produce less than 70 gallons a minute.

The information should be submitted to the County Secretary of the

Committee who will assist in the filing out of the application.

After the application has been recommended by the County Committee, the applicant will be given a copy of the permit (which is his authority to drill, at his own risk, within 10 yards of the location specified) and also the log and registration forms.

As soon as the well is ready for production, the completed log and registration forms must be returned to the County Secretary. Copies of all forms will then be furnished to the owner for his file.

Upon return of the completed log and registration forms, or cancellation of the permit, the \$10 deposit which was made at the time of filing will be refunded.

Another set of rules that are a must for a water well permit are the spacing requirements.

- 4-inch or smaller must be 200 yards from nearest well or well site.
- 5-inch must be 250 yards from nearest well or well site.
- 6-inch must be 300 yards from nearest well or well site.
- 8-inch must be 400 yards from nearest well or well site.
- 10-inch or larger must be 440 yards from nearest well or well site.

This information can save trips to and from the County Office and can also insure that you have an accurate and valid permit.

## "Proceedings Of The Eighth Annual Water For Texas Conference Available"

The Water Resources Institute at Texas A&M University has announced that the Proceedings of the Eighth Annual Water for Texas Conference are available. The Conference, held in November 1963, had the theme "Education and Research Programs Needed for Water in Texas." The two day conference had prominent speakers in the water resources field. Three papers dealt with water problems of national scope and ten papers considered specific education and research programs necessary to solve future problems in water supply development and management.

Copies of the Proceedings are available by writing the Water Resources Institute, Texas A&M University, College Station, Texas.

### WHEN YOU MOVE—

Please notify the High Plains Underground Water Conservation District, Lubbock, Texas on Post Office Form 225 obtainable from your local postmaster, giving old as well as new address, to insure no interruption in the delivery of "The Cross Section."

## DRILLING STATISTICS FOR APRIL

During the month of April 207 new wells were drilled within the High Plains Water District; 9 replacement wells were drilled; and 12 wells were drilled that were either dry or nonproductive for some other reason.

The County Committees issued 298 drilling permits. Listed below by Counties are permits issued and wells completed for April.

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Dry Holes Drilled
Armstrong	0	2	0	0
Bailey	36	19	0	3
Castro	25	11	3	0
Cochran	14	10	0	2
Deaf Smith	49	38	0	0
Floyd	25	40	1	2
Hockley	32	19	0	1
Lamb	36	16	3	0
Lubbock	36	23	2	2
Lynn	2	11	0	0
Parmer	30	12	0	0
Potter	0	0	0	0
Randall	13	6	0	2
<b>Total</b>	<b>298</b>	<b>207</b>	<b>9</b>	<b>12</b>



# Research Project Shows Significant Yield Results

With eyes and thoughts focused on the future supply of water on the High Plains, researchers at the South Plains Research and Extension Center are making studies which they hope will help compensate for the shortage of a water supply.

Many areas are now experiencing the shortage of water for irrigation and are vitally interested in the studies now being conducted.

In July of 1963, run-off recording devices were installed on 15 plots of land with varying slopes. The land varies from level to 1.2 percent slope or 14.4 inches slope per 100 feet. Each device will record the exact amount of run-off from natural rainfall or irrigation.

The run-off from these plots was not recorded in 1963 since there was no rainfall heavy enough to cause run-off from July 1963 to May 1, 1964.

Experimentation over the past 20 years has led researchers to believe that an average of 50 pounds of lint cotton per acre can be produced from one inch of water stored in the soil. One hundred fifty to 200 pounds of grain sorghum can also be produced from one inch of water.

By applying simple mathematics to the above fact you can see that a loss of three inches of water from the soil by run-off could cost the farmer about \$45 per acre in lint cotton production. In many cases this amount would pay for corrective leveling measures needed to decrease the slope of many farms.

The chart below reflects the average yield in pounds of lint cotton for

the five slopes and three moisture levels in the variable grade test.

A significant factor of the first year yields from the plots is that the level dryland plot produced 19 pounds less lint cotton than the same plot with pre-plant and one irrigation during the growing season. The plot also produced 111 pounds more lint cotton than the same plot that was irrigated before planting.

We are aware that this data represents only one trial in the experiment but from this we can see some interesting results.

Dryland that is improved to eliminate run-off will conserve moisture and store it for the crop being grown. If this situation can be economically practiced, yields from dryland will probably be increased. Another result obtained from this year's yield record is that the pre-plant irrigation and the irrigation during the growing season might have cost the farmer money as well as water.

Climatic conditions during the growing season must be taken into consideration. At planting time approximately six inches of rain fell at the Research Center. Many agronomists say this was enough water to make a good cotton crop if it had fallen at the proper times. The data shows that good crops were made on the dryland plots that were level and that loss of water from run-off was eliminated.

This study is scheduled to last for ten years or longer, if necessary, and it will be very interesting to watch the 15 plots of land to see how much run-off water will be lost, what the



James Zetzsche, agricultural engineer at the Research Center points out the recording device that is being used to record the amount of water passing through the recording flume. The device also records the time that the water passes through, giving researchers valuable data on runoff water.

## Floyd County Committeeman Wins \$5,000 Hablitzelle Award

Bill Sherman, 29 year old Lockney farmer and member of the Floyd County Committee of the High Plains Underground Water Conservation District, has won the 1964 Junior Hablitzelle Award for the Advancement of Rural Life. The award was \$5,000 cash, a gold medal and a certificate of recognition. Sherman received the award Wednesday, May 20, at the Texas Research Foundation at Renner, Texas.

The recipient of the award was judged over a four year period with consideration being given for the greatest contribution to rural life in

Texas, the financial progress of the nominee, conservation of water and soil, community service, church activities, philosophy of life and improvement of farming methods.

Sherman and his wife, Mary Jo, have three children, Mark age 6, Karla age 3 and Kay age 1. They are members of the Main Street Church of Christ in Lockney.

Presently farming 1290 acres, Sherman takes time from his busy schedule to take an active part in the work of the Water District, and the Cross Section gives Bill its hardy congratulations.

Slope	VARIABLE GRADE TEST Moisture Levels			Av.
	Dryland	P. P. ONLY	P. P. +1 irr.	
0 (Level)	638	527	657	607
.2 (2.4"/100')	326	426	547	433
.5 (6"/100')	397	397	403	399
.9 (10.8"/100')	250	339	513*	367
1.2 (14.4"/100')	211	432*	454*	366

\*Border broke and some rainfall floodwater entered closed bench.



Above is a line-up of the run-off recording devices that are being used to record the amount of water lost from the fifteen plots of land that are under study at the Research Center.

## BRAZOS RIVER BASIN GROUND-WATER REPORT PRESENTED

The Texas Water Commission has released a new report describing the ground-water resources of the Brazos River Basin.

The report is the first basin-wide ground-water study made of the Brazos River Basin. It includes an area of some 42,000 square miles and parts or all of 69 counties.

As much as 116,000 acre-feet per year of useable water can be withdrawn continuously from the Carrizo-Wilcox aquifer. This area includes parts of Lee, Milam, Robertson, Burleson, Brazos, Madison, and Grimes counties. This is more than 25 times the amount of water pumped from crop yields will be, improved, steady or decreasing.

James S. Newman and James Zetzsche, irrigation researcher, and agricultural engineer respectively are conducting this study on a grant from the High Plains Underground Water Conservation District and the Plains Cotton Growers.

The Cross Section will keep you informed on the progress of the studies in future editions.

this aquifer in 1959.

The Gulf Coast sands within the Brazos River Basin can provide at least 67,000 acre-feet per year (60 million gallons per day) or more than double the 1959 pumpage rate. This area lies within Washington, Grimes, Austin, Waller, Fort Bend, and Brazos counties.

In addition to this quantity available on a continuing basis, there is about 7 million acre-feet of water in storage in the coastal sands. This stored water can be used only once, however. Thus, if the sands were pumped at the average rate of 167,000 acre-feet per year (150 mgd) they could supply this amount for 70 years and then supply the 67,000 acre-feet firm yield.

Also, alluvium along the Brazos River can provide a long-term yield of about 100,000 acre-feet per year. The alluvium extends in a band, about 1 to 7 miles wide, from southeast Bosque and Hill counties to the Gulf, crossing through the two areas mentioned above.

(Continued On Page 4)



## Kenneth Seales Named Field Representative for Water District



KENNETH SEALES

Kenneth Seales, a native of Bailey County, has joined the field force of the Water District. Seales, who was born in Muleshoe and attended school there, began work with the District May 1.

Seales' parents, Mr. and Mrs. Bert Seales, live at Route 5, Muleshoe, and have been engaged in farming for more than 30 years. Seales is married and has one son, Paul, four months old.

Before coming to work for the Water District, he was employed with the Lubbock Police Department as a patrolman. He is a member of the Mackenzie Masonic Lodge and the Baptist Church.

Seales will work out of the Lubbock office as a field representative.

Water Is Your Future, Conserve It!

### Brazos River Report—

(Continued From Page 3)

In the central part of the basin, 19,000 acre-feet per year of ground water of suitable quality can be supplied by the geologic units which make up the Trinity Group.

The Trinity Group covers all or part of the following counties: Eastland, Lampasas, Burnet, Croyell, McLennan, Williamson, Bell, Falls, Limestone, and Milam.

In the northwest part of the basin, the High Plains, was found the most intensive use of ground water. The Ogallala Formation supplied about 2.2 million acre-feet of water in 1959, or 90 percent of the Brazos River Basin total pumpage mostly for irrigation purposes. "The amount of water withdrawn from the Ogallala Formation in the High Plains each year exceeds even the most optimistic estimates of recharge and the ground-water supply is being depleted," the report states. It was estimated that as of 1958 the Ogallala had on the order of 89 million acre-feet of water remaining in storage that would be available to wells in the Brazos Basin portion.

The Ogallala Formation in the Brazos Basin covers all or parts of the following counties: *Parmer, Castro, Swisher, Bailey, Lamb, Floyd, Cochran, Hockley, Lubbock, Crosby, Lynn, Terry, and Garza.*

Total pumpage from major wells in the Brazos Basin was given in the

### 4-H Demonstration—

(Continued From Page 1)

under the supervision of Bailey County Agent, J. K. Adams. Clifford will go to College Station in June to present his demonstration in competition for honors at the Annual State 4-H Round-up.

Black used charts showing how farmers let tailwater escape from their farms and how they could capture this water in pits and reuse it on their farm.

Parents of this fine 4-H Club member are Mr. and Mrs. Eugene Black of Route 2, Muleshoe.



Pictured above is a weed problem that faces many farmers during the irrigation season and is often an annoying problem. Farmers and other interested groups are watching the plots shown in the picture on the left to see the effects of chemical control of weeds now being studied by the Water District

## WEED NUISANCE IN IRRIGATION DITCHES MAY SOON CEASE TO BE A PROBLEM

The nuisance of weeds which grow in permanent irrigation ditches and other unutilized areas may soon cease to be a problem.

David Cunningham, field representative of the High Plains Underground Water Conservation District and Bud Mouser of Plainview are conducting research to eliminate this problem by use of chemicals on four farms located in the Bovina and Friona areas in Parmer County.

Farmers who are participating in the project are M. A. Black, Dwain Menefee, Edwin Lyde, and Ralph Shelton. Having a keen interest in the project, these men volunteered the use of their tail water pits and/or

ditches for the experiments.

Karmex, Telvar, Propazine 80-W and Hyvar X are the four different chemicals being used in the study. These chemicals were applied on March 7, 1964. Different rates of application were used and accurate records are being kept on their effectiveness. Each plot treated has a check plot of untreated area nearby so the results can be viewed by interested farmers.

A big advantage of chemical control of weed seed will be the decreased cost of labor needed to control weeds.

When this study is completed the Cross Section will give definite application rates and final results.

Commission's report at about 2.4 million acre-feet in 1959, almost all of this for irrigation—mostly in the High Plains. Only about 68,000 acre-feet of ground water was withdrawn for public supply in the basin, and about 24,000 acre-feet for industrial uses.

Published as Water Commission Bulletin 6310, "Reconnaissance investigation of the Ground-Water Resources of the Brazos River Basin, Texas," the report may be obtained without charge from the Commission's office, P. O. Box 12311, Austin, Texas 78711. Numerous maps included in the bul-

letin show the areal extent of the important water-bearing rocks, their approximate depths, and the geologic patterns which control ground-water occurrence and movement.

The approach to water planning in Texas is by river basins. Ground-water reconnaissance investigations have been conducted in all river basins so that the findings could be integrated with information on surface water by agencies and groups concerned with planning the development of the State's water resources.

**A LITTLE LIFE IS WORTH MORE THAN A LITTLE TIME, CLOSE THOSE ABANDONED WELLS!**



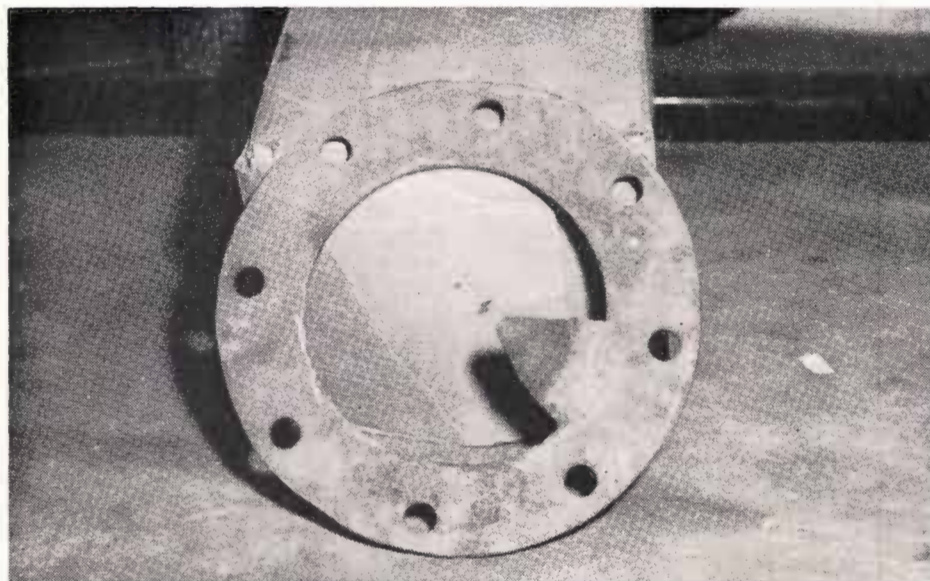
# THE Cross SECTION

A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 11—No. 1

"THERE IS NO SUBSTITUTE FOR WATER"

June 1964



Pictured above is the trash cutting device that has been making lake and pit pumps more efficient. The small blade, protruding toward you, fits adjacent to the pump impellers causing trash brought in by the impellers to be ground into fine particles and passed through the pump.

## Bill J. Waddle Named Editor Of Cross Section



BILL WADDLE

A 1958 graduate of Texas Tech, Waddle majored in agricultural education and was previously employed

as Agricultural Manager of the Lubbock Chamber of Commerce. Prior to his work with the Chamber he was employed by the Texas Agricultural Extension Service as an Assistant County Agricultural Agent in Denton County.

During the past two and a half years he has served as manager of the South Plains Junior Livestock Show; secretary of the Chamber's agricultural, athletic affairs and beautification committees, as well as the Annual Grain Drying and Storage Conference, Agricultural Chemical Conference, and the South Plains Soil Fertility Committee.

Mr. Waddle's professional affiliations include membership in the American Chamber of Commerce Executive's Association where he serves as the departmental programs committee. He is also on the board of directors of the Lubbock Agricultural Club, Southwestern Barrow Show, and is a member of the Texas Commercial Agriculturalist Council. He also has served as assistant manager of the Panhandle South Plains Fair and assisted the West Texas Chamber of Commerce in conducting several livestock tours for West Texas feeders.

## TRASH CLOGGED PUMPS RAPIDLY DISAPPEARING

Clogged, inoperative lake and pit pumps are costly pieces of machinery on any High Plains farm. Stalks, trash, small animals, and almost anything imaginable have been found in the impellers of many lake and pit pumps in the past years.

Great sums of money are spent annually tearing down and repairing pumps that have been damaged by trash lodged in the impellers. Valuable irrigating time, as well as money, is lost while pumps are being repaired and reconditioned because of trash damage.

These factors were some of the reasons that inspired Roy N. Anderson of Clovis to develop a trash cutting device that eliminates the problem of clogged irrigation pumps. Mr. Anderson was using a pump to pick up water from an open ditch and was experiencing rapid and excessive clogging of his machinery by foreign material.

The trash cutting device works in a manner similar to food choppers used by housewives all over America.

It is constructed in the form of a steel plate that can be bolted on the pump just in front of the impellers. The plate has a small blade that protrudes inside the pump adjacent to the impellers. There is a small amount of clearance between the blade and the pump impellers allowing the pump to operate.

When the pump is started, the impellers draw water and trash, if present, into the pump. If trash does enter the pump it strikes the sharp protruding blade and is ground into fine pieces which will allow it to pass through the pump.

The cutting knife is stationary at all times and the movement of the pump impellers creates the force necessary to grind the foreign matter.

Anderson states that the cutter has been very satisfactory in operation, but has found that wheat roots are difficult to cut. He classifies this material as being the most difficult to handle since they are very small, pliable, and strong.

## Are You Too Busy To Save A Life

Could you be one who is placing your family in danger of losing a loved one? You could be and not really be aware of the situation. The situation I refer to is an open abandoned irrigation well.

Rule No. 16 of the High Plains Underground Water Conservation District No. 1 states that "Every owner or operator of any land within the district upon which is located any open or uncovered well is, and shall be required to close or cap the well permanently with a covering capable of sustaining weight of not less than four hundred pounds." Wells located on the land that are in actual use are equipped with pumps, so no danger lies here.

It is a very easy thing to abandon a well and just put a board, barrel, or pile junk over the hole. It is also very easy for a small energetic child

to explore this area and fall in the hole.

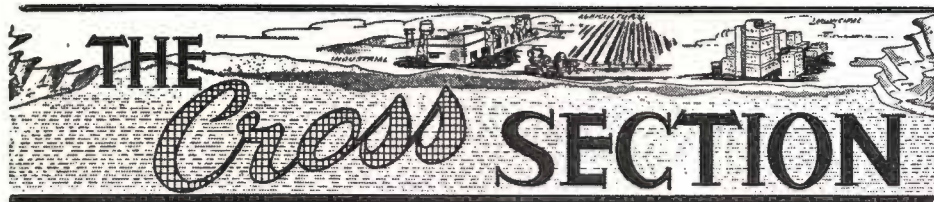
Farmers who are too busy to properly cap their abandoned wells are putting a small value on human life. No, we have not heard of a child falling in a well lately, but if abandoned wells remain open, we soon will.

A safe sufficient capping job can be performed on almost any well within one hour. This time would be well spent knowing you are insuring the safety of your children as well as your neighbors.

Now is the time to think and act if you have abandoned wells that are not permanently closed. Tomorrow may be better but it might be too late to save a life.

Questions concerning the closing of abandoned wells can be answered by your local High Plains Underground Water District office. Feel free to give them a call.





A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Under- ground Water Conservation District No. 1 1628 15th Street, Lubbock, Texas Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

BILL J. WADDLE Editor

BOARD OF DIRECTORS Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President 2806 21st St. Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES) Weldon Newsom Morton, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES) John Gammon, President Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES) Earl Holt, Secretary-Treasurer Rt. 3 Hereford, Texas

Precinct 5

(FLOYD COUNTY) Chester Mitchell Lockney, Texas

District Office, Lubbock

Tom McFarland District Manager  
H. G. Wells Attorney  
Donald L. Reddell Engineer  
Wayne Wyatt Field Representative  
David Cunningham Field Representative  
Dana Wacasey Bookkeeper  
Bill J. Waddle Cross Section and Education  
Melba Wright Secretary  
Jayne Cobb Draftsman  
Mrs. Doris Hagens Secretary

Field Office, Hereford

Mrs. Mattie K. Robinson Secretary

Field Office, Muleshoe

David Cunningham Field Representative  
Mrs. Bertha Daniel Secretary

COUNTY COMMITTEEMEN

Armstrong County

Robert Adams, 1965 Wayside, Texas  
Foster Parker, 1967 Rt. 1, Happy  
Dewitt McGehee, 1966 Wayside, Texas  
John Patterson, 1965 Rt. 1, Happy, Texas  
Jack McGehee, 1967 Wayside

Bailey County

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe

Doyle Davis, 1965 Goodland, Texas  
James P. Wedel, 1967 Rt. 2, Muleshoe  
Leon Lewis, 1965 Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 Star Rt., Maple  
J. W. Witherspoon, 1966 Box 261  
Muleshoe, Texas

Committee meets last Friday of each month at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

Castro County

E. B. Noble  
City Hall, Dimmitt

Ray Riley, 1967 71 W. Lee, Dimmitt  
Frank Wise, 1967 716 W. Grant, Dimmitt  
Lester Dowell, 1966 Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 Star Rt., Hereford, Texas  
H. E. Henley, 1965 Rt. 5, Dimmitt, Texas  
Committee meets on the last Saturday of each month at 10:00 a.m., City Hall, Dimmitt, Texas.

Cochran County

W. M. Butler, Jr.  
Western Abstract Co., Morton

D. A. Ramsey, 1967 Star Rt. 2, Morton  
Ira Brown, 1965 Box 774, Morton, Texas  
Willard Henry, 1966 Rt. 1, Morton, Texas  
H. B. Barker, 1967 602 E. Lincoln, Morton  
L. L. Taylor, 1965 Rt. 1, Morton, Texas  
Committee meets on the second Wednesday of each month at 8:00 p.m., Western Abstract Co., Morton, Texas.

Deaf Smith County

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford

L. E. Ballard, 1966 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 807 N. Main  
Hereford, Texas  
J. E. McCathern, Jr., 1967 Rt. 5, Hereford  
Hereford, Texas  
Billy B. Moore, 1965 Wildorado, Texas  
Charles Packard, 1967 Rt. 3, Hereford  
Committee meets the first Monday of each month at 7:30 p.m., High Plains Water District office, Hereford, Texas.

Floyd County

Donna Sammon  
325 E. Houston St., Floydada

Bill Sherman, 1967 Rt. 4, Floydada  
J. S. Hale, Jr., 1966 Rt. 1, Floydada, Texas  
Iate Jones, 1967 Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 Silvertown Star  
Route, Floydada, Texas  
L. D. "Buster" Simpson, 1965 832 W. Tenn.  
Street, Floydada, Texas  
Committee meets on the first Tuesday of each month at 10:00 a.m., Farm Bureau Office, Floydada, Texas.



High Plains Under- ground Water Conservation District No. 1

Hockley County

Mrs. Phillis Reynolds  
917 Austin Street, Levelland

Bryan Daniel, 1967 Rt. 2, Levelland  
Preston L. Darby, 1965 Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 Rt. 3, Levelland  
Earl G. Miller, 1965 Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 Rt. 2  
Levelland, Texas

Committee meets first and third Fridays of each month at 1:30 p. m. 917 Austin Street, Levelland, Texas.

Lamb County

Calvin Price  
620 Hall Ave. Littlefield

Willie Green, 1967 Box 815, Olton  
Roger Haberer, 1965 Earth, Texas  
W. B. Jones, 1966 Rt. 1, Anton, Texas  
Troy Moss, 1965 Rt. 1, Littlefield, Texas

Committee meets on the first Monday of each month at 7:30 p. m., Fisher's Cafe, Littlefield, Texas.

Lubbock County

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Weldon M. Boyd, 1967 Rt. 1, Idalou  
Bill Hardy, 1965 Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 Rt. 4, Lubbock, Texas

Committee meets on the first and third Mondays of each month at 1:30 p.m., 1628 15th Street, Lubbock, Texas.

Lynn County

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Hubert Tienert, 1967 Wilson  
Robbie Gill, 1965 Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 Wilson, Texas  
Oscar H. Lowery, 1967 Rt. 4, Tahoka  
T. J. Swann, 1965 Rt. 1, Wilson, Texas

Committee meets on the third Tuesday of each month at 10:00 a.m., 1628 15th Street, Lubbock, Texas.

Parmer County

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina

Wendol Christian, 1966 RFD, Farwell, Texas  
Henry Ivy, 1967 Rt. 1, Friona  
Walter Kaltwasser, 1967 RFD, Farwell  
Walter Kaltwasser, 1964 RFD, Farwell, Texas  
Carl Rea, 1965 Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 Friona, Texas

Committee meets on the first Thursday of each month at 8:00 p.m., Wilson & Brock Insurance Agency, Bovina, Texas.

Potter County

E. L. Wilson, 1967 Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 Bushland, Texas  
L. C. Moore, 1965 Bushland, Texas  
Temple Rogers, 1965 Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 Rt. 1, Amarillo

Randall County

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon

R. B. Gist, Jr., 1965 Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 Rt. 2, Canyon, Texas  
A. C. Evers, 1965 Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 Rt. 1 Canyon  
Ed Wieck, 1967 Rt. 1, Canyon

Committee meets on the first Monday of each month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

## A Thought From The Editor

For centuries farmers in America have been noted for their willingness and ability to help neighboring farmers. Their help has been in many different forms; in labor, machinery, advice, and in some instances, financial.

During the last several years many irrigation farmers on the High Plains of Texas have been helping their neighbors more than they have anticipated. Particularly, those who think they have an abundance of water available and let it escape from their land and whose resourceful neighbors have captured this valuable commodity and utilized it to great benefit and profit.

Few records reveal just how great the financial helping hand is that has been passed to neighboring farmers when water is allowed to escape from your land only to be captured by a neighbor.

Are you one that has been setting a precedence, giving water to your neighbor over a period of years? Is it possible that this might one day be a law, due to the fact that your neighbor has received this water over a period of years and has become dependent on it for his livelihood? — It has happened on other things.

Can the present day high plains irrigator afford to give away his most valuable asset? Evidently some feel they can, since this has been the practice of many in the past.

Why do people guard some of their possessions by using banks, savings and loan, and insurance companies and give away their most valuable possession, WATER, by letting it escape, running down the county bar ditch.

On several occasions farmers have let water escape and paid no mind to the escape until a neighbor requested that the High Plains Under- ground Water District install a recording weir to measure the amount of water running down the bar ditch.

What usually happens when this is done? The farmer who is losing the water takes notice of the loss and the farmer who is capturing the "free" water raises his eyebrows. Both sides of the problem can be understood. One farmer asks himself, "Can I afford to give away my water, after I have gone to the expense of producing it?" The other farmer wonders if he can make as much money or even a crop if my "free" water is cut off.

Is it necessary for your neighbor to capture and utilize all the water you have wasted before you become aware that you are taking money from your pocket and putting it in his? — This seems to be the case in many areas on the High Plains of Texas.

Irrigators!! think it over, "how much is a little"? — A little what? — A little money and labor required to eliminate the greatest cost you have in your entire farming operation; GIVING AWAY YOUR IRRIGATION WATER!

## A WORD OF EXPLANATION

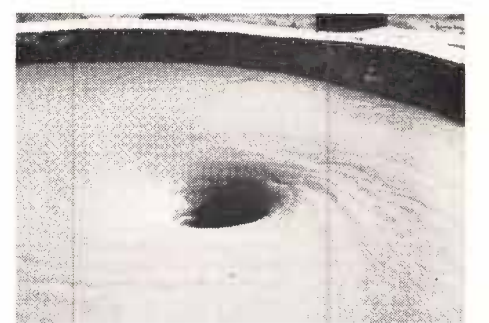
Will you please explain this picture? This is the question readers have been asking concerning this picture in the May edition of the Cross Section.

The picture is a concrete sump catching tailwater on the G. D. Anderson farm about four miles southwest of Friona.

When the picture was made the sump was full of tailwater being caught from a 200 acre tract of land. The water empties from the sump through a ten inch pipe line to another farm, owned by Anderson, across the road.

Last year the 65 acres watered by this device, using tailwater, produced 2400 pounds of red top cane per acre.

Ralph Shelton of Friona, Parmer County Committeeman of the High Plains Under- ground Water District operates the farm.



## DRILLING STATISTICS FOR MAY

During the month of May 187 new wells were drilled within the High Plains Under- ground Water District; 11 replacement wells were drilled and 6 wells were drilled that were either dry or nonproductive for some other reason.

The County Committees issued 190 drilling permits.

Listed below by counties are permits issued and wells completed for May:

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Dry Holes Drilled
Armstrong	2	2	0	0
Bailey	0	2	0	0
Castro	24	26	1	1
Cochran	7	9	0	0
Deaf Smith	17	29	0	0
Floyd	17	24	0	0
Hockley	19	25	0	0
Lamb	25	15	3	2
Lubbock	23	17	2	1
Lynn	8	8	0	0
Parmer	34	20	5	0
Potter	0	0	0	0
Randall	14	10	0	2
<b>TOTALS</b>	<b>190</b>	<b>187</b>	<b>11</b>	<b>6</b>



# An Economical Method Of Capturing "Tailwater"

By BILL J. WADDLE

Catch my tailwater without digging a pit, you must be dreaming! No, Melvin Barns who farms about two and one-half miles west of Farwell, Texas is doing this very thing.

Barns' secret is a tailwater ditch dug on the low end of a tract of land that is presently growing sugar beets.

The ditch, including the intake area is approximately 75 yards long, 72 inches deep and 42 inches wide. A commercial ditching machine was used to construct the ditch. Since the ditch is long and narrow there was no great amount of soil removed or piled around the construction area. The dirt removed from the ditch was arranged in a low narrow stack adjacent to the ditch.

The tailwater ditch is equipped with a vertical turbine pump driven by a three horsepower electric motor. With the pump working at 78% efficiency the unit is capable of pumping 250 gallons per minute. The pump is equipped with an automatic electric switch which works from a float in the ditch. When the wells on the tract of land are pumping, water runs in the ditch until it reaches a certain level, the float then rises and causes the switch to turn the motor on and the pump starts pumping tailwater.

The tailwater is pumped through aluminum pipe to the high end of the tract and is discharged into the open ditch that is being used for irrigation. The water is then returned to the sugar beets to be used again.

Several advantages are obvious by

using this method for handling tailwater. The first and most obvious is the absence of a large deep pit, the second is the small amount of cultivated land used for the installation, the obvious low cost of digging the trench, the small horsepower rated electric motor used and the small amount of lift required to remove the water.

Farms vary and so do irrigators' opinions on how to handle different problems. Under the conditions now being experienced by Barns, the ditch seems to be doing a fine job.

A final thought is the matter of handling silt. In an installation of this type the water is removed fairly rapidly from the ditch while the silt is suspended in the water. A small amount of silt will settle in the ditch but most of it is pumped out and put back on the farm as the tailwater returns to the irrigator's system. If for some reason the ditch does fill with silt, it will be a simple matter to fill the ditch with the soil removed during construction, level the small area and dig a new ditch.

It will be very interesting to observe the ditch this year, especially due to the fact beets are being produced and beets supposedly require frequent waterings.

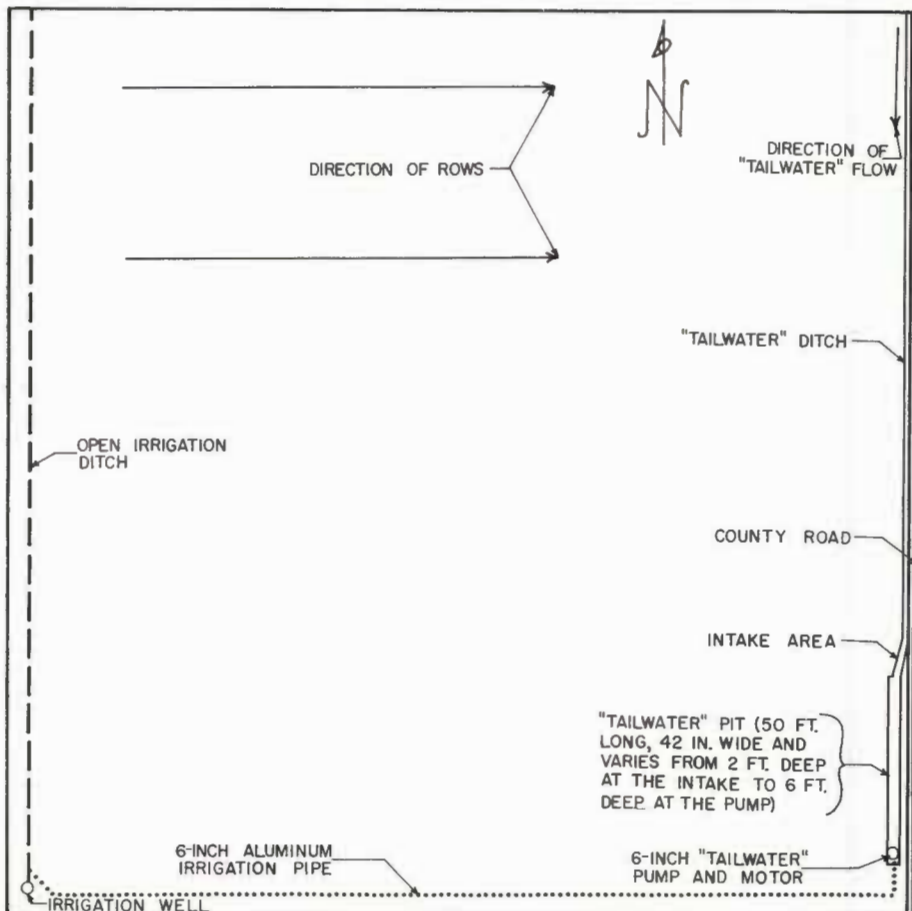
A technical advisor who worked on the installation has estimated the cost of this conservation practice will more than pay for itself in the first year of operation.



The above picture shows the tailwater ditch and pump assembly. Notice the silt in the bottom of the ditch. Some of this silt came from the sides of the ditch as they caved off some loose soil.



A Close up view of the vertical turbine pump and the three horsepower electric motor used to lift the water from the ditch. In the foreground is the electric switch, connected to a float, which turns the motor on and off.



The above diagram shows the entire operation of the tailwater ditch. Notice the dimensions and lay out of the excavation. The tailwater moves through the aluminum pipe on the south end of the field to the open ditch on the west end of the field.



Notice the long low pile of soil removed when the ditch was constructed. The soil can easily be replaced if the ditch is ever abandoned.



# Jeanette Robinson Named Floyd County Secretary



JEANETTE ROBINSON

Jeanette Robinson has been employed as secretary for the Floyd County office of the High Plains Underground Water Conservation District. She is a graduate of Ralls High School. Mrs. Robinson and her husband, Duane, have two children, a 20 month old boy named Kirk and a girl, Whitney, 4 months old. Mr. Robinson

## SUIT FILED OVER OILFIELD WASTE DISPOSAL

The question of which State agency has legal jurisdiction over oilfield waste disposal now will be decided in 53rd district court of Travis County. Superior Oil Co. filed suit asking the court to decree that the Water Pollution Control Board has no such jurisdiction over salt water disposal and that the authority belongs to the Railroad Commission. Superior asked the court to permanently enjoin the Board from exercising such authority and from issuing orders, rules and regulations attempting to regulate salt water disposal. Meanwhile the Board will continue to exercise authority over salt water disposal under the 1961 Water Pollution Control Act, backed by an opinion issued by former Attorney Gen. Wilson in October, 1962. The Board has issued no-pit orders prohibiting surface disposal of salt water in unlined pits, with certain exceptions, in 10 northwest Texas counties, but the first such order isn't effective until September 1.

farms about 15 miles east of Floydada.

The High Plains Underground Water Conservation District welcomes Jeanette and is very happy to have her working in Floyd County.

## ATTENTION! IRRIGATION FARMERS

Through proper land and water management, irrigation "tailwater" can be put to beneficial use

### COMMENCE TODAY

MAKING PLANS ON YOUR FARM FOR RETAINING IRRIGATION "TAILWATER"

## Proceedings Of Second Annual West Texas Water Conference Available

The West Texas Water Institute at Texas Technological College has announced that the proceedings of the Second Annual West Texas Water Conference are available. The Conference, held in February 1964, had the theme Water . . . "The Pot of Gold" at the End of the Rainbow. The one day conference had prominent speakers in the water resources field.

Three papers dealt with businessmen's, petroleum industry's and agriculture's interest in West Texas Water. Conservation practices and ownership of the water was also discussed.

One highlight of the Conference was the adoption of the constitution and by-laws of the institute.

Copies of the Proceedings are available by writing the West Texas Water Institute, Office of the Dean of Agriculture, Texas Technological College, Lubbock, Texas 79409.

### WHEN YOU MOVE—

Please notify the High Plains Underground Water Conservation District, Lubbock, Texas on Post Office Form 22S obtainable from your local postmaster, giving old as well as new address, to insure no interruption in the delivery of "The Cross Section."

## Yellowhouse Canyon Water Control And District Approved

The State Water Commission has approved the formation of the Yellowhouse Canyon Water Control and Improvement District. The District will be comprised of 570 acres of the Johnson Ranch in Lubbock County.

A lake will be built eight miles southeast of Lubbock. The dam will be 2,400 feet long and 21 feet high. Water will cover approximately 120 acres of land. The lake will be used for recreational purposes. The remainder of the acreage in the district will be cut into lots and sold for home sites.

The district plans to put in the dam, roads, sewers, and a sewage disposal plant. Water supply for the district will come from wells which will be drilled within the district. The estimated cost of the project is \$885,000.

Exact location of the lake will be just below Buffalo Lakes which is the recreational lake and facilities operated by the Lubbock County Water Control and Improvement District.

### THE CROSS SECTION

1628 - 15th Street  
Lubbock, Texas

Dear Sirs:

I do not now receive THE CROSS SECTION but would like to have it sent to me each month, free of charge, at the address given below.

Name \_\_\_\_\_

Street Address \_\_\_\_\_ Zip Code \_\_\_\_\_

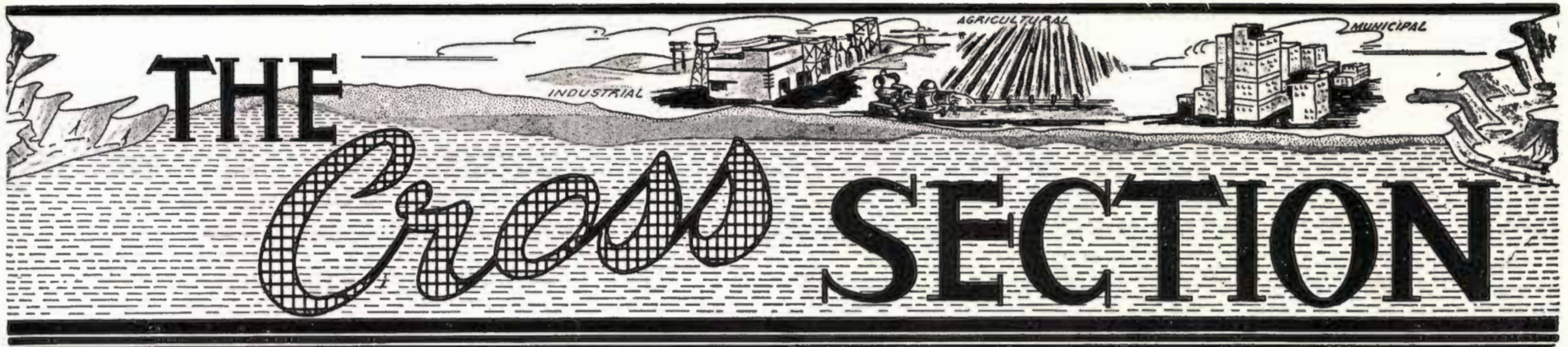
City and State \_\_\_\_\_

(Please cut out and mail to our address)

## WATER IS YOUR FUTURE CONSERVE IT

## A LITTLE LIFE IS WORTH MORE THAN A LITTLE TIME, CLOSE THOSE ABANDONED WELLS!





A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 11—No. 2

"THERE IS NO SUBSTITUTE FOR WATER"

July 1964

# Depletion Of Ground Water Should Be A Concern Of All

By DONALD REDDELL  
Engineer

High Plains Underground Water District

Much has been said and written during the last two decades about the depletion of the ground water supply in the Southern High Plains of Texas. Practically everyone knows that a water depletion problem *DOES* exist. In many localities, wells that used to produce good 8 and 10-inch pipes of water now produce 1 and 2-inch pipes of water.

More and more people visiting the Water District office ask the question: What are *YOU* (the Water District) doing to eliminate this situation? I believe that this is the wrong question to ask. The question should be: What can *I* (the individual) do to help eliminate this situation?

Of course, the only way we can eliminate the depletion of water is to discontinue pumping it. But, this is impractical because the only way that we can receive any benefit from the water is to use it.

If we continue to use ground water in the High Plains, we eventually will reach a point of economic exhaustion. This has already happened in some areas. Other areas of the High Plains have enough ground water to last for many years to come. But, within our lifetime, all areas of the High Plains must eventually face the possibility of reaching a point where it will be uneconomical to pump water from our present source. What are we going to do for water then? It is time we were thinking and planning ahead for this problem.

This problem, in a sense, seems strange to me. The American people have conquered other problems. Why not the water problem? We have developed cures for polio, learned much about cancer, learned to transfer blood from one human to another, made striking advances in heart disease and developed miracle antibiotics. Yet, we have not been able to develop the technical ability to successfully operate one recharge well.

We are sending men into space to circle the earth every three hours. Missiles are launched in Florida and controlled by electronic devices in California. Yet, we have not learned enough about the economics of water use to know when the use of water is

making us money or costing us money.

We cannot look elsewhere for help in this problem. The rest of the world could care less about the water depletion problem in the High Plains of Texas. It is a local problem and one that will have to be solved locally.

It seems that all we ever say is, "Let's conserve our water and thereby prolong the economic life of the High Plains as long as possible." This is *ONLY PART* of the answer. We must withdraw from the world of conformity and begin to ask questions. What can we do in addition to what we are presently doing? I say that the first thing we need to do is grow up. How can we make advancements with our water problem when people are still cloaked in supersitition and tradition concerning this problem? How can we make advancements when even the legal profession has borrowed from the criminal code terms such as "fugitive" and "common enemy" and applied them to certain occurrences of water in nature? We must shake these shackles of tradition and begin to understand the laws of nature which control water.

Secondly, I say that we need to devote money and manpower to the field of research in water conservation. Can anyone name one major water conservation practice that has been developed in the last decade? We had sprinkler systems, underground pipe, well spacing, bench-leveilling, land-leveilling, terraces, recharge wells, lake pumps, and skip row watering ten years ago. This list of water conservation measures is practically the same thing we recommend today.

How many more decades can we let go by without contributing some major new water conservation practice? We must start schools for training people in the science of Hydrology and Water Management in our universities. The oil industry did not get where it is today by doing nothing. Geology and Petroleum Engineering curriculums were started at major universities. With trained personnel they have been able to make giant strides in the development and conservation of our petroleum reserves.

Water people must start this training program immediately.

Much can be done to develop chemicals for reducing the evaporation from soils. Other chemicals can be developed to reduce transpiration of water from plants. Plant breeding can develop plants which will grow crops on less water. We are using more water than ever to water our yards and do the family wash. New methods should be developed for reducing the water requirements of our yards and lawns. Much can be done to reduce the amount of water required to wash clothes, to take a bath and to wash dishes.

Research is needed in the field of weather modification. This is an interesting and ever-broadening field. "Rainmaking" is something that can be done if we will put the man power to work on it.

We need to explore deeper into the earth for additional supplies of ground water. This deeper ground water, in all probability, will be highly mineralized and the well yields will be small when compared to our present wells, but we need to know about this deeper water; how much there is and how salty it is.

I also believe that it is time for us to look toward the problem of importing water from some distant point. Work should start on this problem now. Legal, technical and economical problems will have to be solved before we can ever begin making plans to import water. It we continue to say that it is not feasible and not economical then we will never accomplish the feat. We certainly, in all probability, will not accomplish this

feat in our lifetime.

Many of you think that all this is crazy; that I'm nuts. Maybe so, but water has helped build us a vast agricultural economy here on the South Plains of Texas. We can go on nonchalantly for another decade or two without feeling the effect of the water problem on our economy. But someone must eventually suffer for our complacency.

If we can't save a part of the present water supply for our grandchildren, then the least we can do is to donate a portion of our present economy and manpower to solving a problem that will certainly face them.

Today is the time to start working on these water problems, while our economy is at a peak and we can afford it. If we wait much longer, it will not only be too late to help, but our economy will be on a decline and will be unable to support the needed research. Then it will be necessary to ask outsiders for help. I urge each of you to support water conservation practices in your neighborhood. We should support water research by offering suggestions or financial help. We, also, need to take an active interest in legislative action pertaining to water.

Let us all join hands and in a spirit of understanding and co-operation attack our many phased water problem. All that is necessary is that we study and educate ourselves with respect to the occurrence of water in nature. Then we will start progressing instead of standing still and the South Plains of Texas will become a better place to live because of our efforts.



A familiar sight on the High Plains is the irrigation pipe that at one time was full and today is only half full or less.





A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas

Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

BILL J. WADDLE  
Editor

BOARD OF DIRECTORS  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President — 2806 21st St. Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom — Morton, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)  
John Gammon, President — Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer — Rt. 3 Hereford, Texas

Precinct 5  
(FLOYD COUNTY)

Chester Mitchell — Lockney, Texas

District Office, Lubbock

Tom McFarland — District Manager  
H. G. Wells — Attorney  
Donald L. Reddell — Engineer  
Kenneth Seales — Field Representative  
Wayne Wyatt — Field Representative  
David Cunningham — Field Representative  
Bill J. Waddle — Cross Section and Education  
Dana Wacasey — Bookkeeper  
Melba Wright — Secretary  
Jayne Cobb — Draftsman  
Mrs. Doris Hagens — Secretary

Field Office, Hereford

Mrs. Mattie K. Robinson — Secretary

Field Office, Muleshoe

David Cunningham — Field Representative  
Mrs. Bertha Daniel — Secretary

COUNTY COMMITTEEMEN

Armstrong County

Robert Adams, 1965 — Wayside, Texas  
Foster Parker, 1967 — Route 1, Happy  
Dewitt McGehee, 1966 — Wayside, Texas  
John Patterson, 1965 — Rt. 1, Happy, Texas  
Jack McGehee, 1967 — Wayside

Bailey County

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe  
Doyle Davis, 1965 — Goodland, Texas  
James P. Wedel, 1967 — Rt. 2, Muleshoe  
Leon Lewis, 1965 — Route 1, Box 98 Muleshoe, Texas  
W. L. Welch, 1967 — Star Rt., Maple  
J. W. Witherspoon, 1966 — Box 261 Muleshoe, Texas  
Committee meets last Friday of each month at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

Castro County

E. B. Noble  
City Hall, Dimmitt  
Ray Riley, 1967 — 71 W. Lee, Dimmitt  
Frank Wise, 1967 — 716 W. Grant, Dimmitt  
Lester Dowell, 1966 — Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 — Star Rt., Hereford, Texas  
H. E. Henley, 1965 — Rt. 5, Dimmitt, Texas  
Committee meets on the last Saturday of each month at 10:00 a. m., City Hall, Dimmitt, Texas.

Cochran County

W. M. Butler, Jr.  
Western Abstract Co., Morton  
D. A. Ramsey, 1967 — Star Rt. 2, Morton  
Ira Brown, 1965 — Box 774, Morton, Texas  
Willard Henry, 1966 — Rt. 1, Morton, Texas  
H. B. Barker, 1967 — 602 E. Lincoln, Morton  
L. L. Taylor, 1965 — Rt. 1, Morton, Texas  
Committee meets on the second Wednesday of each month at 8:00 p. m., Western Abstract Co., Morton, Texas.

Deaf Smith County

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford  
L. E. Ballard, 1966 — 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 — 807 N. Main Hereford, Texas  
J. E. McCathern, Jr., 1967 — Rt. 5, Hereford Hereford, Texas  
Billy B. Moore, 1965 — Wildorado, Texas  
Charles Packard, 1967 — Rt. 3, Hereford  
Committee meets the first Monday of each month at 7:30 p. m., High Plains Water District office, Hereford, Texas.

Floyd County

Jeanette Robinson  
325 E. Houston St., Floydada  
Bill Sherman, 1967 — Rt. 4, Floydada  
J. S. Hale, Jr., 1966 — Rt. 1, Floydada, Texas  
Tate Jones, 1967 — Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 — Silverton Star Route, Floydada, Texas  
L. D. "Buster" Simpson, 1965 — 832 W. Tenn. Street, Floydada, Texas  
Committee meets on the first Tuesday of each month at 10:00 a. m., Farm Bureau Office, Floydada, Texas.



High Plains Underground Water Conservation District No. 1

Hockley County

Mrs. Phillis Reynolds  
917 Austin Street, Levelland  
Bryan Daniel, 1967 — Rt. 2, Levelland  
Preston L. Darby, 1965 — Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 — Rt. 3, Levelland  
Earl G. Miller, 1965 — Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 — Rt. 2 Levelland, Texas  
Committee meets: first and third Fridays of each month at 1:30 p. m. 917 Austin Street, Levelland, Texas.

Lamb County

Calvin Price  
620 Hall Ave. Littlefield  
Willie Green, 1967 — Box 815, Olton  
Roger Haberer, 1965 — Earth, Texas  
W. B. Jones, 1966 — Rt. 1, Anton, Texas  
Troy Moss, 1965 — Rt. 1, Littlefield, Texas  
Committee meets on the first Monday of each month at 7:30 p. m., Fisher's Cafe, Littlefield, Texas.

Lubbock County

Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Weldon M. Boyd, 1967 — Rt. 1, Idalou  
Bill Hardy, 1965 — Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 — 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 — Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 — Rt. 4, Lubbock, Texas  
Committee meets on the first and third Mondays of each month at 1:30 p. m., 1628 15th Street, Lubbock, Texas.

Lynn County

Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Hubert Tienert, 1967 — Wilson  
Robbie Gill, 1965 — Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 — Wilson, Texas  
Oscar H. Lowery, 1967 — Rt. 4, Tahoka  
T. J. Swann, 1965 — Rt. 1, Wilson, Texas  
Committee meets on the third Tuesday of each month at 10:00 a. m., 1628 15th Street, Lubbock, Texas.

Parmer County

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina  
Wendol Christian, 1966 — RFD, Farwell, Texas  
Henry Ivy, 1967 — Rt. 1, Friona  
Walter Kaltwasser, 1967 — RFD, Farwell  
Walter Kaltwasser, 1964 — RFD, Farwell, Texas  
Carl Rea, 1965 — Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 — Friona, Texas  
Committee meets on the first Thursday of each month at 8:00 p. m., Wilson & Brock Insurance Agency, Bovina, Texas.

Potter County

E. L. Wilson, 1967 — Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 — Bushland, Texas  
L. C. Moore, 1965 — Bushland, Texas  
Temple Rogers, 1965 — Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 — Rt. 1, Amarillo  
Committee meets on the first Monday of each month at 8:00 p. m., 1710 5th Ave., Canyon, Texas

Randall County

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon  
R. B. Gist, Jr., 1965 — Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 — Rt. 2, Canyon, Texas  
A. C. Evers, 1965 — Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 — Rt. 1 Canyon  
Ed Wieck, 1967 — Rt. 1, Canyon  
Committee meets on the first Monday of each month at 8:00 p. m., 1710 5th Ave., Canyon, Texas

## WATER RESOURCE COMMISSION MEETS

The water resources committee of the West Texas Chamber of Commerce met in Lubbock July 8th.

J. W. Buchanan of Dumas, Chairman of the committee, called the special meeting to appoint a sub committee on water reuse.

Henry E. Meadows of Midland was appointed chairman of the committee. Purpose of the new sub-committee will be to study methods that can be utilized in water conservation and the reuse of water. Possible means of water reuse for agriculture and industry will be of main concern to the committee.

The research sub-committee also met and outlined their program for the coming year. Primary concern of this committee is to find out what is being done in research, the present needs, and what support can be obtained in conducting water research.

Present at the meeting were Buchanan, Meadows, H. G. Wells, Tom McFarland, Russell Bean, Dr. Waylon Bennett, Frank Gray, Bill Waddle, all of Lubbock; J. Alton Miller, Amarillo, Owen Ivie, Big Spring, James Valiant, Halfway, and Loyal Walker of the West Texas Chamber of Commerce.

## Chamber Committee Plans Tour

The agricultural committee of the Plainview Chamber of Commerce plans to tour a portion of the High Plains Underground Water District.

In a meeting July 15, the committee voted to make the tour. The tour will probably be a one day affair and will give Hale County farmers an opportunity to visit and inspect tailwater systems, lake pump installations,

and other work being conducted by the Water District.

Parmer County will be the center of the tour area.

Persons interested in making the tour should contact Charlie Young at the Plainview Chamber of Commerce or the High Plains Underground Water District for details and information concerning date and time of tour.



Tailwater pits such as this one in Deaf Smith County will be visited by the Hale County Group.

## DRILLING STATISTICS FOR JUNE

During the month of June permits were closed on 357 new wells within the High Plains Underground Water District; 16 replacement wells were drilled and 12 wells were drilled that were either dry or nonproductive for some other reason. The County Committees issued 193 drilling permits.

Listed below by counties are permits issued and wells completed for June.

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Dry Holes Drilled
Armstrong	6	6	0	0
Bailey	23	34	4	4
Castro	24	40	1	1
Cochran	8	14	0	1
Deaf Smith	47	43	1	0
Floyd	8	38	1	1
Hockley	9	35	0	1
Lamb	17	36	1	0
Lubbock	15	47	1	3
Lynn	4	7	0	0
Parmer	16	48	7	1
Potter	0	1	0	0
Randall	16	8	0	0
<b>Totals</b>	<b>193</b>	<b>357</b>	<b>16</b>	<b>12</b>



# DISTRICT EXPANDS EFFORTS TO CONTROL SILT

By BILL J. WADDLE

Take a thousand feet of plastic pipe, perforate it with 1/8 inch holes every 30 inches, lay it in a "tailwater" pit, and pump water through it. What have you accomplished?

Dwain Menefee of Parmer County feels he is well on his way to solving the problem of his tailwater pit filling with silt. For years farmers have lost precious amounts of top soil by allowing water to run from their farms carrying soil down the ditches along the county roads. This great amount of lost top soil was usually unobserved other than the fact that the county had to clean out bar ditches periodically so more water and soil could run down the ditches.

In the spring of 1963 Menefee installed a pit to catch irrigation water that had been escaping from his farm. He used this pit to catch enough water to irrigate 47 acres seven times during 1963. During the course of seven irrigations the pit collected the top soil that had been previously lost down the county bar ditch. To make his pit effective and capable of handling all the "tailwater" diverted into it from his farm Menefee realized he had to conquer his silt problem.

Assisted by Water District personnel, Menefee is trying a new and unique method of silt agitation.

The existing pit on the Menefee farm was cleaned out and a new installation of plastic pipe, pump and filter system was installed.

The perforated plastic pipe was laid on the bottom of the pit. The pipe runs the entire length of the pit and is spaced at three foot intervals. By pumping water through the perforat-

ed pipe, an agitating action is created on the bottom of the pit. This action will help keep the silt in suspension and will enable it to be pumped back to the farm through the irrigation lines.

The pit was equipped with a six inch high efficiency automatic pump. The pump is powered by a 7-1/2 h. p. electric motor. The pump is equipped with a 10 inch bowl. Power cost for operating the installation is about 18 cents per hour.

When Menefee turns his irrigation wells on, the run-off water is collected in the pit. As the water reaches a predetermined depth the automatic switch turns the pump on and water is pumped from the pit. Water coming from the pit goes in two directions. One half of the water is pumped into the return lines and the other half goes into the perforated plastic pipe on the floor of the pit causing the agitating action.

The water going through the plastic lines is under a 12 pound per square inch pressure.

Menefee realizes that his new installation is in the experimental stage but he is quite happy with the results he has obtained. Yes, he knows he is getting some silt replaced on his soil, because on several occasions he has had to clean out his small plastic sacks attached to his gated irrigation pipe.

Progressive farmers in the Water District who are interested in conserving water as well as soil are the ones who will be in business for years to come. Menefee is one of these men.



A "birdseye" view of the Menefee installation. Plastic pipes on the floor of the pit carry water for agitation of silt.

## Field Representative Visits Arkansas Project

Our Field Representative, Wayne Wyatt, has just recently returned from a trip to Arkansas County, Arkansas. During Wyatt's visit he toured area Water Conservation Projects extensively, through the co-operation and assistance of the Soil and Water Conservation Commission and the Soil Conservation Service.

The area visited is similar to the Southern High Plains of Texas. Water is pumped from underground formations which are suffering declines similar to those being experienced by the people of the Southern High Plains. The primary crops grown in the area are rice and soy beans. During the growing season irrigations of about three acre-feet of water for rice and about one acre-foot for the soy beans are required for maximum yields.

Mr. Wyatt observed that the Arkansas farmers have problems with the quality of the water pumped from the underground formation. This water is high in alkali and, as a result, the high pH decreases the yield of rice, which requires acid soils. Many farmers faced with declines of the water table and water quality problems have employed every opportunity to trap surface water and not waste any water from rainfall runoff or irrigation tailwater. When possible, they capture and pump water from bayous and store it in their fields or in large reservoirs built for this purpose. On one farm visited, the farmer reported he was trying to "wear the wet out of the water." That is, he was capturing and recirculating all the

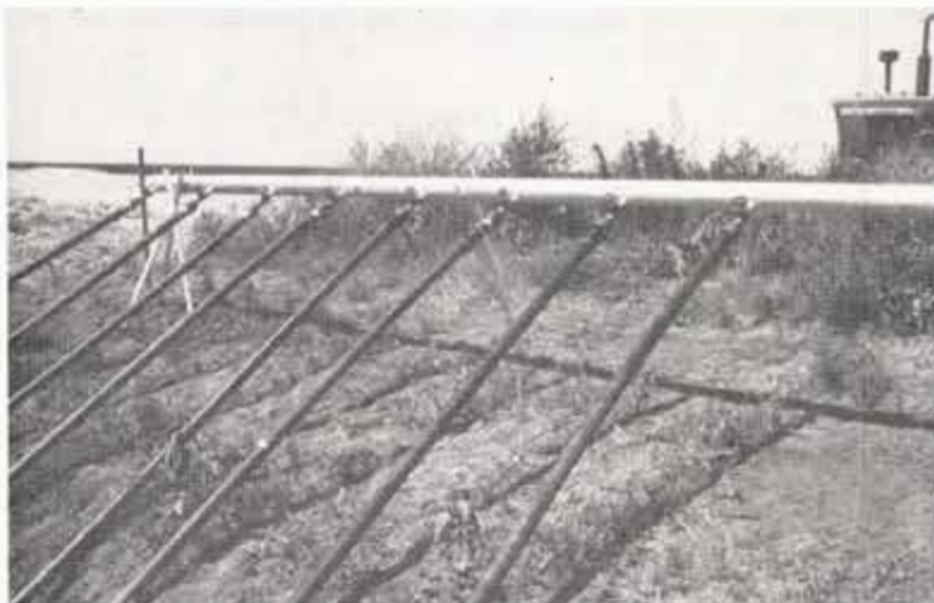
rain water and irrigation tailwater and recirculating it until it was all used for a beneficial purpose.

Perhaps farmers on the High Plains should take a closer look at their "hole card". Agricultural land prices in Arkansas County are similar to prices on the High Plains; farm income per farm is also comparable. Bayous are not available on the High Plains but we DO have lakes. Many of these playa lakes on the High Plains are not being pumped. Thus rain water and irrigation tailwater collected in the basins are lost to evaporation evapotranspiration and seepage.

The evaporation rate on the High Plains of Texas, about 80 inches annually, is our major problem; whereas, in Arkansas County, Arkansas, the evaporation rate is only about 12 inches annually and presents no major concern with surface reservoirs. Some Arkansas farmers are building reservoirs covering from 10 to more than 100 acres on productive land at a reported construction cost ranging from \$190 per acre for reservoirs of less than 25 acres to about \$90 an acre for those larger than 100 acres. In doing so, they are covering up the farm land with values up to \$400 per acre.

Many of the lakes here in the High Plains could be modified at a similar or less expensive cost, thereby confining the water, reducing evaporation, evapotranspiration and also reclaiming valuable farm land. (Which the Arkansas farmer is losing).

If you have a lake, why not give this some thought?



The plastic pipe is connected to a 4-inch pipe with valves. All pipes are allowed to operate or a selection of pipes can be used by cutting off the valves. Working pressure on the plastic pipe is 12 pounds P.S.I.



The above is a picture of the J. R. Oliver Farm, in Arkansas County, Arkansas, on which complete water management practices are observed. Note the Arrows indicating the direction of flow of the water and the large reservoir. No irrigation tailwater or rain water is lost from this farm.

**THE CROSS SECTION**

1628 - 15th Street  
Lubbock, Texas

Dear Sirs:

I do not now receive THE CROSS SECTION but would like to have it sent to me each month, free of charge, at the address given below.

Name \_\_\_\_\_

Street Address \_\_\_\_\_ Zip Code \_\_\_\_\_

City and State \_\_\_\_\_

(Please cut out and mail to our address)



# “Second Hand” Water Has Great Value



Water flowing from Godwin's pit is cut down to eliminate breaking his irrigation ditch. This water could be running down the bar ditch and wasted.

About nineteen miles west of Hereford in Deaf Smith County, Dick Godwin is stretching his irrigation water and getting excellent results.

Godwin, a young aggressive farmer, who operates a large portion of the time from his two way radio equipped station wagon, farms 6,300 acres of land. Radio equipped pickup trucks driven by his foreman enables him to keep up with every phase of his large farming operation.

As we would assume 6,300 acres of rich farming land requires a great deal of supervision and a greater amount of irrigation water. Efficient use of all irrigation water available is the key to a very fine highly productive section of land in the Godwin operation.

A water pit constructed in the north east corner of the section is presently catching water from five irrigation wells after it has run down rows and watered other crops. This “second hand” water adds profit to the crops grown by Godwin.

Two pits actually exist. One is used to catch silt and the main body of water is caught in the second pit.

The water runs about one mile from the source of production to the pit. “Cheap water” is the key to the whole operation. The system is not equipped with any type pump and gravity flow moves all the water.

Ninety rows are watered from the ditch in each set. Crops grown on the section are wheat, grain sorghum, rye, and other small grains. Godwin also has some pasture land on the section and runs some cattle.

A full time irrigator is employed to water the section and Godwin figures it costs him 50 cents per acre to irrigate the section with “second hand” water.

Godwin also has a tail water pit 330 feet long, 10 feet deep and 40 feet wide on his farm. Records were kept on this pit from July 1962 to July 1963. A total of 313.4 acre feet of water was recovered and returned to his farm.

Are you able to irrigate your land this cheap? Investigation might prove you can. Field representatives of the High Plains Underground Water District will be glad to assist you.



Irrigator working full time on the section being watered by Godwin's tailwater. Note tubes set in ditch and the large number being utilized.

## DO YOU KNOW THE VALUE OF YOUR WATER

Water salvaged from lakes and from irrigation tailwater saves pumping water out of storage. This water saved in storage has a potential value which will probably be greater in the future than it is today.

How much tailwater and lake water can you salvage?

Estimated Gross Value Per Acre Foot of Water Salvaged When Applied on These Crops.

Acre Feet	Cotton	Grain Sorghum	Wheat
1	\$ 60.00	\$ 40.00	\$ 33.33
10	600.00	400.00	333.33
25	1500.00	1000.00	833.33
50	3000.00	2000.00	1,666.66
100	6000.00	4000.00	3,333.33
250	15,000.00	10,000.00	13,333.33
500	30,000.00	20,000.00	16,666.66
1000	60,000.00	40,000.00	33,333.33

**Please Close Those Abandoned Wells!!!**

**Water Is Your Future, Conserve It!**

**WHEN YOU MOVE—**  
Please notify the High Plains Underground Water Conservation District, Lubbock, Texas on Post Office Form 22S obtainable from your local postmaster, giving old as well as new address, to insure no interruption in the delivery of “The Cross Section.”



# THE Cross SECTION

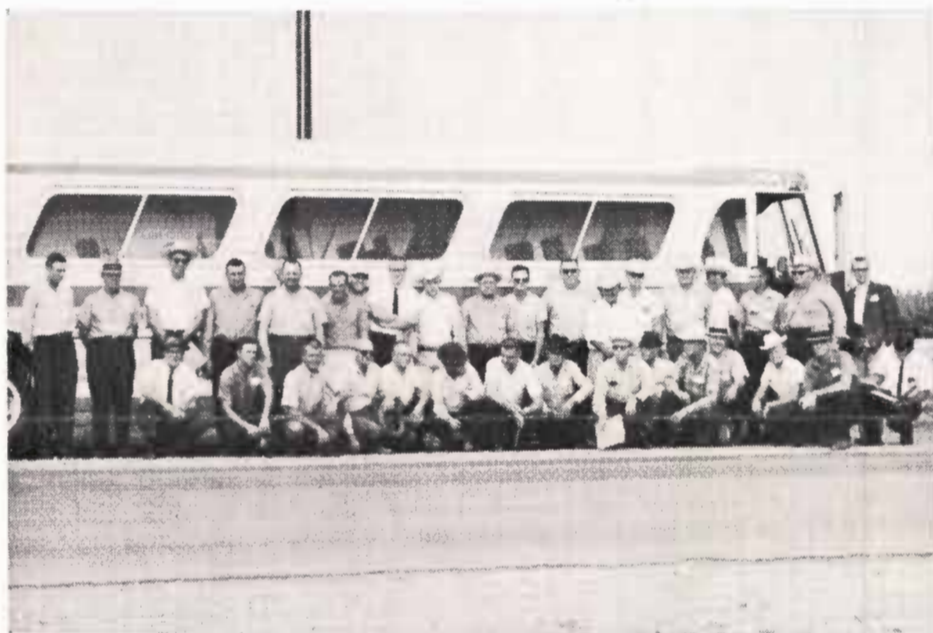
A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 11—No. 3

"THERE IS NO SUBSTITUTE FOR WATER"

August 1964

## Hale County Group Tours Water District Project Area



Hale County farmers, businessmen and other interested parties paused at the Hub Community during their tour of the project area of the High Plains Underground Water District.

Thirty-four Hale Countians visited Parmer County Aug. 18 to inspect methods of reclaiming irrigation tailwater on seven farms in the High Plains Underground Water Conservation District.

The tour by chartered bus was sponsored by the agriculture committee of Plainview Chamber of Commerce. Billy Sylvester, Plainview farmer, is chairman of the committee.

Water district officials felt that farmers whose places were visited on the tour "are some of the leaders in this area in the fields of water conservation."

The first stop was at the James Mabry farm about 1 mile south of Hub where the visitors observed a tailwater return system costing about \$2,486.

Mabry recovered 61.5 acre feet of water from April, 1963, through April, 1964. Water pumped from two contributing irrigation wells now is being measured to determine the percentage of water recovered.

Samples of tailwater recovered with the Mabry system also are being collected for silt, fertilizer and pesticide analyses.

The group next observed a lake pump and tailwater return system on the Gilbert Wenner farm about 3

miles northwest of Hub. Wenner dug a pit in a playa lake and salvaged about 200 acre feet of water from the lake during 1963.

Pumpage from the Wenner system varies from 800 to 1,200 gallons per minute at a cost of about 45 cents per hour, or approximately \$2.50 per acre foot of water.

Land leveling to control irrigation tailwater and soil erosion was seen at the Kenneth Cass farm about 3 miles north of Hub. Cass leveled a strip of land 300 feet wide across the entire length of a 160-acre place.

Cost of this leveling was about \$2,250. In comparison, a tailwater return system would have cost approximately \$2,500 on this particular farm.

Cass said the system "has been very successful in controlling irrigation tailwater runoff and soil erosion the past two years."

A recently completed ditch storage system was seen on the Spencer Hough farm about 3 miles north of Hub. The ditch is about 600 feet long, 36 inches wide and slopes from about 1 foot to 6 feet at the pump end.

The ditch has a capacity of about 45,000 gallons of water. Cost of the ditch pump, motor panel and platform in this tailwater return system

totaled about \$1,000.

The fifth stop was at the Dwan Menefee farm about 3 1/2 miles south of Friona to inspect a tailwater return system where silt recirculation and weed control studies are being conducted.

Water district officials said tailwater samples collected in 1963 indicated that almost 10 tons of soil were being lost with each acre-foot of tailwater.

Much of this is being recirculated back on the Menefee farm, but some of the silt remains in the pit, reducing the water storage area.

An experiment has been launched involving the installation of 1 000 feet of 2-inch plastic line, perforated with one-eighth inch holes 30 inches apart, on the bottom of the Menefee tailwater pit.

### 250 Gallons Per Minute

Approximately 250 gallons of water per minute are being recirculated through these pipes with the hope that this will keep the silt suspended until it can be pumped out.

"Most of the equipment and materials have been donated for this experiment," officials reported, "but the setup would cost about \$3,000 if installed by the farmer."

The "tourists" saw a \$3,800 tailwater system on the J. B. Taylor farm about 1 1/2 miles southeast of Friona. Two wells are contributing water to the system, which handles 290 acres of land.

This system includes a 4-inch centrifugal pump, a 6-cylinder engine

equipped with butane, 1,900 feet of 8-inch plastic pipe, and an 814,500-gallon storage pit measuring 300 feet in length, 20 feet in width and 12 feet deep.

Taylor salvaged a total of 151 acre feet of water from April, 1963, to April, 1964. If valued at \$40 per acre foot this reclaimed water would have had a total value of \$6,040.

A tailwater gravity flow system was seen at the Gabe Anderson farm about 5 miles southwest of Friona. This installation, which cost only \$414, consists of a catch basin and about 200 feet of 10-inch steel pipe.

About 45 acres of redtop cane was irrigated last year with tailwater captured from three contributing wells on the Anderson farm. About 2,400 pounds per acre of cane seed was harvested from this plot last year.

Explaining the purpose of the tour, Sylvester cited the heavy demands placed on irrigation wells during the current long dry spell as another indication of the "imperative need" of wise water conservation measures.

"Farmers in Parmer County seem to be way out front in trapping and using tailwater," he added, "and we certainly thought it would be worth our time to see how they're doing it."

Plans for the tour were arranged by Sylvester; Hale County Agent Ollie Linder; Jess Jackson of the Soil Conservation Service at Plainview; and Bill Waddle and Wayne Wyatt, both of the Water District staff.



Tailwater pump and ditch located on the Spencer Hough farm in Parmer County. Hale County visitors viewed this installation with interest.

**WATER IS YOUR FUTURE CONSERVE IT**





A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas

Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

**BILL J. WADDLE**  
Editor

**BOARD OF DIRECTORS**  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President ..... 2806 21st St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom ..... Morton, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)  
John Gammon, President ..... Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer ..... Rt. 3  
Hereford, Texas

Precinct 5

(FLOYD COUNTY)  
Chester Mitchell ..... Lockney, Texas

**District Office, Lubbock**

Tom McFarland ..... District Manager  
H. G. Wells ..... Attorney  
Donald L. Reddell ..... Engineer  
Kenneth Seales ..... Field Representative  
Wayne Wyatt ..... Field Representative  
David Cunningham ..... Field Representative  
Bill J. Waddle ..... Cross Section and Education  
Dana Wacasey ..... Bookkeeper  
Melba Wright ..... Secretary  
Jayne Cobb ..... Draftsman  
Mrs. Doris Hagens ..... Secretary

**Field Office, Hereford**

Kenneth Sales ..... Field Representative  
Mrs. Mattie K. Robinson ..... Secretary

**Field Office, Muleshoe**

David Cunningham ..... Field Representative  
Mrs. Bertha Daniel ..... Secretary

**COUNTY COMMITTEEMEN**

**Armstrong County**  
Robert Adams, 1965 ..... Wayside, Texas  
Foster Parker, 1967 ..... Route 1, Happy  
Dewitt McGehee, 1966 ..... Wayside, Texas  
John Patterson, 1965 ..... Rt. 1, Happy, Texas  
Jack McGehee, 1967 ..... Wayside

**Bailey County**

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe  
Doyle Davis, 1965 ..... Goodland, Texas  
James P. Wedel, 1967 ..... Rt. 2, Muleshoe  
Leon Lewis, 1965 ..... Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 ..... Star Rt., Maple  
J. W. Witherspoon, 1966 ..... Box 261  
Muleshoe, Texas  
Committee meets last Friday of each month  
at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

**Castro County**

E. B. Noble  
City Hall, Dimmitt  
Ray Riley, 1967 ..... 71 W. Lee, Dimmitt  
Frank Wise, 1967 ..... 718 W. Grant, Dimmitt  
Lester Dowell, 1966 ..... Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 ..... Star Rt., Hereford, Texas  
H. E. Henley, 1965 ..... Rt. 5, Dimmitt, Texas  
Committee meets on the last Saturday of each  
month at 10:00 a. m., City Hall, Dimmitt, Texas.

**Cochran County**

W. M. Butler, Jr.  
Western Abstract Co., Morton  
D. A. Ramsey, 1967 ..... Star Rt. 2, Morton  
Ira Brown, 1965 ..... Box 774, Morton, Texas  
Willard Henry, 1966 ..... Rt. 1, Morton, Texas  
H. B. Barker, 1967 ..... 602 E. Lincoln, Morton  
L. L. Taylor, 1965 ..... Rt. 1, Morton, Texas  
Committee meets on the second Wednesday  
of each month at 8:00 p. m., Western Abstract  
Co., Morton, Texas.

**Deaf Smith County**

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford  
L. E. Ballard, 1966 ..... 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 ..... 807 N. Main  
Hereford, Texas  
J. E. McCathern, Jr., 1967 ..... Rt. 5, Hereford  
Hereford, Texas  
Billy B. Moore, 1965 ..... Wildorado, Texas  
Charles Packard, 1967 ..... Rt. 3, Hereford  
Committee meets the first Monday of each  
month at 7:30 p. m., High Plains Water District  
office, Hereford, Texas.

**Floyd County**

Jeanette Robinson  
325 E. Houston St., Floydada  
Bill Sherman, 1967 ..... Rt. 4, Floydada  
J. S. Hale, Jr., 1966 ..... Rt. 1, Floydada, Texas  
Tate Jones, 1967 ..... Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 ..... Silvertown Star  
Route, Floydada, Texas  
L. D. "Buster" Simpson, 1965 ..... 832 W. Tenn.  
Street, Floydada, Texas  
Committee meets on the first Tuesday of each  
month at 10:00 a. m., Farm Bureau Office, Floy-  
dada, Texas.



High Plains Underground Water Conservancy District No. 1

**Hockley County**

Mrs. Phillis Reynolds  
917 Austin Street, Levelland  
Bryan Daniel, 1967 ..... Rt. 2, Levelland  
Preston L. Darby, 1965 ..... Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 ..... Rt. 3, Levelland  
Earl G. Miller, 1965 ..... Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 ..... Rt. 2  
Levelland, Texas  
Committee meets first and third Fridays of  
each month at 1:30 p. m., 917 Austin Street,  
Levelland, Texas.

**Lamb County**

Calvin Price  
620 Hall Ave. Littlefield  
Willie Green, 1967 ..... Box 815, Olton  
Roger Haberer, 1965 ..... Earth, Texas  
W. B. Jones, 1966 ..... Rt. 1, Anton, Texas  
Troy Moss, 1965 ..... Rt. 1, Littlefield, Texas  
Committee meets on the first Monday of each  
month at 7:30 p. m., Fisher's Cafe, Littlefield,  
Texas.

**Lubbock County**

Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Weldon M. Boyd, 1967 ..... Rt. 1, Idalou  
Bill Hardy, 1965 ..... Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 ..... 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 ..... Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 ..... Rt. 4, Lubbock, Texas  
Committee meets on the first and third Mon-  
days of each month at 1:30 p. m., 1628 15th  
Street, Lubbock, Texas.

**Lynn County**

Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Hubert Tienert, 1967 ..... Wilson  
Robbie Gill, 1965 ..... Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 ..... Wilson, Texas  
Oscar H. Lowery, 1967 ..... Rt. 4, Tahoka  
T. J. Swann, 1965 ..... Rt. 1, Wilson, Texas  
Committee meets on the third Tuesday of each  
month at 10:00 a. m., 1628 15th Street, Lubbock,  
Texas.

**Parmer County**

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina  
Wendol Christian, 1966 ..... RFD, Farwell, Texas  
Henry Ivy, 1967 ..... Rt. 1, Friona  
Walter Kaltwasser, 1967 ..... RFD, Farwell  
Carl Rea, 1965 ..... Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 ..... Friona, Texas  
Committee meets on the first Thursday of  
each month at 8:00 p. m., Wilson & Brock Insur-  
ance Agency, Bovina, Texas.

**Potter County**

E. L. Wilson, 1967 ..... Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 ..... Bushland, Texas  
L. C. Moore, 1965 ..... Bushland, Texas  
Temple Rogers, 1965 ..... Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 ..... Rt. 1, Amarillo

**Randall County**

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon  
R. B. Gist, Jr., 1965 ..... Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoeffer, 1966 ..... Rt. 2, Canyon, Texas  
A. C. Evers, 1965 ..... Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 ..... Rt. 1 Canyon  
Ed Wieck, 1967 ..... Rt. 1, Canyon  
Committee meets on the first Monday of each  
month at 8:00 p. m., 1710 5th Ave., Canyon, Texas

# Water Commission Sets Two Hearings For High Plains Area

Editors Note.

Printed below are copies of official notices posted calling hearings on Water District boundaries on the High Plains. All interested parties will be heard.

To the holders of title to land in and to all persons interested in the alteration of the subdivision boundaries of the underground water reservoir as designated by order of the Board of Water Engineers on March 26, 1951, and known as "Subdivision One, High Plains Area, Ogallala, South of Canadian River", and the redefinition of said underground water reservoir subdivision to include all strata containing underground water suitable for agricultural or domestic purposes which underlie the subdivision boundaries:

Notice is hereby given that under and by virtue of the authority vested by law in the Texas Water Commission and on the basis of new technical data in the files of the Commission, a hearing will be held at nine (9) o'clock a. m., on the 3rd day of September, 1964 in the Cochran County Auditorium in Morton, Texas, for the purpose of hearing testimony relative to whether or not the boundaries of Subdivision One, High Plains Area, Ogallala, South of Canadian River should be altered, and whether or not the underground water reservoir subdivision should be redefined to include all strata containing underground water suitable for agricultural or domestic purposes underlying the subdivision boundaries. More specifically, alteration of the subdivision boundaries is proposed in portions of Armstrong, Bailey, Castro, Cochran, Deaf Smith, Hockley, Lamb, Randall and Terry Counties, Texas.

At said hearing any and all interested parties may appear and offer testimony to show that any lands in the aforesaid counties do or do not overlie said underground water reservoir subdivision.

To the holders of title to land in and to all persons interested in the proposed alteration of the subdivision boundaries of the underground reservoir in Dawson, Gaines, Terry and Yoakum Counties, Texas as designated by order of the Board of Water Engineers on May 8, 1956, and known as "Subdivision No. 4 of the Underground Water Reservoir, High Plains Area, South of the Canadian River":

Notice is hereby given that under and by virtue of the authority vested by law in the Texas Water Commission, a hearing will be held at nine (9) o'clock a. m., on the 2nd day of September, 1964, in the High School Auditorium, Brownfield, Terry County, Texas, for the purpose of hearing testimony relative to whether or not the boundaries of subdivision No. 4 of the Underground Water Reservoir High Plains Area, South of the Canadian River should be altered.

More specifically, consideration is to be given to alteration of the subdivision boundaries to include lands in Andrews, Cochran and Lynn Counties, and additional lands in Dawson, Gaines, Terry and Yoakum Counties, Texas.

At said hearing any and all interested parties may appear and offer testimony to show that any lands in the aforesaid counties do or do not overlie said underground water reservoir subdivision.

## WHEN YOU MOVE—

Please notify the High Plains Underground Water Conservation District, Lubbock, Texas on Post Office Form 22S obtainable from your local postmaster, giving old as well as new address, to insure no interruption in the delivery of "The Cross Section."

## DRILLING STATISTICS FOR JULY

During the month of July permits were closed on 198 new wells within the High Plains Underground Water District; 11 replacement wells were drilled and 7 wells were drilled that were either dry or nonproductive for some other reason. The County Committees issued 188 drilling permits.

Listed below by counties are permits issued and wells completed for June.

County	Permits Issued	New Wells Drilled	Repl. Wells Drilled	Dry Holes Drilled
Armstrong	1	2	0	0
Bailey	5	14	2	2
Castro	20	27	0	0
Cochran	2	3	0	0
Deaf Smith	25	27	1	1
Floyd	31	19	1	0
Hockley	5	19	0	0
Lamb	4	15	3	0
Lubbock	38	29	1	1
Lynn	16	5	0	0
Parmer	25	26	3	1
Potter	1	0	0	0
Randall	15	12	0	2
<b>TOTALS</b>	<b>188</b>	<b>198</b>	<b>11</b>	<b>7</b>



# YOU NEVER MISS THE WATER UNTIL THE WELL GOES DRY

By BILL J. WADDLE

If you were to go in your local bank, department store, drug store or gin office today I'll bet you could hear someone say, "My wells are getting weak and the water level is dropping. What am I going to do?" Yes, this is a very common thought and occurrence on the High Plains.

What can be done? Well, in areas where there is still good strong water and six and eight inch wells are prevalent, farmers can use water conservatively and reduce the amount pumped. What about areas that are already in sad shape for lack of water? Let's take a look at such an area and see what farmers are doing to produce crops on weak irrigation water.

Gene Eades who farms four miles west of New Home in Lynn County is a young aggressive man who is faced with the problem of a very limited supply of water for irrigation.

The water in this part of Lynn County is very weak and is usually found at a depth of about 100 feet with less than 50 feet of saturated thickness. It is unusual when the formation in this area produces in excess of 70 gallons per minute.

Eades started farming a quarter section of land in 1956. The quarter had two six inch wells that produced good four inch pipes of water. This was approximately 300 gallons per minute.

Producing his eighth crop on this quarter section Eades faces a problem with his irrigation water that may affect all farmers on the High Plains in future years.

Today he is irrigating his crop by

using eight irrigation wells connected together. Yes, this seems fantastic, but Eades is doing this very thing and producing a good crop.

Taking a closer look at the situation, we discovered that the eight wells produce a total of 290 gallons per minute. The wells are equipped with small submergible pumps electrically powered and the pumps are set at about 139 feet. The irrigation water is concentrated on the 62 acre cotton allotment. Eades uses a skip row planting system of two in and one row laid out. The cotton crop covers 100 acres. Irrigation time required to cover the cotton is fourteen days.

The past three years the cotton production on this farm under minimum irrigation has averaged 700 pounds of lint per acre.

Grain sorghum, which is usually irrigated once during the season, averages about 2800 pounds per acre.

When you take a good close look at your situation, you can see that you can and must produce crops on a limited supply of water. Sure, many people have an abundance of water now, but so did the area at one time in which Eades farms. When you have to live with a shortage you seem to be pretty conservative whether it be money or water.

Eades has taken his small supply of water and is doing a magnificent job of farming by combining efficient farming methods and good sound water management.

Eades, like many, says "he never missed the water, until the well went dry."



A slow tedious process of irrigation is experienced by Eades. Picture shows irrigation of two rows by using eight wells connected together.



This silt covered portion on U. S. Highway 86 in Parmer County was the site of a serious wreck. A pickup truck overturned when it ran into the silt that had been deposited on the road by tailwater escaping from a neighboring farm. Could you be creating such a hazard by letting water escape from your land?

## SUGAR PLANT DEDICATION SET SEP. 19

Dedication of Holly Sugar Corp.'s new multi-million-dollar sugar plant first such industrial complex in Texas, has been scheduled for Saturday, Sept. 19, with Gov. John Connally the principal speaker.

The plant has been named in honor of the late Merrill E. Shoup, former president and chairman of the board of directors of Holly, who died on July 15.

A program to which the public is invited will begin at 10:30 a.m. at the plant which is located on a 1,700-acre site just west of Hereford. Immediately following the program, the public will be conducted on tours of the huge new food plant.

Construction of the Holly installation has been under way since the spring of 1963. Sugarmaking operations are scheduled to begin about Oct. 1, said Dennis O'Rourke, Holly president.

The Hereford beet sugar refinery will be able to produce, under optimum conditions, up to as much as 200 million pounds of sugar annually. Some of the beets processed at the plant will be grown in a portion of neighboring New Mexico.

### 6,000 Tons Per Day

Sugar beets processed at Hereford will be supplied by farmers in the vast high plains agricultural area surrounding the impressive industrial complex. The plant will have capacity to process in excess of 6,000 tons of beets daily and will operate 24 hours a day, seven days a week, each fall and winter until the entire annual beet crop has been converted into sugar.

O'Rourke said dignitaries and special guests from many parts of the nation have been invited to participate in the dedicatory program.

The plant includes closed circuit television to be used in monitoring some operations. Another feature is what is said to be the largest diffuser of its kind in the world. This huge cylindrical machine is used in steeping sugar juices from the sugarbeets.

The plant also includes main process building in which is housed sug-

ar-making equipment of latest design; bulk sugar silos with a capacity of 60 million pounds of sugar; three huge dried beet pulp warehouses, each covering an area almost as large as a football field, and numerous other buildings and manufacturing installations.

Latest techniques of instrumentation and automation have been incorporated in the new plant which is expected to draw technicians and other visitors from many parts of the world where beet sugar is also produced.

The plant, unique in the Southwest, also includes juice storage equipment pioneered and developed by Holly at its Imperial Valley, Calif., refinery and novel in the sugar-making industry.

In this maiden year of the new operation, some 27,500 acres of sugar beets were planted in the region. Next year and in future years the total acreage is expected to be increased sharply.

"This new enterprise will add many millions of dollars in new wealth and dollar circulation every year to the economics of the region and the nation," O'Rourke said. "This will include cash payments to farmers for their beet crops, employment at the plant and purchase of a multitude of supplies and services necessary in the operation of a plant of this great scope."

Already the new facility has brought an economic surge in the area, reported U. S. Rep. Walter Rogers of Pampa. He said some 46 permanent new business and service establishments have opened in the Hereford area since it was known that the Holly plant would be located here.

O'Rourke said Holly has moved to the area more than 50 plant technicians, agricultural specialists and others who will guide the operation of the plant and help growers in production of the beet crop.

These people, along with members of their families, will be permanent residents of the Hereford community. Employment at the plant year-around is expected to be approximately 100 individuals, while total employment during sugar-making operations will increase to about 350 in all departments of the complex operation.

### THE CROSS SECTION

1628 - 15th Street  
Lubbock, Texas

Dear Sirs:

I do not now receive THE CROSS SECTION but would like to have it sent to me each month, free of charge, at the address given below.

Name \_\_\_\_\_

Street Address \_\_\_\_\_ Zip Code \_\_\_\_\_

City and State \_\_\_\_\_

(Please cut out and mail to our address)

**PLEASE CLOSE THOSE ABANDONED WELLS**



# ENGINEER WITH STATE WATER COMMISSION REASSIGNED



FRANK RAYNER

Frank A. Rayner, geological engineer with the Texas Water Commission has returned to the Water Commission headquarters in Austin to assume the duties of co-ordinator of the quality control program of the ground water division of the Texas Water Commission.

During the past five and one half years Rayner has represented the Commission in their many activities on the High Plains. He has worked extensively with the observation well program in cooperation with the High Plains Underground Water District, he has also completed a comprehensive reconnaissance investigation of the occurrence and development of ground water in the 10,000 square mile area of the extreme Southern High Plains. In addition to numerous local hydrogeologic investigations, Rayner has completed articles for the Cross Section, some of which have been reprinted in national magazines.

Rayner is a 1958 graduate of Texas A&M University with a degree in geological engineering. He is married and is the father of two children. He and Mrs. Rayner will reside at 4800 Enchanted Lane in Austin.

The entire staff of the High Plains Underground Water District wishes Frank the best of luck in his new position.

## Take a Look At The Lake Situation

Lakes located in the High Plains Underground Water District can and do furnish good cheap irrigation water. Approximately 9,000 lakes lie within the district boundaries. More than 1,100 industrious farmers are now salvaging all the available water from some lakes.

Irrigation water derived from these lakes has several advantages, the greatest being that the water costs nothing to obtain. Most of the lakes contain water from rainfall or by runoff from irrigation. Another advantage is the pumping required to deliver the water to the land for irrigation is simple. Very little lift is required to move the water.

Field representatives of the High Plains Water District have prepared the illustrated chart for use in determining the capacity of lakes.

Very few lakes form a perfect circle but allowances were made for irregular lakes.

If you have a lake why not apply this chart and you might be pleasantly surprised at the amount of irrigation water you could salvage.

# BILL CREATING WATER RESEARCH INSTITUTE SIGNED

President Johnson, recently signed into law the bill, S. 2, authorizing the establishment of a water research institute in each State. The institute to be established at the land grant college unless otherwise provided by the State legislature.

In signing the bill, the President said, "Abundant, good water is essential to continued economic growth and progress. The Congress has found that we have entered a period in which acute water shortages are hampering our industries, our agriculture, our recreation and our individual health and happiness."

Under present conditions, he said, by the year 2000 there will be serious water problems in 28 states.

"This legislation will help us solve this problem," he said. "It will create local centers of water research . . . The new centers will be concerned with municipal and regional, as well as with national water problems. Their ready accessibility to state and local officials will permit each problem to be attacked on an individual basis, the only way in which the complex characteristics of each water deficiency can be resolved."

The House Committee on Interior and Insular Affairs, in recommending passage of the bill, said:

"The rapid growth of population

and industry in the United States has been accompanied by ever-expanding demands on our nation's limited water resources.

"Growing urbanization, rapid industrialization expansion and increased agricultural production are significant factors in the increased national requirements.

"The rather sudden national awareness of impending water shortages and the necessity for making the most effective use of the nation's water resources has focused attention on water resources research."

### BULLETIN AVAILABLE

A new publication M. P. 710 Economics of Low-Capacity Irrigation Wells has recently been released by the Texas Agricultural Experiment Station.

The publication deals with farm organization and adjustment, production practices, materials and services, crop yields, irrigation cost and returns, and other factors involved with low capacity irrigation wells.

Copies may be obtained by contacting your local county agricultural agent or writing directly to the Texas Agricultural Experiment Station, R. E. Patterson, Director, Texas A&M University, College Station, Texas.

Diameter of Lake In Feet	Surface Acres	Guestimator of Water in Lakes					
		Acre Feet of Water If It Is 6" Deep	Acre Feet of Water If It Is 1 Foot Deep	Acre Feet of Water If It Is 2 Feet Deep	Acre Feet of Water If It Is 3 Feet Deep	Acre Feet of Water If It Is 4 Feet Deep	Acre Feet of Water If It Is 6 Feet Deep
300	1.6	0.8	1.6	3.2	4.8	6.4	9.6
400	2.9	1.95	2.9	5.8	8.7	11.6	17.4
500	4.5	2.25	4.5	9.0	13.5	18.0	27.0
600	6.5	3.25	6.5	13.0	19.5	26.0	39.0
700	8.8	4.4	8.8	17.6	26.4	35.2	52.8
800	11.5	5.75	11.5	23.0	34.5	46.0	69.0
900	14.5	7.25	14.5	29.0	43.5	58.0	87.0
1,000	18.0	9.0	18.0	36.0	54.0	72.0	108.0
1,100	21.7	10.85	21.7	43.4	65.1	86.8	130.2
1,200	26.0	13.0	26.0	52.0	78.0	104.0	156.0
1,300	30.4	15.2	30.4	60.8	90.8	121.6	182.4
1,400	35.4	17.70	35.4	70.8	106.2	141.6	211.4

Normally a 4 inch application is sufficient for an irrigation, to find the given acres the appropriate acre feet of water would cover multiply by 3.

Example: 9 acre feet of water X 3 = 27 acres could be irrigated 1 time with a 4 inch application.

**A LITTLE LIFE IS WORTH MORE THAN A LITTLE TIME, CLOSE THOSE ABANDONED WELLS!**

High Plains Underground Water Conservation District No. 1  
1628 Fifteenth Street  
Lubbock, Texas





A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 11—No. 4

"THERE IS NO SUBSTITUTE FOR WATER"

September 1964

Monthly, Weekly, Daily we hear people talk about water conservation and what's going to happen when we run out of water.

Texans have been very fortunate over the past years concerning their water and water rights. Everyone has been able to use water freely, any time they desired, pump as much as they felt they needed, and, if irrigating, apply water as many times as they felt necessary, and in most instances, drill wells when and where they desired.

If you have read local papers lately you undoubtedly have read articles and statements by some journalists who are advocating that the state should take over all water rights and control the use of all water in Texas. In other words, the state should own and control the underground water the same as it owns and controls the surface water.

Some journalists have made mention of the wonderful water laws of New Mexico and what a fine job they are doing by controlling the water. Are they doing a good job? Let's take a good close look at this law so many journalists feel we need in Texas.

In New Mexico underground water is the property of the State. Individuals or groups may produce underground water only after having been appropriated a given amount of water by the State Engineer.

Second, "prior appropriation" is the rule in development of underground water. This means that the first to be appropriated a water right has a paramount right over the second. The second has a paramount right over the third, and so forth. If an appropriator with a prior right can prove that late appropriators are deterring him from taking his maximum quantity of water, he can demand that they be required to cease taking water.

Third, the doctrine of "most beneficial use" is practiced. In other words if unappropriated water exists in a basin and more than one applicant seeks a right to use the water, the State Engineer determines which applicant will put the water to the most beneficial use and appropriate the water according to his decision.

It seems quite evident that by taking the control of underground water from the local people and giving the State control would be beneficial to many. Beneficial to interests with great sums of money who could employ lobbyists to help get their demands for water appropriated. What about the little man, who all politicians say are the backbone of the State? It would be disastrous. Many would be out of business, because the State deemed it necessary to take away their water and give it to others

## STATE CONTROL OF GROUND WATER

who could apply political pressures to obtain their desires.

Let's look at an area similar to ours where the State owns all ground water. We will use New Mexico since many Texans feel they have the answers to our water questions.

Parts of Lea County in eastern New Mexico overlay the Ogallala formation from which we in the southern High Plains of Texas obtain our principal supply of underground water. Lovington is located in the center of the underground water basin. Hobbs is near the southern extremity of the basin and Tatum is near the northern edge. Most of the irrigated land in the basin is north and east of Lovington.

The State Engineer designated the Lea County Underground Water Basin as an area covering some 2,180 square miles, or almost 1,400,000 acres of land. The basin was declared closed to any further water appropriations on February 2, 1953. All water underlying each township in the basin is now fully appropriated which means that the Lea County basin is closed to any further development.

Permits issued for irrigation water in the Lea County Basin stipulate that no more than three feet of underground water can be used on each acre of land for which the license applies.

In November of 1960, Allan White of the H. P. U. W. D. visited the area previously described and asked several individuals who reside within the Lea County Basin for their opinions of the ground water laws in New Mexico. White received many answers.

Robert W. Ward, a Lovington attorney, was vitally interested in the underground water of the basin. He felt that the laws of the state gave dictatorial powers to the State Engineer. He also believed that in certain instances this power could be used without adequate knowledge concerning the reservoir and the underground water. Ward further stated that in his opinion speculation in water should not be tolerated. He cited instances where groups and individuals filed for unappropriated water strictly for resale purposes without any intention of actually using the water.

Emery Yoder, irrigation farmer who lived eight miles east of Lovington, drilled his first well in 1938 and in 1960 operated four others. He irrigated 500 acres of land and owned 500 more for which he had no irrigation rights. He applied for a permit to irrigate part of the 500 acres, however, because there was no unappropriated water in the township, the

application was denied and he was unable to drill an irrigation well.

White also visited with Mrs. Nola Wells, a widow who owned 1000 acres of land nine miles east and one south of Lovington. For years she and Mr. Wells ranched, and at that time had no desire to put down irrigation wells. Consequently, today she has no right to produce water from beneath her land except for livestock even though she is surrounded by irrigated farms.

If Mrs. Wells had desired to sell part of her land as irrigated farming units she could not have done so, because she did not have a right under the law to produce water of a commercial quantity, even though it is a known fact that water was beneath her land. In 1960 Mrs. Wells' land was valued at \$50.00 per acre. Had she had water rights it would probably be worth \$600.00 per acre today.

Should individuals lose their right to water merely because they do not have a desire to produce it at the time the basin is open for appropriations? Kinda hard to accept, but that's what happened to Mrs. Wells.

Mr. P. H. Harris, who lived three miles southwest of Bronco, Texas, just over the line in New Mexico, told of an incident that happened to his family. They filed for a permit to irrigate 240 acres of land and were granted the right to do so. The tract was surveyed and the most desirable location for a well was found. A well was drilled that proved to be a dry hole. They should have immediately filed for a replacement well permit, but failed to do so. When they selected another location for a well they discovered their permit was no longer

valid and the 340 acres of water rights had been given to someone else. After long legal action and great expense the water right was finally returned to them.



EMERY YODER

In New Mexico, when available water rights are unappropriated, people who are financially able can get them and immediately develop the area. If a person does not have available funds for immediate development, water rights are often lost.

We have tried to give you views of people who live in New Mexico where the state owns the underground water.

Texans should awake to the possibility that this could happen here in our state. What would this do to the high plains area? Any one can see that it would be disastrous.

What can Texans do? They can look to the future and plan for the future. Water conservation is a reality and can be exercised by the local farmers through their local water districts and without the control of the state. Who knows the situation best? The farmers and landowners who are involved. West Texans, should the state take control of all ground water, you will face preferential uses and you can imagine what preference agriculture will get. Start doing your part today conserving water for our future generations. Believe me, you can do a much better job than the state can in water conservation.

Contact your state representatives and senators and express your opinion on state control of water. If you will study ground water laws in such states as New Mexico you can convince your local state representatives that water rights should belong to the individuals and not to the state.



MRS. NOLA WELLS





A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas  
Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

BILL J. WADDLE  
Editor

BOARD OF DIRECTORS  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President ..... 2806 21st St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom ..... Morton, Texas

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)  
John Gammon, President ..... Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer ..... Rt. 3  
Hereford, Texas

Precinct 5  
(FLOYD COUNTY)

Chester Mitchell ..... Lockney, Texas

District Office, Lubbock

Tom McFarland ..... District Manager  
H. G. Wells ..... Attorney  
Donald L. Reddell ..... Engineer  
Kenneth Seales ..... Field Representative  
Wayne Wyatt ..... Field Representative  
David Cunningham ..... Field Representative  
Bill J. Waddle ..... Cross Section and Education  
Dana Wacasey ..... Bookkeeper  
Melba Wright ..... Secretary  
Jayne Cobb ..... Draftsman  
Mrs. Doris Hagens ..... Secretary

Field Office, Hereford

Kenneth Seales ..... Field Representative  
Mrs. Mattie K. Robinson ..... Secretary

Field Office, Muleshoe

David Cunningham ..... Field Representative  
Mrs. Bertha Daniel ..... Secretary

COUNTY COMMITTEEMEN

Armstrong County

Robert Adams, 1965 ..... Wayside, Texas  
Foster Parker, 1967 ..... Route 1, Happy  
Dewitt McGehee, 1966 ..... Wayside, Texas  
John Patterson, 1965 ..... Rt. 1, Happy, Texas  
Jack McGehee, 1967 ..... Wayside

Bailey County

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe  
Doyle Davis, 1965 ..... Goodland, Texas  
James P. Wedel, 1967 ..... Rt. 2, Muleshoe  
Leon Lewis, 1965 ..... Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 ..... Star Rt., Maple  
J. W. Witherspoon, 1966 ..... Box 261  
Muleshoe, Texas  
Committee meets last Friday of each month  
at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

Castro County

E. B. Noble  
City Hall, Dimmitt  
Ray Riley, 1967 ..... 71 W. Lee, Dimmitt  
Frank Wise, 1967 ..... 716 W. Grant, Dimmitt  
Lester Dowell, 1966 ..... Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 ..... Star Rt., Hereford, Texas  
H. E. Henley, 1965 ..... Rt. 5, Dimmitt, Texas  
Committee meets on the last Saturday of each  
month at 10:00 a.m., City Hall, Dimmitt, Texas.

Cochran County

W. M. Butler, Jr.  
Western Abstract Co., Morton  
D. A. Ramsey, 1967 ..... Star Rt. 2, Morton  
Ira Brown, 1965 ..... Box 774, Morton, Texas  
Willard Henry, 1966 ..... Rt. 1, Morton, Texas  
H. B. Barker, 1967 ..... 602 E. Lincoln, Morton  
L. L. Taylor, 1965 ..... Rt. 1, Morton, Texas  
Committee meets on the second Wednesday  
of each month at 8:00 p.m., Western Abstract  
Co., Morton, Texas.

Deaf Smith County

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford  
L. E. Ballard, 1966 ..... 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 ..... 807 N. Main  
Hereford, Texas  
J. E. McCathern, Jr., 1967 ..... Rt. 5, Hereford  
Hereford, Texas  
Billy B. Moore, 1965 ..... Wildorado, Texas  
Charles Packard, 1967 ..... Rt. 3, Hereford  
Committee meets the first Monday of each  
month at 7:30 p.m., High Plains Water District  
office, Hereford, Texas.

Floyd County

Jeanette Robinson  
325 E. Houston St., Floydada  
Bill Sherman, 1967 ..... Rt. 4, Floydada  
J. S. Hale, Jr., 1966 ..... Rt. 1, Floydada, Texas  
Tate Jones, 1967 ..... Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 ..... Silvertown Star  
Route, Floydada, Texas  
L. D. "Buster" Simpson, 1965 ..... 832 W. Tenn.  
Street, Floydada, Texas  
Committee meets on the first Tuesday of each  
month at 10:00 a.m., Farm Bureau Office, Floy-  
dada, Texas.



High Plains Underground Water Conservation District No. 1

Hockley County

Mrs. Phillis Reynolds  
917 Austin Street, Levelland  
Bryan Daniel, 1967 ..... Rt. 2, Levelland  
Preston L. Darby, 1965 ..... Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 ..... Rt. 3, Levelland  
Earl G. Miller, 1965 ..... Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 ..... Rt. 2  
Levelland, Texas  
Committee meets first and third Fridays of  
each month at 1:30 p. m. 917 Austin Street,  
Levelland, Texas.

Lamb County

Calvin Price  
620 Hall Ave. Littlefield  
Willie Green, 1967 ..... Box 815, Olton  
Roger Haberer, 1965 ..... Earth, Texas  
W. B. Jones, 1966 ..... Rt. 1, Anton, Texas  
Troy Moss, 1965 ..... Rt. 1, Littlefield, Texas  
Raymond Harper, 1966 ..... Sudan, Texas  
Committee meets on the first Monday of each  
month at 7:30 p.m., Fisher's Cafe, Littlefield,  
Texas.

Lubbock County

Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Weldon M. Boyd, 1967 ..... Rt. 1, Idalou  
Bill Hardy, 1965 ..... Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 ..... 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 ..... Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 ..... Rt. 4, Lubbock, Texas  
Committee meets on the first and third Mon-  
days of each month at 1:30 p.m., 1628 15th  
Street, Lubbock, Texas.

Lynn County

Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Hubert Tienert, 1967 ..... Wilson  
Robbie Gill, 1965 ..... Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 ..... Wilson, Texas  
Oscar H. Lowery, 1967 ..... Rt. 4, Tahoka  
T. J. Swann, 1965 ..... Rt. 1, Wilson, Texas  
Committee meets on the third Tuesday of each  
month at 10:00 a.m., 1628 15th Street, Lubbock,  
Texas.

Parmer County

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina  
Wendol Christian, 1966 ..... RFD, Farwell, Texas  
Henry Ivy, 1967 ..... Rt. 1, Friona  
Walter Kaltwasser, 1967 ..... RFD, Farwell  
Carl Rea, 1965 ..... Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 ..... Friona, Texas  
Committee meets on the first Thursday of  
each month at 8:00 p.m., Wilson & Brock Insur-  
ance Agency, Bovina, Texas.

Potter County

E. L. Wilson, 1967 ..... Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 ..... Bushland, Texas  
L. C. Moore, 1965 ..... Bushland, Texas  
Temple Rogers, 1965 ..... Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 ..... Rt. 1, Amarillo

Randall County

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon  
R. B. Gist, Jr., 1965 ..... Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 ..... Rt. 2, Canyon, Texas  
A. C. Evers, 1965 ..... Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 ..... Rt. 1 Canyon  
Ed Wieck, 1967 ..... Rt. 1, Canyon  
Committee meets on the first Monday of each  
month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

EDITORS NOTE

With the demand for water intensifying daily, industry and agriculture are applying increased demands on water from the Ogallala Formation. Papers, letters and public speeches have been read and heard concerning both agriculture and industries' uses of water from this formation. The CROSS SECTION and the High Plains Underground Water District are vitally interested in both sides of the question.

Oil companies and farmers both must have water to carry on their business ventures. What is the solution?

To give our readers both sides of the question, the CROSS SECTION has printed two fine articles. One discusses the farmers' view, and the other the oil companies' views concerning use of fresh water from the Ogallala Formation.

One of these articles appeared in the LUBBOCK AVALANCHE JOURNAL and the other in the LEVELLAND SUN NEWS.

The CROSS SECTION hopes you will read both articles and give thought to each parties' interest.

Questions have been raised pro and con, about a waterflood program planned for a 25,114 acre section of the Wasson field in Yoakum and Gaines County.

Unit and flood plans have been presented for approval to the Texas Railroad Commission by Shell Oil Co. operator of the cooperative venture.

Involved is approximately two-fifths of the 63,500-acre oil reservoir. The unit will take in the entire southern section of the field along with a portion of the Russell pool. Both fields produce from a common San Andres reservoir.

The operation has been designated Denver (San Andres) Unit.

Water for the flooding project will come from the Ogallala reservoir. Injection of fresh water will be into 88 in-put wells located around the periphery of the unit.

The program, of course, on the part of the oil industry is for recovery of oil.

Objections to the use of fresh water for the water flooding program have been advanced. Depletion of the Ogallala water, from which irrigation water on the High Plains is obtained, has been listed as the chief objection.

Saturday in Lubbock, representatives of Shell Oil Co., from Midland, advanced pertinent facts from their standpoint regarding the proposed water flooding program.

In the main, their presentation is: "In Shell's application to the Railroad Commission to inject fluid in the Denver Unit at Wasson, we estimated the maximum rate of injection to be 1,500 barrels per day per well. But even if this maximum per well figure was applied only 441,000 gallons per well would be required weekly.

"The maximum input by Shell in the Denver Unit will last only 1 to 2 years, after which injection rates will decline. The total water usage for Shell's Denver Unit over its life of at least 50 years is estimated to be 116,000 acre-feet. As a comparison, the latest Texas Water Commission records available to use indicate that 267,000 acre-feet of water were produced for irrigation alone in the year 1961 in Gaines and Yoakum Counties.

These records also indicate that the total supply of fresh water in the Ogallala formation in Gaines and Yoakum Counties in 1958 was 13,589,000 acre-feet. Thus, the ultimate total usage by Shell in the Denver Unit over the life of the waterflood will be equivalent to about five months' production for irrigation in Gaines and Yoakum Counties and will be only 9-10 of one per cent of the total supply of water in these two counties.

"The total water usage for flooding all known reservoirs at Wasson over the life of the floods is estimated to be about 300,000 acre-feet. This 300,000 acre-feet for the whole Field will be equivalent to about 1 year's pro-

duction for irrigation in Yoakum and Gaines Counties and will be only 2.2 per cent of the total supply in the two counties.

"We will not deplete the area where we propose to develop a water field for Wasson. Our agreement with the landowner limits the maximum compares favorably with typical pumpage rates from irrigation wells in the High Plains. Our current plans for development of the Wasson Water Field call for only one well per full section of land, which compares to typical well development on an irrigated farm of about eight wells per section. Also, under our agreement the landowner will retain water rights under a portion of his land so that he will end up with a checkerboard of rights the field for his use in irrigation or for other needs.

"Let's look at the water situation in the eight counties of the Southern High Plains where waterflooding operations by the oil industry will begin in a number of oil fields in the next 15 years. The eight counties considered are Andrews, Gaines, Yoakum, Terry, Cochran, Hockley, Lubbock and Lamb. We estimate that over the entire lives of the floods in these counties, about 1,000,000 acre-feet will be required. If we assume that all of this water would come from the Ogallala fresh water formation, this 1,000,000 acre-feet would be 2.2 per cent of the total supply of fresh water stored in the Ogallala formation in the eight counties of the Southern High Plains. This total supply was reported in 1958 by the Texas Water Commission to be 45,296,000 acre-feet. This same 1,000,000 acre-feet total oil industry usage for waterflooding is less than 3-10 of one per cent of the total supply of 357,256,000 acre-feet of fresh water stored in the Ogallala formation in the 48-county High Plains Area.

"Shell, as well as the other oil operators, intend to use brackish or saline waters for waterflooding wherever such use is reasonably economical. As an example during 1964 as a result of studies by the oil operators (including Shell) in the vicinity of Odessa in Ector County, installation of the West Texas Water Supply System was begun to carry brackish water from the Capitan Reef west of Kermit to waterflood projects in Ector and surrounding counties. In the case of the Wasson Field, a similar study of water sources was made. No adequate source of saline water was found near the Field; and the salt water produced with the oil will be utilized for injection, but the amount is small. Also the price of piping water from the Capitan Reef to Wasson was unreasonably high. Studies of recovering additional oil from Wasson by injection of gas instead of water indicate that gas would be far less efficient.



## A Farmers View Of Use Of Underground Water

Hardly 75 years ago, Hockley County and the South Plains area was a rolling grassland that nomadic Indians crossed only when the numerous playa lakes contained a supply of drinking water.

But with the advent of the windmill, man began to enjoy and make productive the rich land, first through cattle and then through cultivation.

About 25 years ago, irrigation became popular, and agriculture really began to boom, with cotton and grain sorghum making this area one of the true farm belts of the nation.

About the same time irrigation began its rapid growth, oil was discovered in rich quantities beneath Hockley County and wide adjacent areas and a new segment of the economy began its rise.

In the following 20 years, agriculture continued its ballooning increase, with the area especially earning its niche in U. S. annals as an outstanding cotton producing area. Agricultural technology advanced steadily, helping boost production more and more but irrigation was the key — without water there can be no crops.

During the same 20 years, oil technology advanced, also. Much of the primary petroleum recovery in the area was completed, and the industry began eyeing the rich — yet apparently waning — supply of underground water, thus far used basically for agriculture and domestic uses, as an aid to secondary recovery.

Hockley and neighboring counties weren't a pioneer area for waterflood oil recovery projects. Such practices had been carried on earlier in other oil production areas in which primary recovery had faded.

Within the past five years, or less, flooding operations have been started more and more in the county, and during the past year, the oil industry has initiated a complete plan of recovery for the Levelland and Slaughter fields, utilizing water extracted from oil in production and also, fresh water gained by three means:

1. Purchase of water rights.
2. Outright purchase of land to include water rights.
3. By permission of landowners under lease agreements.

In the High Plains Underground Water District, which includes much of the South Plains the oil industry has to secure water well permits from the district board, and follow spacing rules, even where water rights are owned solely by the oil firms.

Hydrologists say that saline (salt and-or sulfur) water can be obtained in locations from 700 to 2,000 feet. Conceivably, this water could be used for well flooding. However, it is more expensive to use because of its depth and also because it has a tendency to clog a formation. Nonetheless some saline or brackish water is being used for flooding in areas where fresh water is not available in quantities.

The oil industry does have the same right to water as does agriculture. However, when water is used for irrigation it still is in the natural cycle.

Some goes into the air by evaporation. Most goes into the air by plant transpiration.

A small amount can possibly seep downward, but it is still above the formation from which it originally came.

Oil spokesmen say use of fresh water would be relatively light.

But when used for waterflood pur-

poses, the water immediately becomes contaminated and unfit for human or plant use.

In a Feb. 7, 1964, speech to the West Texas Water Conference in Lubbock, Kenneth Roberts, a representative of Texas Mid-Continent Oil and Gas Assn., declared:

"... West Texas is extremely fortunate to have its economy supported by the petroleum producing industry—an industry that requires very little water. I can think of no other business, industrial or non industrial, that could contribute so much to the economy with such a small use of water resources.

"During much of the life of an oil field, there is practically no water used in producing operations. At some time during the life of a field, a waterflood operation may be put into effect. In a minority of cases, fresh water may be used... However, even at the time of peak water usage by oil and gas producers during waterfloods, the value to the community of fresh water use by the oil industry, compared with the potential users of the same quantity of water is extremely impressive.

To illustrate the every small usage of water by such an important industry, I... refer to the 48-county area overlying the Ogallala. This area is a heavy oil-producing area, and statistics, compiled from studies of this area by petroleum industry engineers, are available showing projected water use by the oil industry.

"... Approximately 96 to 98 per cent of the water produced from the Ogallala each year is used for irrigation, with the rest used for municipal and industrial purposes. Projected needs of the oil industry for Ogallala water for use in water flood operations in this area reveal that waterflooding will cause no significant change in the relative use of water by the various groups.

"These projections indicate that the use of Ogallala water by the petroleum industry for waterfloods will not exceed six-tenths of one per cent of the total supply of Ogallala water. The ultimate total usage by oil industry waterfloods represents only about one-fourth of the total Ogallala water currently produced in one year. The total use of this water by the petroleum industry for water floods will shorten the projected 40-year life of the Ogallala water supply by only about three months.

"... The anticipated development of the various waterflood projects in the fields overlying the Ogallala will probably result in a peak usage by the industry of Ogallala water from 1968 to 1974. During this period... the oil industry's annual share of Ogallala water should only represent approximately eight-tenths of one per cent of the volume produced each year. After the end of this peak need, our annual share of Ogallala water should be only about four-tenths of one per cent of annual production.

"... Even during the six-year period of peak usage by the industry, our eight-tenths of one per cent is not going to have any significant effect on either the total water produced or how the water is divided among the various users."

Referring to the points made by Roberts in the speech, Hockley Farm bureau president J. B. Harbin, who has been studying the water depletion

problem for some time, declares "there are discrepancies" in oil spokesman's figures.

He declares:

"One has only to realize the use percentages quoted by Roberts are figured for agriculture on a 48-county area, and it is quite evident that oil production is concentrated within only very small areas of a 48-county section.

"For example, on an acreage basis, approximately one-fourth of Hockley County has oil production. Those people engaged in agriculture realized the water available for irrigation is very spotted and many areas are dry so far as irrigation is concerned. Those areas of irrigation are rapidly decreasing in water production and weak wells on the edge of irrigation belts are constantly being abandoned as unprofitable or dry.

"If the projected need of water by the oil industry is six-tenths of one per cent of all that is used in one year for the 48 counties, consider what will happen to the small bands of irrigation near Sundown, Anton, Ropesville and Smyer.

"Remember, too, that to reach a total of irrigation water used in one year for agriculture such counties as Bailey, Deaf Smith, Hale and Floyd have to be counted. These counties have great supplies of irrigation water and yet there is little or no oil production to be waterflooded.

"In other words, that portion of the six-tenths of one percent oil of all irrigation water used which would be applied to Hockley County alone will certainly amount to a great percentage of total water available.

## WEST TEXAS MUSEUM PLANS WATER PROGRAM

*Water, the Gold at the End of our Rainbow?* is the title for the October 8th program at the West Texas Museum in Lubbock.

A panel of specialists on underground water, surface water, and future sources of water for Texas will pinpoint the economic value of water to Lubbock residents and its trade territory.

Moderator of the panel will be Dr. Gerald Thomas, Dean of Agriculture, Texas Tech and Chairman of the West Texas Water Institute. Other members of the panel will be Mr. Tom McFarland, Manager of the High Plains Water District, Lubbock; Mr. Ed Reed, Hydrologist and Consulting Engineer, Midland; and Judge Otha F. Dent, Member of the Texas Water Commission, Austin.

HIGH PLAINS WATER DISTRICT  
1628 — 15th Street  
Lubbock, Texas  
Gentlemen:

Will you please send me one of the District's new brochures entitled, "High Plains Water Depletion Case — Its Effect on Me and My Community." Send free of charge to the address shown below:

Name \_\_\_\_\_  
Mailing Address \_\_\_\_\_  
City and State \_\_\_\_\_

## 30,000 RESEARCH GRANT AWARDED TEXAS TECH

Texas Tech's agricultural engineering department received a \$30,000 research grant Friday (Sept. 18) from the Electric Research Advisory Committee, composed primarily of key representatives from electric cooperatives in Texas and New Mexico.

In accepting the grant, the first Tech has received under the auspices of the West Texas Water Institute, Dr. R. C. Goodwin, Tech president, said, "This research is vital to the future of the High Plains because of the increasing scarcity of water."

Tech's agriculture dean, Dr. Gerald W. Thomas, joined Dr. Goodwin in praising this grant.

"We are going to have to use whatever means we can to stimulate research and education relating to water use in West Texas," he said.

"Primarily, we are concerned with making more efficient use of available water supplies and planning programs to promote sustained use of these water resources so that succeeding generations will also benefit from them."

Dean Thomas added that this grant recognizes the services of the Water Institute in coordinating and stimulating research and educational activities.

"We also feel that it reflects the confidence of the electric power industry in the ability of our agricultural engineering department at Tech to successfully conduct research of this type," he said.

Dr. Willie Ulich, head of agricultural engineering at Tech, and principle investigator on this project disclosed that the research will cover a three-year period and will study power requirements and efficiency of High Plains irrigation well pumps and power units.

"We plan to center this project at Tech and work primarily on wells within a 300-mile radius of Lubbock," he said.

Consultants from power cooperatives, the U. S. Department of Agriculture and the Rural Electrification Administration will work with Dr. Ulich and his staff.

Dr. Ulich outlined the objectives of the research project.

"We hope to determine efficiencies of irrigation pumps and power units used on the High Plains; to determine operational and maintenance characteristics of power units under prevailing Plains conditions; and to establish costs of pumping irrigation by well classification by depth, capacity and power" he stated.

PLEASE CLOSE THOSE ABANDONED WELLS



## DRILLING STATISTICS FOR AUGUST

During the month of August permits were closed on 152 wells within the High Plains Underground Water District; 10 replacement wells were drilled and wells were drilled that were either dry or nonproductive for some other reason. The County Committees issued 183 drilling permits.

Listed below by counties are permits issued and wells completed for August.

County	Permits Issued	New Wells Completed	Replacement Wells Drilled	Dry Holes Drilled
Armstrong	0	0	0	0
Bailey	14	7	0	0
Castro	32	13	0	0
Cochran	3	3	0	0
Deaf Smith	47	40	0	0
Floyd	14	24	0	0
Hockley	16	11	0	0
Lamb	9	7	4	0
Lubbock	22	22	2	1
Lynn	4	6	0	0
Parmer	14	9	4	0
Potter	0	0	0	0
Randall	8	10	0	6
<b>Total</b>	<b>183</b>	<b>152</b>	<b>10</b>	<b>7</b>

same period of time as Menefee and has salvaged 122 acre feet of water that was applied back to his crops.

J. D. Kirkpatrick has salvaged 187 acre feet of water, M. A. Black 64 acre feet, and Edwin Lide 67 acre feet.

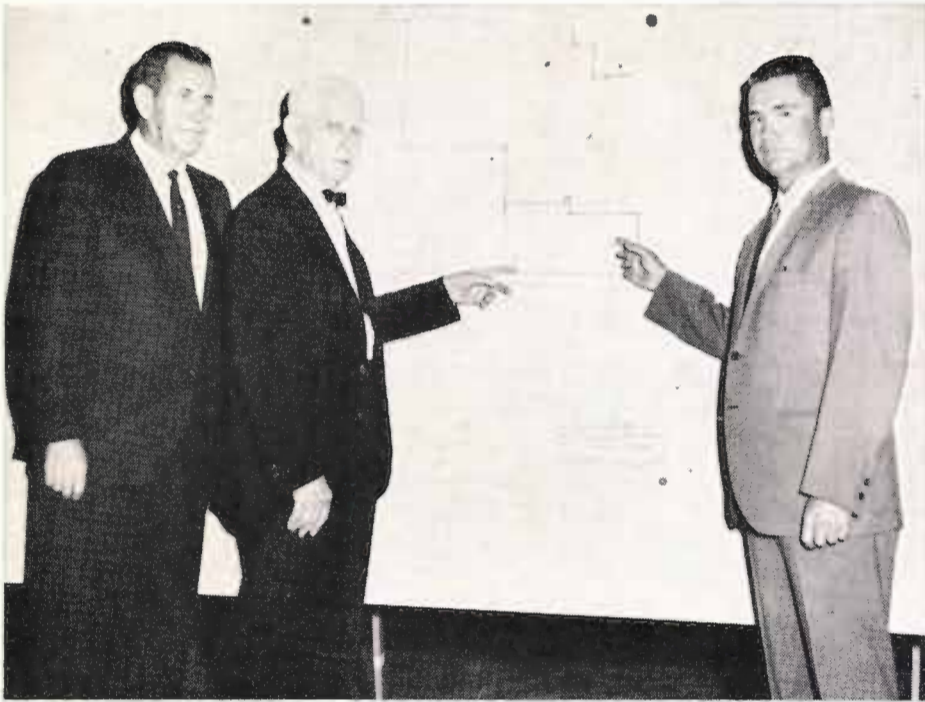
Charles Hough, who is using the tailwater ditch, described in the August edition of the Cross Section, has salvaged 14.1 acre feet of water in a period of two and one half months. Hough has reapplied this water to his sugar beet crop.

Many producers of beets have often mentioned the cost of producing the

crop is greater than cotton or grain sorghum. Hough has cut his expense some by utilizing his "tailwater".

The total acre feet of water salvaged by these seven farmers amounts to approximately 811 acre feet. The total value of the water is \$32,440 dollars.

Are you missing out on saving money on your farming operations? You and only you know the expense of producing a crop. Chances are you could save some money if you start planning now to utilize to the fullest extent irrigation water you will pump next year.



Standing left to right are Judge Otha Dent, H. A. Beckwith and Weldon Newsom. Newsom, a director of the High Plains Underground Water District is explaining a map of Cochran County to the two members of the Texas Water Commission.

## Water Commission Holds Hearings In West Texas

The Texas Water Commission held two hearings recently in the West Texas area. Purpose of the hearings was to hear testimony concerning the alteration of the boundaries of Subdivision No. 4 of the Underground Water Reservoir, High Plains Area, South of the Canadian River and Subdivision One, High Plains Area, Ogallala, South of Canadian River.

The hearing concerning Subdivision No. 4 was held in Brownfield, Texas September 2. Another hearing concerning Subdivision No. 1 was held September 3 in Morton.

H. A. Beckwith and Judge Otha Dent, both members of the Texas Water Commission from Austin, presided at the hearings.

Testimony was given by interested parties to show lands which did or did not overlie the above mentioned underground water reservoir.

The Texas Water Commission will take the evidence presented into consideration and will render their decision concerning the boundaries in the near future.

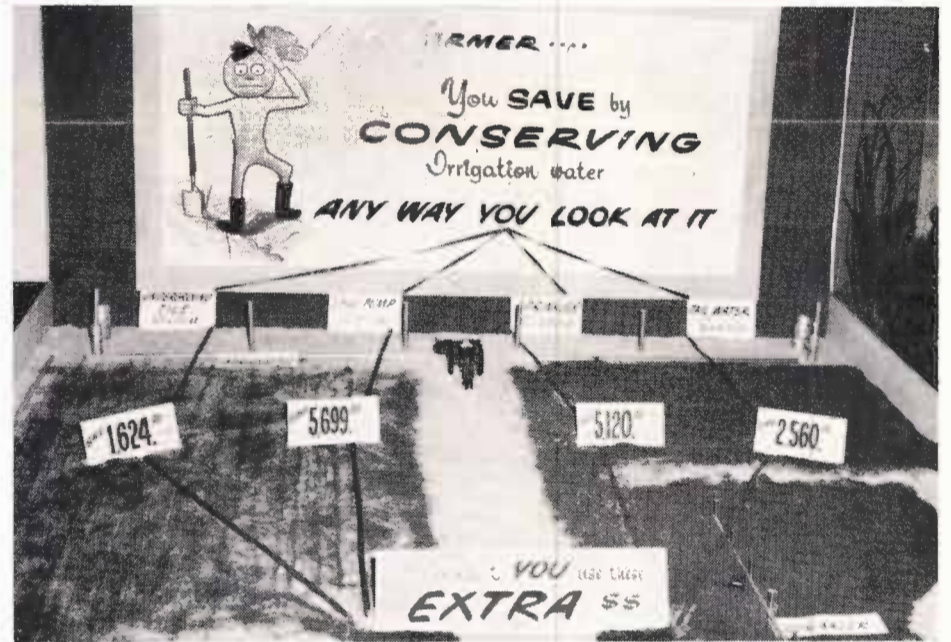
## 811 ACRE FEET OF WATER RECOVERED

Irrigation tailwater pits are showing good results for seven farmers in the High Plains Underground Water District. Field Representatives of the district have been keeping accurate records on the amount of water pumped from the structures. The structures have been designed to prevent rain water from entering them, so all water pumped from the pits was contributed by irrigation wells.

J. B. Taylor installed a "tailwater" pit in April 1963. He has used this pit continuously and as of September 1, 1964, he had pumped 225 acre feet of water from the structure for recirculation. Based on the fact that an acre foot of water is worth \$40.00 to the farmer, Mr. Taylor has saved \$9,000. worth of irrigation water that would have been lost by runoff.

Dwain Menefee installed his "tailwater" system in April of 1963, and as of September 1, 1964 he had returned 132 acre feet of water back to his farm.

James Mabry has used a pit for the



Save by Conserving was the title for this educational booth at the Tri State Fair in Amarillo. The exhibit won first place and was entered by the Hereford FFA Chapter.



# THE Cross SECTION

A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 11—No. 5

"THERE IS NO SUBSTITUTE FOR WATER"

October 1964

## GOVERNOR'S CONFERENCE ON NATURAL RESOURCE MANAGEMENT

October 16 and 17 were the dates of the Governor's Conference on Natural Resource Management and Development in Texas, which was held in Dallas.

Governor Connally, in his address to the group, said, "There were several reasons why I called this conference with the co-operation of the Sportsmen's Clubs of Texas.

"First I believe this is an opportune time to assess our progress in the management and development of the natural resources with which Texas has been so amply blessed. Secondly, I felt we should have an inventory of these resources, and a projection of our conservation needs for the next 30 or 40 years. We all know that the population of Texas is increasing far more rapidly than the national rate, and that our 10 million today will be 20 million or more by the turn of the century. Thirdly, I believe it is essential that more public attention be brought to the accomplishments and the problems of conservation in our state."

Connally also stated that "The en-

## WELLS LEAVES WATER DISTRICT



H. G. WELLS

tire range of water conservation and development needs more adequate planning if Texas is to continue its growth. Water requirements for cities, industry and agriculture have sharply increased under the pressures of population."

Secretary of the Interior, Stewart Udall, spoke on "Our Natural Resources".

## Committee On Conservation Meets

The Texas Committee on Conservation Education recently held its fall meeting in Dallas.

Highlight of the meeting was the presentation of a new teacher's guide entitled "A Guide to the Teaching of Conservation in Science and Social Studies for the Elementary and Secondary Schools of Texas". This new guide was developed by the group in co-operation with the Texas Education Agency.

The new bulletin describes six of the State's most important natural resources — Water, soil, forests, wildlife range and minerals — and suggests ways to correlate conservation instruction in existing science and social studies curricula. In the elementary grades, topic phrases and sentences for possible study have been suggested for each grade, and in the secondary grades, for each approved science and social studies course.

Copies of the guide are being distributed to all schools in Texas by the Texas Educational Agency.

Tom McFarland, Manager of the High Plains Underground Water Conservation District, is a member of the committee that assisted in the development of the new guide.

H. G. Wells, Attorney for the High Plains Underground Water Conservation District, has resigned his position with the organization.

Wells, State Representative from Tullia, has handled legal matters for the District since his appointment in October of 1963.

As a State Representative, Wells has served on the Committee for Conservation and Reclamation for his three terms of office.

Wells has moved to Wichita Falls and joined a law firm in that city.

The Directors and the staff of the High Plains Underground Water Conservation District wish Mr. Wells much success in his new position.



Water Conservation exhibit entered at the Panhandle South Plains Fair at Lubbock. This exhibit was in the blue ribbon class. Monterey High School of Lubbock constructed the exhibit for educational purposes. L. M. Hargrave and Walter Labay admire the exhibit.

## Water For Texas Conference

The ninth annual Water for Texas Conference is to be held November 23-24, 1964 at Texas A&M University College Station, Texas. The Conference theme is "Water Quality and Chemicals—Industrial and Agricultural." The program will stress individual aspects of the relationships between water quality and chemicals.

A session on "Watersheds and Water Quality" is focused on the importance of movement and retention of chemicals in the soil. The persistence of pesticides in soils will be discussed. In a session, "Ecology of Bays and Streams," the effects of toxic compounds on marine ecology will be presented. Other papers will discuss topics such as biological indicators of pollution, Texas fisheries resources, and problems of the recent fish kills. The session on "Analysis and Control Aspects" will include papers on analytical techniques for the identification of pesticides, the control and enforcement aspects of water quality, and the responsibility of industry in maintaining water quality.

The keynote speaker at the Conference is Dr. Gordon McCallum, Assistant Surgeon General, U. S. Public Health Service. The speaker at the Conference luncheon is State Senator Culp Krueger, Chairman of the Committee for the Study of the Bays of Texas. Dr. N. C. Brady, Director of Science and Education, U. S. Department of Agriculture, will be the banquet speaker.

The speakers at the technical sessions of the Conference are all authorities in their particular field. The speakers represent government, both state and federal, educational and research institutions, and industry. The Conference is sponsored by the Water Resources Institute Texas A&M University. Proceedings of the Conference will be published.

## Texas Water Conservation Assoc. Holds Annual Meet

Austin was the site of the Twentieth Annual Meeting of the Texas Water Conservation Association. The Association meeting was held on October 11 and 12.

Speakers for the event included Brigadier General Richard H. Free, Division Engineer, Southwestern Division, Corps of Engineers, U. S. Army, Dallas; H. N. Smith, State Conservationist, United States Soil Conservation Service, Temple; and Dr. Thomas B. Nolan, Director, U. S. Geological Survey, Washington, D. C.

Topics discussed on the program dealt with the "Corps of Engineers' Water Resources Development Program in Texas", "Soil Conservation Service Program in Texas" and "The Role of the U. S. Geological Survey in Water Resources Development".

A highlight of the noon luncheon was an address by the Hon. Waggoner Carr, Attorney General of Texas.

Representatives of the High Plains Underground Water District were in attendance.





**A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1**

Published monthly by the High Plains Under-  
ground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas

Telephone PO2-8088  
Second-class Postage Paid at Lubbock, Texas.

**BILL J. WADDLE**  
Editor

**BOARD OF DIRECTORS**  
Precinct 1  
(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President ..... 2806 21st St.  
Lubbock, Texas

**Precinct 2**  
(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom ..... Morton, Texas

**Precinct 3**  
(BAILEY, CASTRO and PARMER COUNTIES)  
John Gammon, President ..... Rt. 1, Friona, Texas

**Precinct 4**  
(ARMSTRONG, DEAF SMITH, POTTER and  
RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer ..... Rt. 3  
Hereford, Texas

**Precinct 5**  
(FLOYD COUNTY)  
Chester Mitchell ..... Lockney, Texas

**District Office, Lubbock**  
Tom McFarland ..... District Manager  
H. G. Wells ..... Attorney  
Donald L. Reddell ..... Engineer  
Kenneth Seales ..... Field Representative  
Wayne Wyatt ..... Field Representative  
David Cunningham ..... Field Representative  
Bill J. Waddle ..... Cross Section and Education  
Dana Wacasey ..... Bookkeeper  
Melba Wright ..... Secretary  
Jayne Cobb ..... Draftsman  
Mrs. Doris Hagens ..... Secretary

**Field Office, Hereford**  
Kenneth Seales ..... Field Representative  
Mrs. Mattie K. Robinson ..... Secretary

**Field Office, Muleshoe**  
David Cunningham ..... Field Representative  
Mrs. Bertha Daniel ..... Secretary

**COUNTY COMMITTEEMEN**  
**Armstrong County**  
Robert Adams, 1965 ..... Wayside, Texas  
Foster Parker, 1967 ..... Route 1, Happy  
Dewitt McGehee, 1966 ..... Wayside, Texas  
John Patterson, 1965 ..... Rt. 1, Happy, Texas  
Jack McGehee, 1967 ..... Wayside

**Bailey County**  
Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe  
Doyle Davis, 1965 ..... Goodland, Texas  
James P. Wedel, 1967 ..... Rt. 2, Muleshoe  
Leon Lewis, 1965 ..... Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 ..... Star Rt., Maple  
J. W. Witherspoon, 1966 ..... Box 261  
Muleshoe, Texas  
Committee meets last Friday of each month  
at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

**Castro County**  
E. B. Noble  
City Hall, Dimmitt  
Ray Riley, 1967 ..... 71 W. Lee, Dimmitt  
Frank Wise, 1967 ..... 716 W. Grant, Dimmitt  
Lester Dowell, 1966 ..... Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 ..... Star Rt., Hereford, Texas  
H. E. Henley, 1965 ..... Rt. 5, Dimmitt, Texas  
Committee meets on the last Saturday of each  
month at 10:00 a.m., City Hall, Dimmitt, Texas.

**Cochran County**  
W. M. Butler, Jr.  
Western Abstract Co., Morton  
D. A. Ramsey, 1967 ..... Star Rt. 2, Morton  
Ira Brown, 1965 ..... Box 774, Morton, Texas  
Willard Henry, 1966 ..... Rt. 1, Morton, Texas  
H. B. Barker, 1967 ..... 602 E. Lincoln, Morton  
L. L. Taylor, 1965 ..... Rt. 1, Morton, Texas  
Committee meets on the second Wednesday  
of each month at 8:00 p.m., Western Abstract  
Co., Morton, Texas.

**Deaf Smith County**  
Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford  
L. E. Ballard, 1966 ..... 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 ..... 807 N. Main  
Hereford, Texas  
J. E. McCathern, Jr., 1967 ..... Rt. 5, Hereford  
Hereford, Texas  
Billy B. Moore, 1965 ..... Wildorado, Texas  
Charles Packard, 1967 ..... Rt. 3, Hereford  
Committee meets the first Monday of each  
month at 7:30 p.m., High Plains Water District  
office, Hereford, Texas.

**Floyd County**  
Jeanette Robinson  
325 E. Houston St., Floydada  
Bill Sherman, 1967 ..... Rt. 4, Floydada  
J. S. Hale, Jr., 1966 ..... Rt. 1, Floydada, Texas  
Tate Jones, 1967 ..... Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 ..... Silvertown Star  
Route, Floydada, Texas  
L. D. "Buster" Simpson, 1965 ..... 832 W. Tenn.  
Street, Floydada, Texas  
Committee meets on the first Tuesday of each  
month at 10:00 a.m., Farm Bureau Office, Floy-  
dada, Texas.



High Plains Under-  
ground Water Conservation District No. 1

**Hockley County**  
Mrs. Phillis Reynolds  
917 Austin Street, Levelland  
Bryan Daniel, 1967 ..... Rt. 2, Levelland  
Preston L. Darby, 1965 ..... Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 ..... Rt. 3, Levelland  
Earl G. Miller, 1965 ..... Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 ..... Rt. 2  
Levelland, Texas  
Committee meets first and third Fridays of  
each month at 1:30 p. m. 917 Austin Street,  
Levelland, Texas.

**Lamb County**  
Calvin Price  
620 Hall Ave. Littlefield  
Willie Green, 1967 ..... Box 815, Olton  
Roger Haberer, 1965 ..... Earth, Texas  
W. B. Jones, 1966 ..... Rt. 1, Anton, Texas  
Troy Moss, 1965 ..... Rt. 1, Littlefield, Texas  
Raymond Harper, 1966 ..... Sudan, Texas  
Committee meets on the first Monday of each  
month at 7:30 p. m., Fisher's Cafe, Littlefield,  
Texas.

**Lubbock County**  
Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Weldon M. Boyd, 1967 ..... Rt. 1, Idalou  
Bill Hardy, 1965 ..... Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 ..... 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 ..... Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 ..... Rt. 4, Lubbock, Texas  
Committee meets on the first and third Mon-  
days of each month at 1:30 p.m., 1628 15th  
Street, Lubbock, Texas.

**Lynn County**  
Mrs. Doris Hagens  
1628 15th Street, Lubbock  
Hubert Tienert, 1967 ..... Wilson  
Robbie Gill, 1965 ..... Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 ..... Wilson, Texas  
Oscar H. Lowery, 1967 ..... Rt. 4, Tahoka  
T. J. Swann, 1965 ..... Rt. 1, Wilson, Texas  
Committee meets on the third Tuesday of each  
month at 10:00 a.m., 1628 15th Street, Lubbock,  
Texas.

**Parmer County**  
Aubrey Brock  
Wilson & Brock Insurance Co., Bovina  
Wendol Christian, 1966 ..... RFD, Farwell, Texas  
Henry Ivy, 1967 ..... Rt. 1, Friona  
Walter Kaltwasser, 1967 ..... RFD, Farwell  
Carl Rea, 1965 ..... Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 ..... Friona, Texas  
Committee meets on the first Thursday of  
each month at 8:00 p.m., Wilson & Brock Insur-  
ance Agency, Bovina, Texas.

**Potter County**  
E. L. Wilson, 1967 ..... Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 ..... Bushland, Texas  
L. C. Moore, 1965 ..... Bushland, Texas  
Temple Rogers, 1965 ..... Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 ..... Rt. 1, Amarillo  
**Randall County**  
Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon  
R. B. Gist, Jr., 1965 ..... Rt. 2 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 ..... Rt. 2, Canyon, Texas  
A. C. Evers, 1965 ..... Rt. 1, Canyon, Texas  
Lewis A. Tucek, 1967 ..... Rt. 1 Canyon  
Ed Wieck, 1967 ..... Rt. 1, Canyon  
Committee meets on the first Monday of each  
month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

**EDITOR'S NOTE**

The August issue of the "CROSS SECTION" has drawn several letters from our readers. The article entitled "State Control of Ground Water" was the subject of these letters. All letters received were appreciated and welcomed by the editor. The CROSS SECTION plans in the near future to reprint some of these letters. Due to the space required, one letter will be printed each month. The first letter in this series is printed below.

Remember! The editor is always glad to have your comments. Let me hear from you.

\* \* \* \* \*

Dear Mr. Waddle:

Your September, 1964, issue, discussing the aspects of state control of ground water hit the writer, more than forcibly, particularly with reference to what can happen to the landowner when, as, and if the state "takes over".

The writer has been attorney for a group of landowners in Kansas in their effort to preserve, protect, and defend their rights to water underlying their lands, against invasion by the City of Wichita, Kansas.

After many years (approximately 14), the landowners lost and the Supreme Court of the United States refuses to review the Kansas decision "for want of substantial federal question".

The experience of the writer demonstrates that when the "state takes over" and politics become the criterion — the landowner is a "dead duck". The only way that the landowners can protect themselves, would appear to be to keep the legislature from confiscating their water rights.

For your information and the information of your Board of Directors and other parties in interest, enclosed are copies of the following:

1. Brief on behalf of the landowners;
2. Copy of opinion by the Supreme Court of Kansas (beginning at page 317). You will note that the Supreme Court of Kansas totally disregarded the undisputed facts and all the past history or Kansas Law and judicial decision (and in some respects even taking quotations out of context in the opinion of the writer.); and
3. Jurisdictional Statement and Petition for Rehearing.

The enclosures demonstrate, conclusively, that the landowners must act before the state takes over if they are to be given any consideration.

I trust you will find the enclosures of substantial interest, at least the conclusion section of the brief on pages 116-117

Very truly yours,  
Kenneth Speir  
Of Speir, Stroberg & Sizemore

**Water Conservation  
Needs Your Help**

If you are a teacher, scout master, or if you work with any group of people, water conservation needs your help.

The High Plains Under-  
ground Water Conservation District has available, free of charge, materials that can be used in the teaching of water conservation. Maps, bulletins, and slides are available for your use. If we can be of help give us a call.

**Please Close Those  
Abandoned Wells!!!**

**Election Time  
Draws Near  
For District**

Election of County Committee members and two Directors for the High Plains Under-  
ground Water Conservation District is drawing near.

Residents in the High Plains Water District should begin thinking of capable representatives from their county precinct to represent them. County Committees will soon submit their nominations, so do your part and help select a representative to represent you in the High Plains Under-  
ground Water Conservation District.

**DRILLING STATISTICS FOR SEPTEMBER**

During the month of September 99 new wells were drilled within the High Plains Water District; 8 replacement wells were drilled; and 4 wells were drilled that were either dry or nonproductive for some other reason. The County Committees issued 160 new drilling permits.

Listed below by counties are permits issued and wells completed for September.

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Dry Holes Drilled
Armstrong	2	1	0	0
Bailey	0	3	1	0
Castro	13	8	0	1
Cochran	6	5	0	0
Deaf Smith	24	14	1	1
Floyd	17	14	1	0
Hockley	25	7	1	1
Lamb	10	10	2	0
Lubbock	18	11	0	1
Lynn	19	3	0	0
Parmer	18	21	2	0
Potter	0	0	0	0
Randall	8	2	0	0
<b>Totals</b>	<b>160</b>	<b>99</b>	<b>8</b>	<b>4</b>



# SAFE WATER FOR YOUR HOME

Much has been written and spoken in recent years concerning water conservation on the High Plains of Texas. When we have an abundance of water, there also follows that this water should be of safe sanitary quality for drinking and household use.

Records in the Lubbock City-County Health Department laboratories over the past several years reveal that fifty per cent of the samples of water taken from private wells have been labeled "Coliform Organisms Present", which means that the water in the well is being contaminated.

Coliform Organisms found in a sample of water indicate a condition which might make it possible for the supply to contain disease producing organisms such as typhoid, dysentery, salmonella, etc.

Contamination in a domestic water supply usually means that foreign matter is entering the well through openings at or near the surface where insects, wind-blown particles and flood water can enter the well and reach the water reservoir. Another source of contamination is cesspool water entering from sub-surface openings and reaching the water through the open space between the casing and the well wall.

Since most contamination enters the well from or near the surface, the remedy to correct this situation is proper well construction which eliminates all entrance routes. The number one remedy for this condition is proper casing of the well.

Proper casing of a well is accompi-

shed by extending a water-tight casing to near the bottom of the water bearing formation.

Seal the casing to the well from the top of the water bearing formation to the surface of the ground with cement mortar. The cement mortar should be placed around the casing to prevent any polluted water from entering the well by running down the outside of the casing. The well casing should extend at least eighteen inches above the surrounding ground level to eliminate water entering the casing.

The top of the casing should be sealed with a tight-fitting cap to prevent the entrance of water, insects or wind-blown material around the cap, drop pipe or the power cable, in the case of a submersible pump. Illustration number one shows the sealing of a well and cementing of the casing in the proper manner.

## New Wells

In new well construction a complete disinfection should be given by the addition of two hundred parts per million Chlorine to the well water before the surface seal is completed. A sample of the water from the well should be examined at a laboratory to confirm the water is safe for domestic use.

## Existing Wells

In existing wells that show contamination, several construction features should be added to make the water safe for domestic use. Wells that are placed in pits should be brought up above the surface to eliminate the possibility of flood waters

reaching the top of the casing.

All new domestic wells should be located a safe distance from stock pens or septic tanks and no cesspool should be located on any premises where a well for household use is located.

## Method Of Sampling A Water Supply

Now that we have discussed briefly well construction and contamination, many readers, I am sure, would like to know the procedure for collecting and analyzing water samples.

Sterile sample bottles are available from any approved local public health laboratory or the Texas State Department of Health, Division of Laboratories, Austin Texas.

In the collection of water samples great care should be used to avoid accidental contamination.

Municipal water systems are required by law to take at least four (4) samples monthly from the supply (distribution system) for the purpose of bacteriological analysis during each monthly period of operation of such service. Individuals should check their domestic supply periodically for contamination.

The following procedures are designed for collecting samples from a municipal water supply, but they also apply to individual domestic water systems:

1. Samples should be collected from various points in the distribution system. Samples directly from the supply well should be collected only when special studies or quality information is desired.

2. The faucet or water tap should be flushed out briefly and then flamed with a blow torch, alcohol lamp, butane burner, a small piece of cotton saturated with alcohol, or other flaming device. After flaming the faucet or water tap, water should be allowed to run freely.

3. Excessive care should be used in filling the sample bottle. Directions will accompany the bottle and they should be adhered to strictly.

4. Water samples should not be collected from faucets which have leaky washers, vertical pipes, drinking fountains, rubber hoses, or cold and hot water mixing faucets.

5. Never collect water samples on windy days.

6. A report card accompanies each sample bottle furnished by the laboratory. The card is in triplicate form and must be completely filled out. The information on the card is important to health authorities, especially: Location, type of supply, source of supply, treatment (if any), number of samples collected this date, date collected, point of collection and chlorine residual (if known). Water samples that are submitted without identification cards, or without the cards filled out as completely as possible, will usually be rejected by the testing laboratories.

7. All samples should arrive at the laboratory within 72 hours after collection.

## Interpretation Of Water Reports

When you receive your laboratory report it will either be stamped "No Coliform Organisms Present" or "Coliform Organisms Present".

"No Coliform Organisms Present" indicates no fecal pollution. This simply means that the water sample at the time of testing was of good bacteriological quality. One should remember that the results of a sample of water should not be taken as an index of the quality of the entire supply at all times. Fecal pollution may be intermittent, hence, the importance

of regular sampling for bacteriological analysis.

"Coliform Organisms Present", indicate fecal pollution. This means the water sample was found to contain organisms most commonly found in sewage, hence, might contain such disease-producing organisms as typhoid bacilli, dysentery organisms, etc.

When water reports show that Coliform Organisms are present, something should be done immediately to remove the source of contamination and protect against future entry of contaminating material. If you are unable to eliminate the source of contamination, contact the State Health Department or the local public health agency for instructions on chlorination and sanitation of your supply.

You can expect your water sample results in about three days if your sample shows no contamination; if contamination is discovered, about five days are required for a complete analysis. In all cases, results are sent out promptly upon completion of the analysis.

Everyone knows that water is a requirement for life. Polluted water has no place in our society. The High Plains Underground Water Conservation District hopes that all individual water supplies will be maintained as well as the municipal supplies are guarded in our area. Our hats are off to the men who make our water safe to drink. Check your well today, so you can be assured your family is drinking unpolluted water.

## WEED CONTROL RESULTS

The High Plains Underground Water District, during the past cropping season, has conducted a study involving the use of chemicals in controlling weeds. Treated areas included permanent irrigation ditches, tail-water pit banks, and other untillable areas.

Chemical treatment was applied to four locations in late February and early March.

Reviewing the climatic conditions that prevailed this spring, one remembers that it was unusually dry. This condition is believed to have delayed the killing action of the materials used.

The materials showed excellent results immediately after rainfall in the treated areas. Killing action was observed after the material had sufficient time to leach down in the soil.

Materials used in this study included Karmex, Telvar, Propazine 80W, and Hyvar X.

David Cunningham, field representative of the High Plains Underground Water District, arranged the demonstration plots with the cooperation of Bud Mouser of Plainview, Texas.

Sites for the demonstrations were selected at random but were confined to one county in the Water District.

Representatives who worked on this project are very confident that weeds associated with irrigation can be controlled efficiently, even under irregular climatic conditions.

See photographic illustrations of Demonstration Plots shown on Page 4.

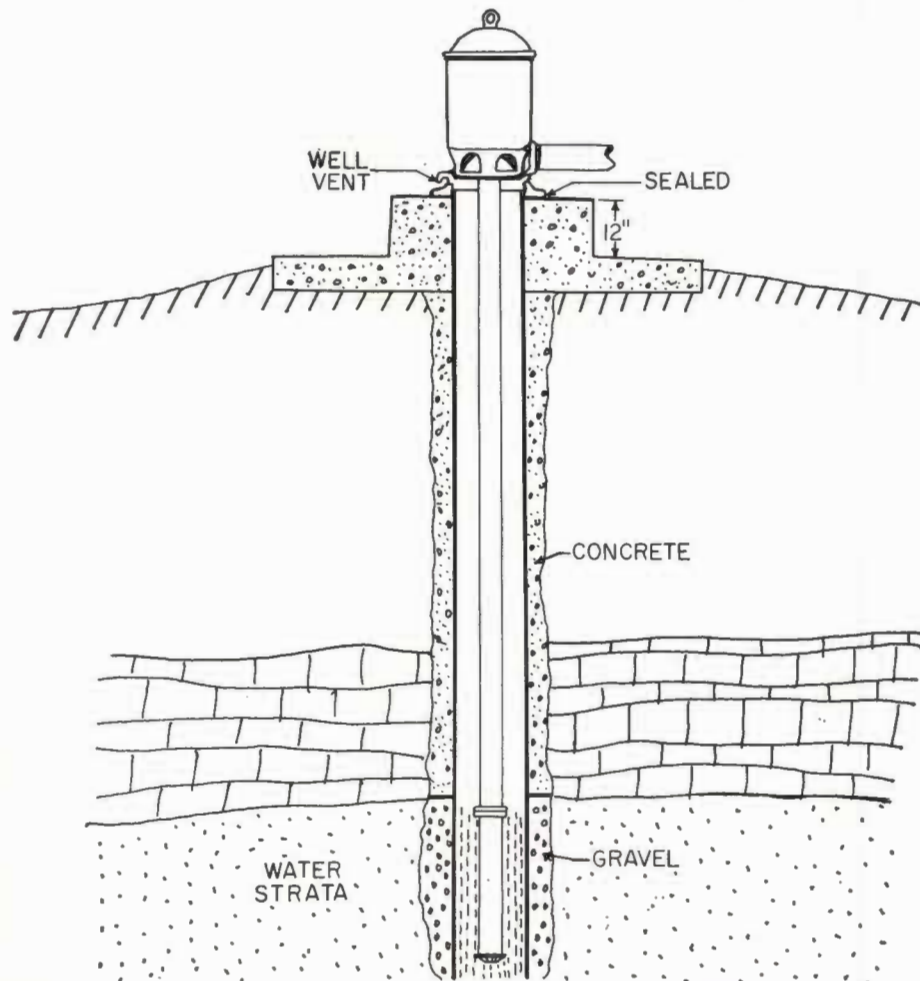


Illustration No. 1 This drawing shows the proper manner of sealing and cementing the casing of a domestic water well.





Dwain Menefee applied 18 pounds of Karmex on February 29, 1964. The material was applied to the entire area with the exception of the check plot shown in the picture.



This plot was highly infested with careless weeds in 1963. Three pounds of Propazine 80-W was applied March 7, 1964. The treated area covered 7,754 square feet and approximately 80 percent of the weeds were controlled.



One half pound of Telvar was applied to 1230 square feet on the M. A. Black farm north of Friona. Application was made on March 7, 1964. Approximately 100 percent kill was obtained and maintained throughout the entire watering season.



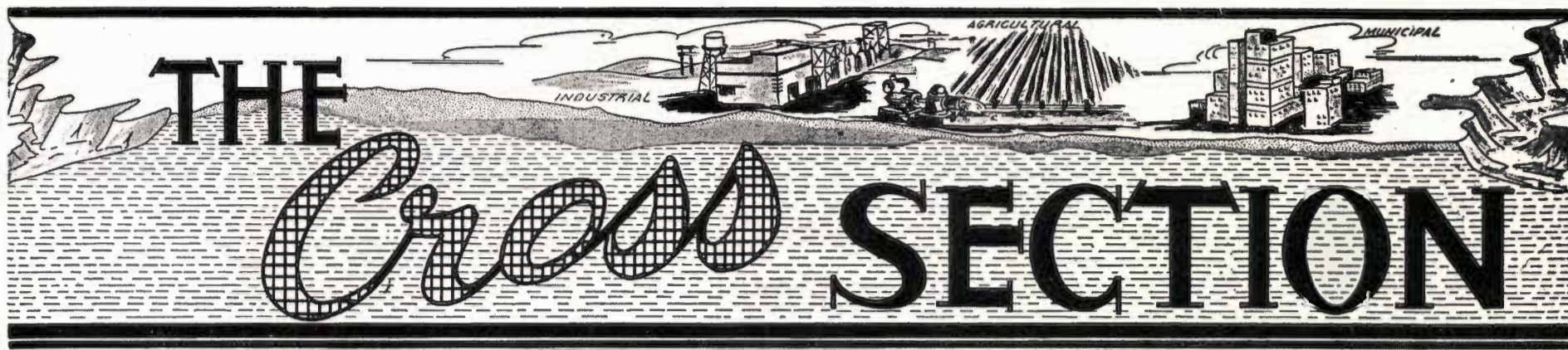
Approximately 50 percent control was obtained on this location using one half pound of Hyvar X. The chemical was applied on March 7, 1964. This demonstration plot is located on the Ralph Shelton farm southwest of Friona.

It is estimated that 1000 "tailwater" pits are in operation, and the total value of water salvaged is \$3,680,000. A majority of the existing tailwater structures on the High Plains of Texas have been constructed since 1961.

Figures obtained from actual records show that most structures have averaged a pumpage of approximately ninety-two acre feet of water in their first year of operation. This chart has been designated to give you some valuable information concerning the construction of irrigation tailwater structures.

Pit Size	Cubic Yds of Dirt Removal	Gallon Capacity	Acre Inches	Acres of Land This Amount of Water Would Irrigate With Application Rate of:	4"	6"	Hours Required to Empty Pit pumping at:				
							100 G. P. M.	200 G. P. M.	300 G. P. M.	500 G. P. M.	1000 G. P. M.
10'x5'x50'	92.6	18,875	0.68	0.17	0.11	3.1	1.55	1.05	0.62	0.3	
20'x10'x50'	370.4	74,700	2.75	0.7	0.45	12.45	6.23	4.15	2.49	1.2	
30'x10'x50'	555.6	112,050	4.12	1.03	0.69	18.67	8.34	6.22	3.73	1.8	
40'x10'x50'	740.7	149,400	5.50	1.37	0.91	24.9	12.45	8.3	4.98	2.4	
50'x10'x50'	926.0	186,750	6.87	1.71	1.14	31.12	15.56	10.37	6.22	3.1	
10'x10'x100'	370.4	74,700	2.75	0.17	0.45	12.45	6.23	4.15	2.49	1.2	
20'x10'x100'	740.7	149,400	5.50	1.37	0.91	24.9	12.45	8.30	4.98	2.4	
30'x10'x100'	1121.2	224,100	8.25	2.06	1.37	37.25	18.62	12.45	7.47	3.7	
40'x10'x100'	1501.6	298,800	11.00	2.75	1.83	49.8	24.9	11.04	9.96	4.9	
50'x10'x100'	1832.0	373,500	13.75	3.44	2.29	62.25	31.12	20.75	12.45	6.2	
20'x10'x200'	1481.4	298,800	11.00	2.75	1.83	49.8	24.9	11.04	9.96	4.9	
30'x10'x200'	2222.1	458,200	16.56	4.16	2.76	76.36	28.18	25.45	15.24	7.6	
40'x10'x200'	2962.8	597,600	22.00	5.50	3.66	99.6	49.8	33.20	19.92	9.9	





A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 11—No. 6

"THERE IS NO SUBSTITUTE FOR WATER"

November 1964

## Sharing My Thoughts

By DAVID CUNNINGHAM  
Field Representative,  
HIGH PLAINS WATER DISTRICT

As a field representative of the High Plains Underground Water Conservation District I often hear the question, What is Water Conservation?

I feel at the present time it is our only hope for survival.

There are many ideas, some that are very far-fetched, as to what can be done when our present water supply has diminished to the point where irrigation is not economically feasible. These ideas should not be forgotten as idle dreams.

In my opinion, we are making a terrible mistake if we gamble on the thought that when our present water supply is depleted, there will be something just as good to replace it. This could never be accomplished by the water districts, State or Federal Government.

If I could show you how to make an extra year's profit every five years, would you be interested? Studies conducted by the High Plains Underground Water Conservation District show that on an average a farmer can conserve one year's water out of every five years by using a tailwater return system.

Who does the individual farmer benefit when he uses water conservation practices? First, he benefits himself, by higher yields, lower operating expenses and a prolonged life of our most priceless natural resource in this area, water. Second, he benefits his neighbors and his community. He benefits his neighbors because with an adequate water supply the value of the land will remain steady and in turn will aid the man who wishes to obtain a loan as well as the man who wishes to sell his property. He benefits his community because when farmers profit, likewise the business places which make up our towns and cities on the high plains profit.

I feel that Water Conservation can and will be accomplished. I am also of the opinion that it can best be accomplished at local level of authority. Authority where the local people govern themselves, and not state or federal control which takes control from the hands of the people who actually live in, and provide the great economy of our High Plains Area.

The main purpose for which the High Plains Water District was formed was to provide local control of our underground water. We cannot do an effective job without the cooperation

of the men who actually use this resource.

With water running down the bar-ditches of our county roads and highways it is very hard to convince others that State or Federal control is not the answer. Won't you do your part to keep the High Plains on the great level that it is today? Consider Water Conservation, because in doing so you are also considering your future.

### Court Rules Against Texas Water Pollution Control Board

The Superior Oil case in which Texas water and oilmen were vitally interested, was brought to trial November 2. The case was a guideline on regulation of salt water brine and wastes that are associated with the production of oil.

The case was heard in District Judge Herman Jones Court in Austin.

Superior and three intervenors sought an order prohibiting the Texas Water Pollution Control Board from regulating oil field salt water and waste disposal. Superior contended the Railroad Commission, one of the intervenors, had exclusive jurisdiction over the disposal of oil field waste and brines.

Others joining Superior were Sun Oil Company and George Mitchell and Associates.

The Water Pollution Control Board contended the 1961 law creating the board was broad enough to include regulation of oil field waste disposal. Attorney General Waggoner Carr so held in 1962, but reconsideration of the opinion was underway this spring when the Superior suit was filed.

The Water Pollution Control Board already has orders in effect prohibiting disposal of salt water in unlined pits in several northwest Texas counties.

Judge Jones rendered his decision in favor of Superior on November 20. In making his decision, Jones stated that if the Pollution Board is allowed to control oil field waste and brines, then eventually the board would control the production of oil and gas. Production of oil and gas is now controlled by the Railroad Commission.

Appeal of Jones' decision is planned by the Water Pollution Control Board.

### WATER DISPUTE IN NEW MEXICO

A dispute over State controlled underground water has risen in the rolling sandhills near Portales, New Mexico.

The basic question is who should have the right to pump water from beneath some 48,000 acres of ranch land northeast of Portales.

Approximately 200 cattlemen who own and lease the land say they should.

On the other side, about 300 farmers say the state law permits them to drill 197 wells on ranchland and pipe the water several miles to their irrigated farm lands.

In New Mexico, as in some other states, the underground water is the property of the state and the development and use of the underground water is under the control of the State Water Engineer's office.

Plans to drill the wells came to light November 4 when the first Portales Valley Project, Inc. publication notice of intent to drill the wells was posted. State law requires that three publications of such intent be made. The second publication was made November 11. The third publication has been delayed in an agreement between the P. V. P. and the 200 ranchers. The ranchers in return called off a hearing on the temporary injunction to prevent the drilling of the wells.

In the P. V. P. publication notices of November 4 and November 11, it was stated that 197 wells would be drilled on approximately 75 sections of land northeast of Portales.

The ranchers have formed the Water Rights of New Mexico Landowners Association. The group is headed by L. V. Harrison of the Arch Community which is near Portales.

High on the list of the association's objectives is the power granted to the state engineer's office. The group feels that the present laws give too much power and authority to the state water engineer.

The Association intends to seek amendments to the water laws so that landowners may obtain water rights under their own land.

Present New Mexico laws declare that the state engineer's decision must be complied with by a district court, unless the decision is shown to be arbitrary or not supported by substantial evidence.

Association members are going to seek an amendment to the law which

will give district courts the power to make decisions.

About 36 per cent of the land involved is owned by the federal and state governments, the remaining 64 per cent is owned by individuals.

Cross Section readers will remember that in some areas of New Mexico, such as the Portales Basin, landowners must have permits from the state engineer to drill a water well. The law does not say that the water obtained must come from land owned by the water user.

Portales Valley Project, Inc. representatives stated that the water well applications were filed to tie up the water until the Bureau of Reclamation completed a feasibility study.

P. V. P. plans call for the wells to be drilled in about two years. If the water is granted to the P. V. P. and wells are drilled and produced, water would be piped a minimum distance of about four miles and a maximum distance of about twenty miles.

Some of the ranchers in the sandhills area say they made applications for permits to drill water wells on their own land and have been awaiting action since May and June.

A conservation district would have to be formed and the ranchers are opposed to this act. Ranchers say lands in the district would be taxed for the cost of the project.

Here are two sides to a dispute over water. Under state law I guess the P. V. P. is correct, but the editor can also see the ranchers side of the question. It would be difficult for me to watch someone drill irrigation wells on my land and pump the water several miles for use on crops if I had been denied the same right.

Could this situation have been eliminated if local government had control of the underground water?

### DISTRICT COURT UPHOLDS RULES OF WATER DISTRICT

In a case filed in the 69th District Court, Judge Harry Schultz upheld the High Plains Water District and granted a permanent injunction to close a well drilled in violation of the District's rules. In his decision, Judge Schultz pointed out that the defendant knew of the rules of the District and of the requirements of permits for the drilling of water wells over a certain size. Proper spacing was another important part of the argument.

With twenty-seven thousand separate permits now on file, this is only the second time the District has been required to defend its rules in a Court of Law.





# WATER WATER EVERYWHERE BUT NOT A DROP TO DRINK

By BILL J. WADDLE

**A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1**

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas

Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

**BILL J. WADDLE**  
Editor

**BOARD OF DIRECTORS**  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President — 2806 21st St. Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom — Rt. 2 Morton, Texas

Precinct 3

(BAILEY, CASTRO and FARMER COUNTIES)  
John Gammon, President — Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer — Rt. 3 Hereford, Texas

Precinct 5

(FLOYD COUNTY)  
Chester Mitchell — Lockney, Texas

**District Office, Lubbock**

Tom McFarland — District Manager  
Donald L. Reddell — Engineer  
Wayne Wyatt — Field Representative

David Cunningham — Field Representative  
Bill J. Waddle — Cross Section and Education  
Dana Wacasey — Bookkeeper  
Melba Wright — Secretary  
Jayne Cobb — Draftsman  
Mrs. Doris Hagens — Secretary

**Field Office, Hereford**

Kenneth Seales — Field Representative  
Mrs. Mattie K. Robinson — Secretary

**Field Office, Muleshoe**

David Cunningham — Field Representative  
Mrs. Bertha Daniel — Secretary

**COUNTY COMMITTEEMEN**

**Armstrong County**

Robert Adams, 1965 — Wayside, Texas  
Foster Parker, 1967 — Route 1, Happy  
Dewitt McGehee, 1968 — Wayside, Texas  
John Patterson, 1965 — Rt. 1, Happy, Texas  
Jack McGehee, 1967 — Wayside

**Bailey County**

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe

Doyle Davis, 1965 — Goodland, Texas  
James P. Wedel, 1967 — Rt. 2, Muleshoe  
Leon Lewis, 1965 — Route 1, Box 98  
Muleshoe, Texas  
W. L. Welch, 1967 — Star Rt., Maple  
J. W. Witherspoon, 1966 — Box 261  
Muleshoe, Texas  
Committee meets last Friday of each month at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

**Castro County**

E. B. Noble  
City Hall, Dimmitt

Ray Riley, 1967 — 71 W. Lee, Dimmitt  
Frank Wise, 1967 — 716 W. Grant, Dimmitt  
Lester Dowell, 1966 — Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 — Star Rt., Hereford, Texas  
H. E. Henley, 1965 — Rt. 5, Dimmitt, Texas  
Committee meets on the last Saturday of each month at 10:00 a. m., City Hall, Dimmitt, Texas.

**Cochran County**

W. M. Butler, Jr.  
Western Abstract Co., Morton

D. A. Ramsey, 1967 — Star Rt. 2, Morton  
Ira Brown, 1965 — Box 774, Morton, Texas  
Willard Henry, 1966 — Rt. 1, Morton, Texas  
H. B. Barker, 1967 — 602 E. Lincoln, Morton  
L. L. Taylor, 1965 — Rt. 1, Morton, Texas  
Committee meets on the second Wednesday of each month at 8:00 p. m., Western Abstract Co., Morton, Texas.

**Deaf Smith County**

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford

L. E. Ballard, 1966 — 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 — 807 N. Main Hereford, Texas  
J. E. McCathern, Jr., 1967 — Rt. 5, Hereford Hereford, Texas  
Willy B. Moore, 1965 — Wildorado, Texas  
Charles Packard, 1967 — Rt. 3, Hereford  
Committee meets the first Monday of each month at 7:30 p. m., High Plains Water District office, Hereford, Texas.

**Floyd County**

Jeanette Robinson  
325 E. Houston St., Floydada

Bill Sherman, 1967 — Route F, Lockney  
S. Hale, Jr., 1966 — Rt. 1, Floydada, Texas  
Tate Jones, 1967 — Rt. 4, Floydada  
Grigsby "Doodle" Milton, 1965 — Silverton Star Route, Floydada, Texas  
L. D. "Buster" Simpson, 1965 — 832 W. Tenn. Street, Floydada, Texas  
Committee meets on the first Tuesday of each month at 10:00 a. m., Farm Bureau Office, Floydada, Texas.



High Plains Underground Water Conservation District No. 1

**Hockley County**

Mrs. Phillis Reynolds  
917 Austin Street, Levelland

Bryan Daniel, 1967 — Rt. 2, Levelland  
Preston L. Darby, 1965 — Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 — Rt. 3, Levelland  
Earl G. Miller, 1965 — Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 — Rt. 2 Levelland, Texas

Committee meets first and third Fridays of each month at 1:30 p. m. 917 Austin Street, Levelland, Texas.

**Lamb County**

Calvin Price  
620 Hall Ave. Littlefield

Willie Green, 1967 — Box 815, Olton  
Roger Haberer, 1965 — Earth, Texas  
W. B. Jones, 1966 — Rt. 1, Anton, Texas  
Troy Moss, 1965 — Rt. 1, Littlefield, Texas  
Raymond Harper, 1966 — Sudan, Texas

Committee meets on the first Monday of each month at 7:30 p. m., Rayney's Restaurant Littlefield Texas.

**Lubbock County**

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Weldon M. Boyd, 1967 — Rt. 1, Idalou  
Bill Hardy, 1965 — Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 — 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 — Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 — Rt. 4, Lubbock, Texas

Committee meets on the first and third Mondays of each month at 1:30 p. m., 1628 15th Street, Lubbock, Texas.

**Lynn County**

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Hubert Tienert, 1967 — Wilson  
Robbie Gill, 1965 — Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 — Wilson, Texas  
Oscar H. Lowery, 1967 — Rt. 4, Tahoka  
T. J. Swann, 1965 — Rt. 1, Wilson, Texas

Committee meets on the third Tuesday of each month at 10:00 a. m., 1628 15th Street, Lubbock, Texas.

**Parmer County**

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina

Wendol Christian, 1966 — RFD, Farwell, Texas  
Henry Ivy, 1967 — Rt. 1, Friona  
Walter Kaltwasser, 1967 — RFD, Farwell  
Carl Rea, 1965 — Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 — Friona, Texas

Committee meets on the first Thursday of each month at 8:00 p. m., Wilson & Brock Insurance Agency, Bovina, Texas.

**Potter County**

E. L. Milhoan, 1967 — Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 — Bushland, Texas  
L. C. Moore, 1965 — Bushland, Texas  
Temple Rogers, 1965 — Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 — Rt. 1, Amarillo

Committee meets on the first Monday of each month at 8:00 p. m., 1710 5th Ave., Canyon, Texas.

**Randall County**

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon

R. B. Gist, Jr., 1965 — Rt 3 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 — Rt. 2, Canyon, Texas  
A. C. Evers, 1965 — Rt. 2, Canyon, Texas  
Lewis A. Tucek, 1967 — Rt. 1 Canyon  
Ed Wieck, 1967 — Rt. 1, Canyon

Committee meets on the first Monday of each month at 8:00 p. m., 1710 5th Ave., Canyon, Texas.

Countless times this phrase has been repeated by many not knowing the importance and impact of the words. Could this be a true, realistic statement for West Texas? Could this become an area with a water supply too salty for drinking or for agricultural use?

Interested people keep asking, "How many years will it be before we pump all our water from the formation? The answer to this question is not easy, but some areas have already ceased to pump water because of its excessive salt content. "Salt", they exclaim, incredibly, when someone tells them about it. "But where does it come from?" Most of it comes from oil field wastes and brines.

In previous years, the common practice used to dispose of these brines was to construct earthen pits and discharge the salt water produced with the oil into pits to evaporate or sink into the ground. Evidence has shown that large percentages of salt water moved downward from the pits into the fresh water sands.

At first, pits were located at considerable distances from existing water wells, and because of the slow rate of movement of the underground water, the pollution of wells was not widespread. However, the salt finally migrated to the points of withdrawals and numerous wells became highly salty and unfit to use for domestic or irrigation purposes. As a general rule, oil field brines contain a greater amount of salt than you would find in sea water, so you can imagine how it would feel in your mouth.

Today, pollution is a reality in some areas of the High Plains. Dan Valentine of Whiteface, Texas, and the Lubbock Children's Home have been experiencing such problems. Their cases have been discussed in previous editions of the CROSS SECTION. One of the more recent pollution cases in the area has occurred in Hockley County, about seven miles west of Levelland. Louie Ray Carter is farming a plot of land owned by his father-in-law. Carter's father-in-law was an active farmer in the county for forty years and had never experienced a salt water problem before. And then it happened.

In the early part of June, 1964, Carter and his father-in-law drilled a new irrigation well to supplement water from one other existing irrigation well on the farm. The new well was drilled to a depth of 200 feet. The well was equipped with a fourteen-inch casing and was gravel-packed. Pumping was quickly initiated and things really looked good. Water flowed at the capacity of a good six-inch irrigation well. Observers noticed that at times large amounts of sand were being pumped which is usually good for new irrigation wells.

As the developing process progressed, a neighbor put his hand under the discharge pipe to get a drink. He tasted the water, then quickly spit it out. He had filled his mouth with water so salty it almost gagged him.

A sample of the water was quickly delivered to a local laboratory for chemical analysis. Thirty-six hundred parts per million of salt were being spread across the crop land.

A few hours later, another sample was caught and the salt had increased to four thousand parts per million.

Where did the salt water come from? There could be but one answer: From an old surface pit which had been used for salt water disposal by an oil company in the area. The pit is now closed, but for several years it acted as a funnel, depositing deleterious matter into the soil and eventually into the fresh water.

Salt cannot be filtered from the water. It will remain in solution even though the salt water may pass through hundreds of feet of sand and gravel before reaching the fresh water. As the salt water mixes with the fresh water there will be some dilution, nevertheless, the salt will still be present.

It will move through formations of great permeability faster than formations of little permeability, thus causing pollution in one area and none in an adjoining area.

The elimination of surface pits has greatly relieved the situation, but pollution is still occurring and can continue to occur for years as the salt impounded between the surface of the earth and the water table gradually feeds into the fresh water formation.

In the case of Louie Ray Carter, what has pollution of the underground water cost him?

The land that the well is located on would be valued at approximately \$450.00 per acre as irrigated farm land. Now that pollution is known to be present, the land reverts back to dry land and the value of dry farm land in this area is approximately \$250.00 per acre.

The well cost approximately \$2,000. to drill, install the casing and gravel pack.

Looking deeper into the loss of money, one must figure the yields of crops lost due to the lack of irrigation water. Farmers in the area estimate that between twelve and fifteen thousand dollars per farm can be lost in crop yields if irrigation water is not available. Carter planted his crops at the normal rate used when irrigation water is available and had to produce them under dry land conditions.

Investigating the area surrounding the polluted well, it was discovered that one resident was hauling water for domestic use.

When a person spends a lifetime building a home and pays for irrigated farm land, pollution can ruin him. Sure, in many instances landowners have received damages for pollution, but what is a money settlement if it won't compensate for a lifetime of effort and work?

Have you wondered what you would do if your water became polluted from oil field brines and wastes. You might consider doing some thinking on this subject.

**WHEN YOU MOVE—**

Please notify the High Plains Underground Water Conservation District, Lubbock, Texas on Post Office Form 22S obtainable from your local postmaster, giving old as well as new address, to insure no interruption in the delivery of "The Cross Section."



# Modification Of Playa Lakes

By DONALD L. REDDELL

The High Plains of Texas, consisting of approximately 35,000 square miles, is widely known for its dry and windy weather. With the annual precipitation averaging around 18 - 20 inches, this vast area is not affected so much from lack of rain as by extreme variations in rainfall from year to year. The problem of extreme variations in rainfall is intensified by the tendency for most precipitation to occur in sudden, heavy thunder showers.

Unreliable rainfall, coupled with high rates of evaporation and transpiration, have caused the High Plains farmer to turn to irrigation. Water is being withdrawn from the Ogallala water-bearing sands through thousands of wells at several hundred times the natural recharge rate. A serious ground water depletion problem is being created by the mining of this vast ground water supply.

Flat tableland, devoid of trees, and with very few streams, are features of the High Plains topography. However, the country is marked by numerous depressions in the land surface. Approximately 90 per cent of the rainfall runoff in this area accumulates in these depressions and forms thousands of small, shallow playa lakes. The remaining 10 per cent of the rainfall runoff is contributed to the Canadian, Red, Brazos and Colorado Rivers.

For centuries these playa lakes have dotted the countryside, providing a temporary water resource during periods of high rainfall, only to become dust bowls when the lake has dried up. As agriculture encroached upon the range, these areas became waste land, ill favored because of their habitual inundation several times a year. The inundation of the lake bed represents an economic loss to the area because of the flooding of thousands of acres of valuable land. This land, if reclaimed, could be used to grow crops, to build houses and to establish parks or other recreational facilities.

The shallow depths of these lakes will normally allow certain grasses and weeds to grow in the lake bottom. The shallow water, in connection with the vegetative cover, provides an ideal breeding place for mosquitoes. It has been well established, through studies by the U. S. Public Health Service and the Texas State Health Department, that playa lakes form the major habitat for the mosquitoes which carry encephalitis in West Texas. In a study by the Encephalitis Section of the USPHS in 1954, playa lakes in the study area accounted for approximately 75 per cent of the mosquito production. During the seven-year period of 1954-60 in eleven counties of Northwest Texas, 460 cases of infectious encephalitis were reported to the Texas State Health Department.

With the increased urbanization of many areas of the High Plains, the problems of pest and floodwater mosquitoes also become increasingly important. Anyone who has been pestered by mosquitoes while having a "cook out" in their backyard knows how miserable an evening can become because of the small pest. With the extremely high levels of relief from mosquito annoyance enjoyed by other areas of the country, residents of the High Plains will increasingly demand more efficient control of mosquitoes.

The lake-bed soil in these depressions is a heavy, impermeable, black clay that retards the percolation of water downward into the water-bearing sands. Therefore, a large part of the water which collects in the playas is lost through evaporation and transpiration. In the past, many landowners have overlooked the playa lake as a source of irrigation water. However, as our ground water supply continues to dwindle, the playa lake will become an important supply of irrigation water. Use of the playa water is presently encouraged because a gallon of water used from the playa is a gallon of water left in our ground water supply for future use.

By modifying the bottom of the pla-



Grain Sorghum Crop Produced On Lake Bottom

ya lakes, many persons on the High Plains believe that playa lakes can be transformed from an economic liability to an economic asset and at the same time reduce the mosquito-breeding problem while conserving water. With this in mind, a research grant was obtained from the National Institute of Health, U. S. Public Health Service, Department of Health, Education and Welfare. This research grant was given to the Lubbock City-County Health Unit, Dr. David Cowgill, Director. Other agencies were called upon to help with the research. Dr. Ellis W. Huddleston and Dr. Donald Ashdown, Department of Horticulture, Park Administration, and Entomology, Texas Technological College, supervised the collection of biological data at each lake. Mr. Darrell Morris, Biologist, Lubbock City-County Health Unit, has worked full time on the project since its beginning. Hydrological data for each lake were collected by the High Plains Water District.

With this research grant, an experimental project was started to determine the feasibility of modifying playa lakes. Plans of the project called for a three-year study of playa lakes in Lubbock County, Texas. Work on the project was started in September of 1961. Ten lakes in Lubbock County were selected. The first year of the project was spent in collecting biological and hydrological information on the lakes in their natural conditions. During the second and third years, five lakes were modified and data collected on the lakes in their modified forms.

One of the lakes which was modified is on the C. K. Kitten farm in southeast Lubbock County. A pit 78 feet by 917 feet at the top, 10 feet by 698 feet at the bottom and 17 feet deep was constructed in this lake. Approximately 21,500 cubic yards of dirt were excavated at a cost of \$3,870. This dirt was spread evenly onto the adjoining lake bottom. A dike was constructed around the north, south and west sides of the pit so that rainfall runoff can enter the pit on only the east side where an entrance channel has been constructed. This pit will hold 15 acre-feet of water with a surface area of 1.7 acres when full. This volume of water covered 14.7 acres of land prior to modification therefore, 13 acres of land was reclaimed.

Mr. Kitten has installed a lake pump at the pit and a pipeline from

the pit to his permanent irrigation system. Therefore, water can easily be pumped which has heretofore been lost to evaporation and percolation. In 1962 and 1963 this lake caught 148 and 153 acre-feet of water, respectively. This much water could be a big aid to any irrigation farmer. During the past year, 1964, the lake caught only three acre-feet of water and was not a source of irrigation water.

The soil which was taken from the pit and spread onto the lake bottom was what most farmers call caliche. Soil samples were collected from the lake bottom and analyzed by the Soil Testing Laboratory at the Lubbock Experiment Station. These analyses showed that the caliche soils used for fill material were very low in organic matter, very low in nitrogen, very high in phosphorus, very high in potassium, very high in calcium and very low in salinity hazard.

Mr. Kitten planted a grain sorghum crop on this land this past year. Four acres of this lake bottom were watered one time. The remaining nine acres were dry land. Nitrogen was applied on five acres of the lake bottom at the rate of 70 pounds per acre. The remaining eight acres received no fertilizer. The crop received only about five inches of rainfall all year. Yet, when the grain was harvested, it made an astounding 3,200 pounds per acre. Mr. Kitten said that this was a greater yield than some of his irrigated grain which was watered two times.

This lake, along with the other four which have been modified, show definitely that mosquito breeding has been eliminated. Therefore, modifying playa lakes certainly appears to have many possibilities. This research project has shown that mosquitoes can be eliminated, a source of irrigation water provided which has heretofore been wasted, and valuable land reclaimed for use in growing crops. A playa lake can certainly be an asset instead of a liability if put to use.



C. K. Kitten's Modified Lake

**Water Is Your  
Future,  
Conserve It!**



## Economic Effects Of Declining Irrigation Water In The High Plains Of Texas

By JOHN J. SEIBERT  
Area Farm Management Specialist  
Texas Agriculture Extension Service,  
LUBBOCK, TEXAS

Recently, many questions have been raised regarding the economic effects of a declining irrigation water table. Interest has increased in this rate of decline in 1964 mostly due to the extreme dry weather during this growing season. Such questions as (1) how long will the existing water supply last, (2) how long can we economically afford to pump irrigation water for agricultural uses (3) what will happen to incomes when this supply of "liquid gold" is depleted, and many others covering large areas for which there is limited information available.

In recent years, irrigation specialists, drillers, suppliers, etc. have observed a decrease in the number of acres being irrigated per irrigation well. Table 1 cites these changes since 1959.

In 1959, the average number of acres irrigated per irrigation well in the Southern High Plains (Extension District 2) was 85.4 acres. This has decreased to where the average acreage irrigated per well is 77.7 acres in 1964.

According to recent research published by Texas A&M University, the investment in an 8" irrigation well will range from \$10,000 to \$15,000. This includes (1) an 8" six-stage irrigation pump (2) an MM irrigation motor (3) drilling and casing from a 400 foot depth-800 gallon per minute well (4) sufficient gas line, (5) underground distribution system and (6) adequate gate pipe and shutoff valves. In all probability, this capacity well should irrigate approximately 120 to 160 acres depending primarily on the irrigated crop being produced. This would range from \$62 to \$125 investment per irrigated acre. Operating costs for this size irrigation well will vary depending on number of times the acreage is irrigated, the quantity of irrigation water applied

per irrigation, the water requirement for the crop being irrigated, and irrigated area per setting.

Based on present research available and the price structure for commodities produced, the return per acre inch of irrigation water is highest when marketed through cotton. Based on the assumption that cotton acreage would receive priority, approximately 13 to 18 acre inches would be applied per growing season. The operating costs under these conditions will normally range from \$6.50 to \$15.00 per acre.

Facing a declining irrigation water supply, producers are confronted with changes in irrigation investments. These changes will include smaller irrigation wells which would result in smaller drilling and casing investments but would require increased costs in distribution systems and/or labor. For example, a complete irrigation system (including the irrigation well, the casing, the pump, motor, main distribution line and sprinkler distribution line and allied equipment) will range from \$6,000 to \$9,000. The number of acres irrigated from such an irrigation investment would range from 60 to 75 acres or investments costs of from \$80 to \$150 per irrigated acre. Operating costs again would be dependent primarily on the area per setting, crop being irrigated, number of acres irrigated and the quantity of irrigation water applied. Operating costs from such an irrigation system would range from \$8.50 to \$20.00 per acre.

In making the change from an 800 gpm well to a 225 to 450 gpm well, adjustments will be gradual. For example, the 800 gpm would not be abandoned, just because output decreased slightly. The changes cited above are from one condition to the other.

In parts of the Southern High Plains, three or four irrigation wells are being "tied" together, their output being pumped into an above-



ground tank, and water distributed through sprinkler systems with portable centrifugal pumps. This is being done very effectively, but results are even greater investments and operating costs per acre. It's not uncommon to have capital investments per well over \$150 per irrigated acre under these conditions.

If enough information were available to accurately predict the rate at which the irrigation water supply is declining on the High Plains, a fairly accurate projection could be made on necessary changes in irrigation investments. However, with the limited data that is available producers who are faced with conditions which make irrigation changes necessary, an additional \$18 to \$25 per irrigated acre can be expected in irrigation investment costs. With the pre-

sent commodities being produced, operating costs can be expected to increase from \$2 to \$5 per irrigated acre. Assuming that all irrigation water availability dropped to an output from 225 to 450 gallons per minute well, the total amount of irrigation acres would decrease approximately 50 per cent.

Also assuming that agriculture commodities marketed from the High Plains would maintain present prices, net farm income would decrease approximately 30 percent.

It is difficult to accurately appraise the economic effect of such a change in the South High Plains. However, the above adjustments would be readily felt on agricultural purchases and sales in downtown Lubbock and other areas.

### DRILLING STATISTICS FOR OCTOBER 1964

During the month of October 133 new wells were drilled within the High Plains Water District; 10 replacement wells were drilled; and 4 wells were drilled that were either dry or nonproductive for some other reason. The County Committies issued 156 new drilling permits.

Listed below by counties are permits issued and wells completed for October.

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Dry Holes Drilled
Armstrong	0	2	0	0
Bailey	10	4	2	0
Castro	11	24	1	0
Cochran	8	2	0	0
Deaf Smith	15	28	1	0
Floyd	20	10	0	0
Hockley	19	7	0	1
Lamb	17	9	2	0
Lubbock	33	15	3	1
Lynn	11	7	0	0
Parmer	5	13	0	0
Potter	0	1	0	0
Randall	7	11	1	2
<b>TOTALS</b>	<b>156</b>	<b>133</b>	<b>10</b>	<b>4</b>

Table 1. Total Number Irrigation Wells, Irrigated Acres, and Average Acres Irrigated per Well. Extension District 2. 1959-1964\*

Year	Irrigated Acres	Irrigation Wells	Average Acres Per Irrigation Well
1959	3,065,295	35,894	85.4
1960	3,101,968	36,017	86.1
1961	2,905,769	37,043	78.4
1962	3,169,460	39,178	80.9
1963	3,228,715	40,309	80.1
1964	3,324,040	42,801	77.7

\*Source: High Plains Irrigation Survey, by David W. Sherrill, Area Irrigation Specialist, Texas Agricultural Extension Service, Lubbock, Texas.

All data estimated by County Agricultural Agents on June 1 of each year.



# THE Cross SECTION

A Monthly Publication of the High Plains Underground Water Conservation District No. 1

Volume 11—No. 7

"THERE IS NO SUBSTITUTE FOR WATER"

December 1964



*Board of Directors*

*County Committeemen*

*Office Personnel*







**A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1**

Published monthly by the High Plains Underground Water Conservation District No. 1  
1628 15th Street, Lubbock, Texas  
Telephone PO2-8088

Second-class Postage Paid at Lubbock, Texas.

**BILL J. WADDLE**  
Editor

**BOARD OF DIRECTORS**  
Precinct 1

(LUBBOCK and LYNN COUNTIES)

Russell Bean, Vice-President ..... 2806 21st St.  
Lubbock, Texas

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)  
Weldon Newsom ..... Rt. 2 Morton, Texas

Precinct 3

(BAILEY, CASTRO and FARMER COUNTIES)  
John Gammon, President ..... Rt. 1, Friona, Texas

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)  
Earl Holt, Secretary-Treasurer ..... Rt. 3  
Hereford, Texas

Precinct 5

(FLOYD COUNTY)  
Chester Mitchell ..... Lockney, Texas

**District Office, Lubbock**

Tom McFarland ..... District Manager  
Donald L. Reddell ..... Engineer  
Wayne Wyatt ..... Field Representative  
David Cunningham ..... Field Representative  
Bill J. Waddle ..... Cross Section and Education  
Dana Wacasey ..... Bookkeeper  
Melba Wright ..... Secretary  
Jayne Cobb ..... Draftsman  
Mrs. Doris Hagens ..... Secretary

**Field Office, Hereford**

Kenneth Seales ..... Field Representative  
Mrs. Mattie K. Robinson ..... Secretary

**Field Office, Muleshoe**

Mrs. Bertha Daniel ..... Secretary

**COUNTY COMMITTEEMEN**

**Armstrong County**

Robert Adams, 1965 ..... Wayside, Texas  
Foster Parker, 1967 ..... Route 1, Happy  
Dewitt McGehee, 1966 ..... Wayside, Texas  
John Patterson, 1965 ..... Rt. 1, Happy, Texas  
Jack McGehee, 1967 ..... Wayside

**Bailey County**

Mrs. Bertha Daniel  
High Plains Water District  
Box 594 Muleshoe

Doyle Davis, 1965 ..... Goodland, Texas  
James P. Wedel, 1967 ..... Rt. 2, Muleshoe  
Leon Lewis, 1965 ..... Route 1, Box 98  
Muleshoe, Texas

W. L. Welch, 1967 ..... Star Rt., Maple  
J. W. Witherspoon, 1966 ..... Box 261  
Muleshoe, Texas

Committee meets last Friday of each month  
at 2:30 p. m., 217 Avenue B., Muleshoe, Texas

**Castro County**

E. B. Noble  
City Hall, Dimmitt

Ray Riley, 1967 ..... 71 W. Lee, Dimmitt  
Frank Wise, 1967 ..... 716 W. Grant, Dimmitt  
Lester Dowell, 1966 ..... Rt. 1, Dimmitt, Texas  
Lester Gladden, 1965 ..... Star Rt., Hereford, Texas  
H. E. Henley, 1965 ..... Rt. 5, Dimmitt, Texas  
Committee meets on the last Saturday of each  
month at 10:00 a.m., City Hall, Dimmitt, Texas.

**Cochran County**

W. M. Butler, Jr.  
Western Abstract Co., Morton  
D. A. Ramsey, 1967 ..... Star Rt. 2, Morton  
Ira Brown, 1965 ..... Box 774, Morton, Texas  
Willard Henry, 1966 ..... Rt. 1, Morton, Texas  
H. B. Barker, 1967 ..... 602 E. Lincoln, Morton  
L. L. Taylor, 1965 ..... Rt. 1, Morton, Texas  
Committee meets on the second Wednesday  
of each month at 8:00 p.m., Western Abstract  
Co., Morton, Texas.

**Deaf Smith County**

Mrs. Mattie K. Robinson  
High Plains Water District  
317 N. Sampson, Hereford

L. E. Ballard, 1966 ..... 120 Beach, Hereford, Texas  
Clinton Jackson, 1965 ..... 807 N. Main  
Hereford, Texas

J. E. McCathern, Jr., 1967 ..... Rt. 5, Hereford  
Hereford, Texas

Billy B. Moore, 1965 ..... Wildorado, Texas  
Charles Packard, 1967 ..... Rt. 3, Hereford  
Committee meets the first Monday of each  
month at 7:30 p.m., High Plains Water District  
office, Hereford, Texas.

**Floyd County**

Jeanette Robinson  
325 E. Houston St., Floydada

Bill Sherman, 1967 ..... Route F. Lockney  
J. S. Hale, Jr., 1966 ..... Rt. 1, Floydada, Texas  
Tate Jones, 1967 ..... Rt. 4, Floydada

Grigsby "Doodle" Milton, 1965 ..... Silverton Star  
Route, Floydada, Texas

L. D. "Buster" Simpson, 1965 ..... 832 W. Tenn.  
Street, Floydada, Texas

Committee meets on the first Tuesday of each  
month at 10:00 a.m., Farm Bureau Office, Floy-  
dada, Texas.



High Plains Underground Water Conservation District No. 1

**Hockley County**

Mrs. Phillis Reynolds  
917 Austin Street, Levelland

Bryan Daniel, 1967 ..... Rt. 2, Levelland  
Preston L. Darby, 1965 ..... Rt. 1, Ropesville, Texas  
Leon Lawson, 1967 ..... Rt. 3, Levelland  
Earl G. Miller, 1965 ..... Rt. 5, Levelland, Texas  
S. H. Schoenrock, 1966 ..... Rt. 2  
Levelland, Texas

Committee meets first and third Fridays of  
each month at 1:30 p. m. 917 Austin Street,  
Levelland, Texas.

**Lamb County**

Calvin Price  
620 Hall Ave. Littlefield

Willie Green, 1967 ..... Box 815, Olton  
Roger Haberer, 1965 ..... Earth, Texas  
W. B. Jones, 1966 ..... Rt. 1, Anton, Texas  
Troy Moss, 1965 ..... Rt. 1, Littlefield, Texas  
Raymond Harper, 1966 ..... Sudan, Texas

Committee meets on the first Monday of each  
month at 7:30 p.m., Rayney's Restaurant Little-  
field Texas.

**Lubbock County**

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Weldon M. Boyd, 1967 ..... Rt. 1, Idalou  
Bill Hardy, 1965 ..... Rt. 1, Shallowater, Texas  
Bill Dorman, 1967 ..... 1910 Ave. E., Lubbock  
Edward C. Moseley, 1966 ..... Rt. 1, Slaton, Texas  
M. N. Thompson, 1965 ..... Rt. 4, Lubbock, Texas

Committee meets on the first and third Mon-  
days of each month at 1:30 p.m., 1628 15th  
Street, Lubbock, Texas.

**Lynn County**

Mrs. Doris Hagens  
1628 15th Street, Lubbock

Hubert Tienert, 1967 ..... Wilson  
Robbie Gill, 1965 ..... Rt. 1, Wilson, Texas  
Roy Lynn Kahlich, 1966 ..... Wilson, Texas  
Oscar H. Lowery, 1967 ..... Rt. 4, Tahoka  
T. J. Swann, 1965 ..... Rt. 1, Wilson, Texas

Committee meets on the third Tuesday of each  
month at 10:00 a.m., 1628 15th Street, Lubbock,  
Texas.

**Parmer County**

Aubrey Brock  
Wilson & Brock Insurance Co., Bovina

Wendol Christian, 1966 ..... RFD, Farwell, Texas  
Henry Ivy, 1967 ..... Rt. 1, Friona  
Walter Kaltwasser, 1967 ..... RFD, Farwell  
Carl Rea, 1965 ..... Rt. 1, Bovina, Texas  
Ralph Shelton, 1965 ..... Friona, Texas

Committee meets on the first Thursday of  
each month at 8:00 p.m., Wilson & Brock Insur-  
ance Agency, Bovina, Texas.

**Potter County**

E. L. Milhoan, 1967 ..... Rt. 1, Amarillo  
W. J. Hill, Jr., 1966 ..... Bushland, Texas  
L. C. Moore, 1965 ..... Bushland, Texas  
Temple Rogers, 1965 ..... Rt. 1, Amarillo, Texas  
Eldon Plunk, 1967 ..... Rt. 1, Amarillo

**Randall County**

Mrs. Louise Knox  
Randall County Farm Bureau Office, Canyon

R. B. Gist, Jr., 1965 ..... Rt 3 Box 43 Canyon, Texas  
Paul Dudenhoefter, 1966 ..... Rt. 2, Canyon, Texas  
A. C. Evers, 1965 ..... Rt. 2, Canyon, Texas  
Lewis A. Tucek, 1967 ..... Rt. 1 Canyon  
Ed Wleck, 1967 ..... Rt. 1, Canyon

Committee meets on the first Monday of each  
month at 8:00 p.m., 1710 5th Ave., Canyon, Texas

## A Word From The Editor . . .

During the past several months it has been my good fortune to write and edit the CROSS SECTION.  
The Christmas Season always makes one take time to think about all the things we have and all the friends that have helped make 1964 a wonderful year. I would like to thank all the people who have contributed to the CROSS SECTION, by writing articles, letters, and voicing opinions on different matters.  
It will be our policy to continue to work with everyone concerning irrigation water conservation.  
Doors at the High Plains Underground Water Conservation District are always open, so come in and let's get acquainted.

# County Agricultural Agents' Role In Water Conservation Program

By H. F. McQUEEN,

Former Area Information Specialist, Texas Agricultural Extension Service

County Agricultural Agents through out the Texas High Plains will recognize the value of water—and its benefit not only to farmers and ranchers but also to the city dweller. From the start of the Extension Service, County Agricultural Agents have performed a vital role in education of people everywhere regarding use of proper soil and water conservation.

Today members of soil conservation districts and water districts throughout the High Plains serve on sub-committees of program building committees in each county. In some counties a separate soil and water conservation sub-committee is in operation. In the remainder of the counties, soil and water conservation falls under the crops sub-committee, but regardless of what the sub-committee is called it meets regularly to assist in planning the soil and water conservation programs for both the short range and long range for that county. County agents in the High Plains all recognize that water is the number one priority problem. Educating the producer as to the best way to get the most out of the least amount of water plays a vital role in the County Agent's work and in advance planning by the program building sub-committee. County Agriculture Agents have conducted many extensive educational programs on water conser-

vation. One is the extensive educational program on cut-off dates for cotton irrigation. Others have been conducted in the field making the most appropriate use of tail water, tying in crop rotation as an integral part of water conservation program, among the many programs in which County Agricultural Agents have played an active part.

County Agricultural Agents rely on many sources for the information they use in educational programs. A few of the many informational sources from which they draw materials include Texas Agricultural Experiment Station, The U. S. Geological Survey, High Plains Underground Water District and the Texas Water Commission. But County Agents have much more information which they use to educate producers. Each year a High Plains Irrigation Survey is published by the Texas Agricultural Extension Service. This survey includes total number of wells in each county, depth of the wells, total irrigated acreage of each crop by counties and trends in irrigation by counties. These are just a few of the many facts and figures which are contained in each of these High Plains Irrigation Surveys.  
Extensive use is made of mass media in carrying out the vital educational programs in each county. County Agricultural Agents make ex-



County Agents conduct community meetings to discuss problems confronting farmers in their county.



# Election Time For Water District Here Again

The High Plains Water District's annual elections will be held on the second Tuesday of January — that date this time is January 12, 1965.

Arrangements are now being made to secure voting places and election officials in each of the thirteen counties that make up the District.

At the end of this year two of the five men who serve as members of the Board of Directors will conclude their present terms of office. These two men are, John Gammon of Lazbuddie, who represents Bailey, Castro and Parmer Counties; and Earl Holt of Hereford, who represents Armstrong, Deaf Smith, Potter and Randall Counties.

In addition to the election of the two board members in the counties mentioned above, there will also be two people elected to each five-man County Committee in the District. Each county has a "County Committee" that signs well drilling permits and makes recommendations on various matters to the District Board. Two members, of the present "County Committees" in the thirteen counties of the District, terms expire at the end of this year.

All qualified voters are eligible to cast ballots in the Water District elections.

This point has been universally misunderstood. Many have the mistaken idea that because they do not own land or operate an irrigation well that they are not qualified to vote. The barber, grocer, mechanic, school teacher, etc., who lives in the district is eligible to vote even though he does not own or operate irrigated land.

Nominations of qualified persons for District Directors and County Committeemen are made by the respective County Committees, or they may be made by petition signed by any twenty-five qualified voters in the area involved.

Voters must cast their ballots in their home counties; however, he may vote at any one of the voting places in that county.

Nominees for Directors' and Committeemen's places are listed below:

## POLLING PLACES

### ARMSTRONG COUNTY

1. School House in Wayside

### BAILEY COUNTY

1. Enoch's Gin, Enochs
2. Community House, Muleshoe

### CASTRO COUNTY

1. Brockman Hardware Company,

tensive use of newspaper, radio, television and magazines to get information relayed to the producer. Each county Extension Office also has a supply of the latest bulletins, leaflets and other news materials that can be obtained by anyone. Many of these educational materials deal with the subject of water conservation.

County Agents are doing a great deal in the field of water conservation—much of it without ballyhoo but necessary just the same.

In a nutshell County Agricultural Agents, largely through the county program building committees, are working earnestly to inform the public of the ways and means to get the most out of the least amount of water.

- Nazareth
2. County Court House, Dimmitt
  3. Easter Community Center, Easter
  4. American Legion Hall, Hart

### COCHRAN COUNTY

1. County Activities Bldg., Morton
2. Star Route Co-op Gin, 5 miles west of Morton
3. Alamo Gin, 8 miles east of Morton

### DEAF SMITH COUNTY

1. County Court House, Hereford

### FLOYD COUNTY

1. County Court House, Floydada
2. City Hall, Lockney

### HOCKLEY COUNTY

1. City Hall, Anton
2. Farm Center Gin, Ropesville
3. County Court House, Levelland
4. Whitharral Lions Club Bldg., Whitharral
5. City Hall, Sundown

### LAMB COUNTY

1. City Hall, Olton
2. City Hall, Sudan
3. Community Bldg., Earth
4. County Court House, Littlefield
5. Farmer's Co-Op Gin, Spade

### LUBBOCK COUNTY

1. Community Club House, Shallowater
2. City Hall, Wolfforth
3. Old County Courthouse, Lubbock
4. City Hall, Idalou
5. Community Clubhouse, Slaton

### LYNN COUNTY

1. Community Center, New Home
2. City Judge's Office, Wilson State Bank, Wilson

### PARMER COUNTY

1. City Hall, Friona
2. Wilson & Brock Insurance Agency, Bovina
3. County Court House, Farwell
4. School House, Lazbuddie

### POTTER COUNTY

1. School House, Bushland

### RANDALL COUNTY

1. Consumer's Fuel Ass'n. Elevator, Ralph Switch
2. VFW Hall, 1 mile north of Canyon
3. Columbus Club Hall, Umbarger

## NOMINEES

### FOR DISTRICT DIRECTOR

(One to be elected for each precinct)

### PRECINCT THREE (3) (Bailey, Castro and Parmer Counties)

1. Ross Goodwin, Muleshoe
2. \_\_\_\_\_

### PRECINCT FOUR (4) (Armstrong, Deaf Smith, Potter and Randall Counties)

1. Andrew Kershen, Route 4, Hereford
2. \_\_\_\_\_

## NOMINEES FOR

### COUNTY COMMITTEEMEN

(Two to be elected for each county)

### ARMSTRONG COUNTY

(Two to be elected Commissioner's Precinct No. 3)

1. Wayne McNeil, Happy, Texas
2. Cordell Mahler, Wayside Texas
3. Floyd B. Adams, Wayside, Texas
4. Guy Watson, Wayside, Texas

### BAILEY COUNTY

(One to be elected Commissioner's Precinct No. 1)

1. Marvin Nieman, Rt. 1, Box 107, Muleshoe, Texas
2. Lloyd Throckmorton, Rt. 1, Box 115, Muleshoe, Texas

(One to be elected Commissioner's Precinct No. 3)

1. Melvin L. Hale, Box 76, Maple, Texas
2. Homer W. Richardson, Box 56,

### Maple, Texas

### CASTRO COUNTY

(One to be elected Commissioner's Precinct No. 4)

1. Carlos Calvert, Dimmitt, Texas
2. John Merritt, Rt. 2, Dimmitt, Texas
3. Donald Wright, Box 65, Dimmitt, Texas

(One to be elected Commissioner's Precinct No. 3)

1. Morgan Dennis, Star Route, Hereford, Texas
2. Otis Hastings, Star Route, Hereford, Texas

### COCHRAN COUNTY

(One to be elected Committeeman-at-Large)

1. Ira Brown, Box 774, Morton, Texas
2. Lloyd Miller, Box 575, Morton, Texas

(One to be elected Commissioner's Precinct No. 2)

1. John C. (Ted) King, Rt. 1, Morton, Texas
2. E. J. French, Sr., Rt. 1, Morton, Texas

### DEAF SMITH COUNTY

(One to be elected Commissioner's Precinct No. 3)

1. Billy Wayne Sisson, Rt. 5, Hereford Texas
2. George Ritter, Rt. 5, Hereford, Texas

(One to be elected Commissioner's precinct No. 4)

1. Billy Bob Moore, Wildorado, Texas
2. Harold Dean Fowler, Wildorado, Texas

### FLOYD COUNTY

(One to be elected Commissioner's Precinct No. 1)

1. M. J. McNeil, 833 West Tennessee, Floydada, Texas.
2. E. E. Norris, Rt. 2, Floydada, Texas

(One to be elected Commissioner's Precinct No. 3)

1. M. M. Julian, Rt. Q, Lockney, Texas
2. E. J. Kinslow, Star Route, Floydada, Texas

### HOCKLEY COUNTY

(One to be elected Commissioner's Precinct No. 1)

1. P. L. Darby, Rt. 1, Ropesville, Texas
2. \_\_\_\_\_

(One to be elected Commissioner's Precinct No. 2)

1. H. R. Phillip, Rt. 4, Levelland, Texas
2. Troy Overman, Rt. 4, Levelland, Texas

### LAMB COUNTY

(One to be elected Committeeman-at-Large)

1. Jack Thomas, Olton, Texas
2. K. B. Parrish, Springlake, Texas
3. Troy Moss, Littlefield, Texas
4. Buddy Joe Wiseman, Sudan, Texas

(One to be elected Commissioner's Precinct No. 2)

1. Roger Haberer, Earth, Texas
2. George W. Laing, Earth, Texas

### LUBBOCK COUNTY

(One to be elected Commissioner's Precinct No. 1)

1. M. N. Thompson, Rt. 4, Lubbock, Texas
2. W. O. Roberts, Rt. 4, Lubbock, Texas

(One to be elected Commissioner's Precinct No. 4)

1. Bob Grice, Shallowater, Texas
2. Bill Hardy, Shallowater, Texas

### LYNN COUNTY

(One to be elected Commissioner's Pre-

cinct No. 4)

1. Don D. Balch, Rt. 4, Tahoka, Texas
2. Harold G. Frankln, Rt. 4, Tahoka Texas

(One to be elected Commissioner's Precinct No. 1)

1. Reuben Sander, Rt. 1, Slaton Texas
2. Dale Zant, Rt., 1, Wilson, Texas

### PARMER COUNTY

(One to be elected Commissioner's Precinct No. 1)

1. Ralph Shelton, Friona, Texas
2. Eric Rushing, Friona, Texas

(One to be elected Commissioner's Precinct No. 2)

1. Harold Hawkins, Rt. 1, Bovina, Texas
2. Carl Rea, Rt. 1, Bovina, Texas

### POTTER COUNTY

(Two to be elected Commissioner's Precinct No. 4)

1. Temple Rogers, Rt. 1, Amarillo, Texas
2. L. C. Moore, Bushland, Texas
3. Jim Line, Bushland, Texas

### RANDALL COUNTY

(One to be elected Commissioner's Precinct No. 3)

1. R. B. Gist, Jr., Rt. 2, Box 43, Canyon, Texas
2. Melvin Schaeffer, Rt. 1, Happy, Texas

(One to be elected Commissioner's Precinct No. 4)

1. Earnest A. Stocker, Rt. 1, Canyon, Texas
2. Carl Hartman, Jr., Rt. 1, Canyon, Texas

## Engineer Appointed To Water Committee

Don Reddell, Engineer, of the High Plains Underground Water District has been appointed to a three-year term on the Ground Water Committee of the American Society of Agricultural Engineers.

Reddell's appointment is effective in July of 1965.

For the past five years Reddell has served as Engineer for the Water District. He has worked with artificial recharge installations, tail water recovery systems, lake modification and numerous other projects.

## You Can Vote Absentee December 24 Through January 4 . . . Apply At Your County Water District Office

THE CROSS SECTION  
1628 15th Street  
Lubbock, Texas

Dear Sir:

I do not now receive THE CROSS SECTION but would like to have it sent to me each month, free of charge, at the address given below.

Name \_\_\_\_\_

Street Address \_\_\_\_\_

City and State \_\_\_\_\_

(Please cut out and mail to our address)



**These Installations Saved Lots of Water and Money for Their Owners. You Could Have One of These in 1965 . . . WHY NOT TRY ONE?**



**PLEASE CLOSE THOSE ABANDONED WELLS**

**Drilling Statistics For November 1964**

During the month of November permits were closed on 134 wells within the High Plains Underground Water District; five replacement wells were drilled and nine wells were drilled that were either dry or non-productive for some other reason. The County Committees issued 179 drilling permits.

County	New Permits	Wells Drilled	Replacement Wells	Dry Holes
Armstrong	0	0	0	0
Bailey	9	16	0	0
Castro	13	24	0	3
Cochran	7	0	0	0
Deaf Smith	15	21	0	1
Floyd	16	9	1	0
Hockley	31	16	0	0
Lamb	14	12	2	0
Lubbock	34	9	1	3
Lynn	6	3	0	2
Parmer	26	16	1	0
Potter	0	0	0	0
Randall	8	8	0	0
<b>TOTAL</b>	<b>179</b>	<b>134</b>	<b>5</b>	<b>9</b>

**OBSERVATION WELLS TO BE MEASURED**

The month of January is very significant to all Water District personnel. The annual water level measurements of more than 800 observation wells in the High Plains Underground Water Conservation District will be made. These 800 wells are a portion of over 1700 wells to be measured in a 39-County area by the Texas Water Commission, North Plains Water District and the High Plains Water District.

The rock formations beneath the surface of the earth are great natural underground reservoirs in which a portion of the water derived from rain and snow is stored to supply the wells and springs and to maintain the flow of streams during periods of fair weather.

Water levels in wells register the stages of these natural reservoirs; they show the extent to which water supplies are depleted by drouth or by heavy pumping for irrigation, industrial uses, and public water works, and also the extent to which they are replenished in seasons of abundant rainfall or melting snow.

In 1937 depths to water were measured periodically in several hundred observation wells throughout the High Plains. Some of the wells were used for irrigation, some for domestic purposes and some were unused. Until 1940 measurements were made for the most part at intervals of 1 to 3 months.

Experience has shown, however, that the most dependable information regarding net annual losses from and additions to storage in the ground water reservoir can be obtained by comparing water level measurements

that are made in successive years in late winter or early spring prior to the irrigation season.

The initial observation wells were located in areas of heavy pumping. As irrigation spread over the High Plains, the observation wells did not. Consequently, there are numerous areas where hundreds of irrigation wells exist, but only a few observation wells.

Observation wells are measured with steel tapes. The tapes are 300 to 500 feet in length. The tapes are entered into the well annulus to measure the water level. The water level of the well is then added or subtracted from last year's reading to determine the present level of the water in the well.

In the High Plains Underground Water District, observation wells are measured during January of each year. Factors determining the selection of January are:

- \* Reasonable recovery period after the end of the summer irrigation season.
- \* Prior to early spring preplant irrigation season.
- \* Available personnel to measure the wells.
- \* Necessity of making water level measurements near the same date each year.

After the observation well is measured the levels are recorded and sent to the office in Lubbock to be kept in permanent files.

Water level records are available in the Lubbock Office of the District and through the Texas Water Commission.