THE Cross SECTION

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

Volume 18—No. 1 "THERE IS NO SUBSTITUTE FOR WATER" *January, 1972*

RESULTS OF THE JANUARY 1972 ELECTION

The annual election of the High Plains Underground Water Conservation District No. 1 was held on January 11, 1972. The District's Board of Directors met on January 18, 1972, to canvass the results of the election and declared three Members reelected to the Board of Directors, and the election of 24 County Committeemen.

Board Members Reelected

The incumbent Director for District Director's Precinct 1, (Crosby, Lubbock and Lynn Counties), Mr. Ray Kitten, was reelected for another two-year term. Mr. Kitten received 422 votes, while Mr. C. C. Sherrod, also seeking the Precinct 1 post, received 189 votes. Twelve write-in votes were also cast for the Precinct 1 directorship.

Mr. Selmer Schoenrock, receiving 145 votes, was also reelected the Director for District Director's Precinct 2 (Cochran, Hockley and Lamb Counties). The other candidate on the ballot for Precinct 2, Mr. D. A. Ramsey received 98 votes. There were 34 write-in votes for this directorship.

The member to the Board of Directors for District Director's Precinct 5 (Floyd and Hale Counties), Mr. Chester Mitchell, was unopposed for reelection. He polled all of the 101 votes cast for this position.

Messrs. Kitten and Schoenrock are commencing their second two-year term, while Mr. Mitchell is entering an unprecedented fifth term, having already served eight years in this position.

Executive Officers Chosen

At a noon luncheon on January 18th, Judge Pat S. Moore, of the 72nd District Court, administered the oath of office to Messrs. Kitten, Schoenrock, and Mitchell.

After reconvening for the afternoon session, and on the motion of Mr. Mitchell, Mr. Ross Goodwin, Member to the Board from District Director's Precinct 3 (Bailey, Castro and Parmer Counties), was elected President of the Board of Directors. Mr. Goodwin is entering his eighth year of service on the Board of Directors. In addition to his seven years as Director, he had previously served six years on the Bailey County Committee. Mr. Goodwin's 13 years of service to the District is exceeded only by Mr. Mitchell's 14 years of accumulative service as County Committeeman and Board Member.

On the motion of Mr. Billy Wayne Sisson, Member to the Board representing District Director's Precinct 4 (Armstrong, Deaf Smith, Potter and Randall Counties), Mr. Mitchell was then elected Vice President of the Board. After nomination by Mr. Schoenrock, Ray Kitten was reelected Secretary-Treasurer.

County Committeemen

A total of 24 men—three each for the eight counties in Director's Precincts 1, 2, and 5—were elected to serve four-year terms as County Committeemen. The Committeemen declared elected by the District Directors are listed below.

Cochran County	Hockley County
Dan Keith	Ewel Exum
H. H. Rosson	Douglas Kauffman
Danny Key	Billy Ray Carter

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Jugde Pat S. Moore (right) administers the oath of office, as Members to the District's Board of Directors, to Ray Kitten (left), Selmer Schoenrock (middle) and Chester Mitchell.

ECOLOGY
And The Economic Facts of Life*

By L. S. POPE

Agriculture has a real stake in the massive ecological movement that has formed in America during the last three years. Texas farmers and ranchers may be the hardest hit by some of the constraints that ecological enthusiasts would force on food and fiber production. The sharp increase in the use of fertilizers, insecticides, herbicides, and hormone-like materials, together with the vast concentration of livestock in huge feedlots, confinement swine units, or poultry and dairy operations raises serious questions about the pollution of our environment from these sources.

The Same Problem

To some extent, this problem has been with us ever since American technology forged ahead in food production. As Metcalf of Illinois has aptly stated that: "Man purposefully contaminates the environment with pesticides to improve its quality for himself and his domestic animals and plants. Pesticides tilt the cost-benefit ratio in favor of the *farmer* and the *ultimate consumer* of food and fiber products." It is perhaps more sensitive today because:

1. We have concentrated production into relatively small land areas by emphasizing high yields, which can come only through the application of fertilizers, insecticides and herbicides;
2. Chemicals are cheaper in price and more available today;
3. The consumer has become accustomed to high quality, abundant foods which can be produced today only by a chemically-oriented agriculture;
4. Producers have been lax in attempts to control waste, runoff, and in the judicious use of pesticides; and
5. Profits from agricultural production have been meager, to say the least. This necessitates the use of every available tool to improve yields and raise the production level.

As a result, there is a vast misunderstanding about the role of agricultural chemicals or the problem of waste management. This has occurred at a time when every would-be ecologist has been voicing a strong demand that we "clean up our environment". There seems to be little regard for the costs

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WATER DEPLETION TAX ALLOWANCE MAPS

The 1971, cost-in-water depletion, income-tax-allowance guideline maps for the 15 counties within the District were released on January 18th. The District's Board of Directors set the cost of the guideline maps at $7.50 per map. The previous cost per map was one dollar. The Directors authorized this increase in price in order to eliminate the annual monetary loss incurred in the preparation of these maps, to establish an economic base for the preparation of new cost-in-water tables, and for the anticipated eventual computerization of this entire program. The Internal Revenue Service has ordered a new land-cost appraisal study conducted in order to bring the cost-in-water allowables in line with current market conditions. The estimated cost of the anticipated computerization program is expected to approach $20,000.

The table below outlines the direct costs of preparing the decline maps, the cost of the surveys made to establish the cost-in-water tables, printing and postage costs, and the map sales income for the years 1968, 1969 and 1970. (All values are in dollars.)

Map Year	*Direct Costs Incurred*	*Map Sale Receipts*	*Net Direct Loss*
1968	4,516.79	660.00	3,856.79
1969	4,651.58	1,537.00	3,114.58
1970	5,823.22	1,552.00	4,271.22

—continued on page 3 . . . MAPS

MISTER IRRIGATOR

During February, preplant irrigation will start the 1972 irrigation season. Now is the time to quickly review your water conservation needs. If you ran tailwater into the bar ditches last year, resolve to take steps now to prevent this practice in 1972. Let your water conservation conscience actively guide you before you start pumping your wells.

We hope you have a successful season—efficient water utilization will help.

The Cross Section

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Telephone 762-0181

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Don McReynolds ..... Geologist
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Obbie Goolsby ..... Field Representative
J. Dan Seale ..... Field Representative
Clifford Thompson ..... Head, Permit Section
Mrs. Dana Wacasey ..... Secretary-Bookkeeper
Mrs. Norma Fite ..... Secretary

BOARD OF DIRECTORS

Precinct 1
(CROSBY, LUBBOCK and LYNN COUNTIES)
Ray Kitten, Secretary-Treasurer ..... Slaton

Precinct 2
(COCHRAN, HOCKLEY and LAMB COUNTIES)
Selmer H. Schoenrock ..... Levelland

Precinct 3
(BAILEY, CASTRO and PARMER COUNTIES)
Ross Goodwin, President ..... Muleshoe

Precinct 4
(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)
Billy Wayne Sisson ..... Hereford

Precinct 5
(FLOYD and HALE COUNTIES)
Chester Mitchell, Vice President ..... Lockney

COUNTY COMITTEEMEN

Armstrong County
Carroll Rogers, 1973 ..... Wayside
George Denny, 1973 ..... Rt. 1, Happy
Jack McGehee, 1973 ..... Wayside
Charles Kennedy, 1975 ..... Rt. 1, Happy
Cordell Mahler, 1975 ..... Wayside

Bailey County
Mrs. Darlene Henry, Secretary
Henry Ins. Agency
217 East Ave. B, Muleshoe
Jessie Ray Carter, 1973 ..... Rt. 5, Muleshoe
Ernest Ramm, 1973 ..... Rt. 2, Muleshoe
Adolph Wittner, 1973 ..... Star Route, Baileyboro
Lloyd D. Throckmorton, 1975 ..... Rt. 1, Muleshoe
W. R. "Bill" Welch, 1975 ..... Star Rt., Maple

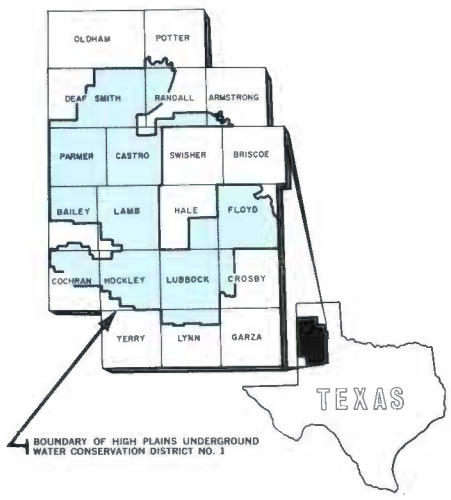
Castro County
E. B. Noble, Secretary
City Hall, 120 Jones St., Dimmitt
John Gilbreath, 1973 ..... Rt. 2, Hart
Bob Anthony, 1973 ..... Rt. 4, Dimmitt
Dale Maxwell, 1973 ..... Hiway 385, Dimmitt
Joe Nelson, 1975 ..... Box 73, Dimmitt
Anthony Acker, 1975 ..... Rt. D., Nazareth

Cochran County
W. M. Butler, Jr., Secretary
Western Abstract Co., 108 N. Main Ave., Morton
Jessie Clayton, 1974 ..... 706 S. Main Ave., Morton
Hugh Hansen, 1974 ..... Route 2, Morton
Dan Keith, 1976 ..... Route 1, Morton
H. H. Rosson, 1976 ..... Route 1, Morton
Danny Key, 1976 ..... Star Route 2, Morton

Crosby County
Clifford Thompson, Secretary
1628 15th Street, Lubbock
Jack Bowman, 1974 ..... Lorenzo
Kenneth Gray, 1974, ... Lorenzo
W. O. Cherry, 1976 ..... Lorenzo
E. B. Fullingim, 1976 ..... Lorenzo
M. T. Darden, 1976 ..... Lorenzo

Deaf Smith County
B. F. Cain, Secretary
County Courthouse, 2nd Floor, Hereford
W. L. Davis, Jr., 1973 ..... Hereford
L. B. Worthan, 1973 ..... Rt. 3, Hereford
Frank Zinser, Jr., 1973 ..... Rt. 5, Hereford
George Ritter, 1975 ..... Westway, Hereford
Harry Fuqua, 1975 ..... Rt. 1, Hereford

Floyd County
Gayle Baucum, Secretary
Farm Bureau, 101 S. Wall Street, Floydada
Fred Cardinal, 1974 ..... Route 4, Floydada
Pat Frizzell, 1974 ..... Box 1046, Lockney
Malvin Jarboe, 1976 ..... Route 4, Floydada
Connie Bearden, 1976 ..... Route 1, Floydada
M. M. Smitherman, 1976 ..... Silverton Star Route, Floydada



Hale County
J. B. Mayo, Secretary
Mayo Ins., 1617 Main, Petersburg
Don Hegi, 1974 ..... Box 179, Petersburg
Henry Kveton, 1974 ..... Route 2, Petersburg
Clint Gregory, Jr., 1976 ..... Box 98, Petersburg
Henry Scarborough ,1976 ..... Route 2, Petersburg
Homer Roberson, 1976 ..... Route 2, Peterbsurg

Hockley County
Jim Montgomery, Secretary
609 Austin Street, Levelland
E. E. Pair, 1974 ..... Route 2, Levelland
Jimmy L. Price, 1974 ..... Route 3, Levelland
Ewel Exum, 1976 ..... Route 1, Ropesville
Douglas Kauffman, 1976 ..... 200 Mike, Levelland
Billy Ray Carter, 1976 ..... Route 5, Levelland

Lamb County
Calvin Price, Secretary
620 Hall Avenue, Littlefield
Lee Roy Fisher, 1974 ..... Box 344, Sudan
Jack Thomas, 1974 ..... Box 13, Olton
Gene Templeton, 1976 ..... Star Route 1, Earth
W. W. Thompson, 1976 ..... Star Route 2, Littlefield
Donnie Clayton, 1976 ..... Box 276, Springlake

Lubbock County
Clifford Thompson, Secretary
1628 15th Street, Lubbock
R. F. (Bob) Cook, 1974 ..... 804 6th Street, Idalou
Dan Young, 1974 ..... 4607 W 14th Street, Lubbock
Glenn Blackmon, 1976 ..... Route 1, Shallowater
Andrew (Buddy) Turnbow, 1976 ..... Route 5, Box 151 B, Lubbock
Alex Bednarz, 1976 ..... Route 1, Slaton

Lynn County
Clifford Thompson, Secretary
1628 15th Street, Lubbock
Roger Blakney, 1974 ..... Route 1, Wilson
Orville Maeker, 1974 ..... Route 1, Wilson
O. R. Phifer, Jr., 1976 ..... New Home
S. B. Rice, 1976 ..... Route 1, Wilson
W. R. Steen, 1976 ..... Route 2, Wilson

Parmer County
Aubrey Brock, Secretary
Wilson & Brock Insurance Co., Bovina
Webb Gober, 1973 ..... RFD, Farwell
Jim Roy Daniel, 1973 ..... Friona
Joe Moore, 1973 ..... Box J, Lazbuddie
Guy Latta, 1975 ..... 1006 W. 5th, Friona
Edwin Lide, 1975 ..... Rt. 1, Bovina

Potter County
Henry W. Gerber, 1973 ..... Rt. 1, Amarillo
Fritz Menke, 1973 ..... Rt. 1, Box 538, Amarillo
Vic Plunk, 1973 ..... Rt. 1, Amarillo
F. G. Collard, III, 1975 ..... Rt. 1, Box 101, Amarillo
W. J. Hill, 1975 ..... Bushland

Randall County
Mrs. Louise Tompkins, Secretary
Farm Bureau, 1714 Fifth Ave., Canyon
Leonard Batenhorst, 1973 ..... Rt. 1, Canyon
Richard Friemel, 1973 ..... Rt. 1, Canyon
Marshall Rockwell, 1973 ..... Canyon
John F. Robinson, 1975 ..... 1002 7th St., Canyon
Fred Begert, 1975 ..... 1422 Hillcrest, Canyon

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

Election of 1972 . . .

. . . continued from page 1

Crosby County
W. O. Cherry
E. B. Fullingim
M. T. Darden

Floyd County
Malvin Jarboe
Connie Bearden
M. M. Smitherman

Hale County
Clint Gregory, Jr.
Henry Scarborough
Homer Roberson

Lamb County
Gene Templeton
W. W. Thompson
Donnie Clayton

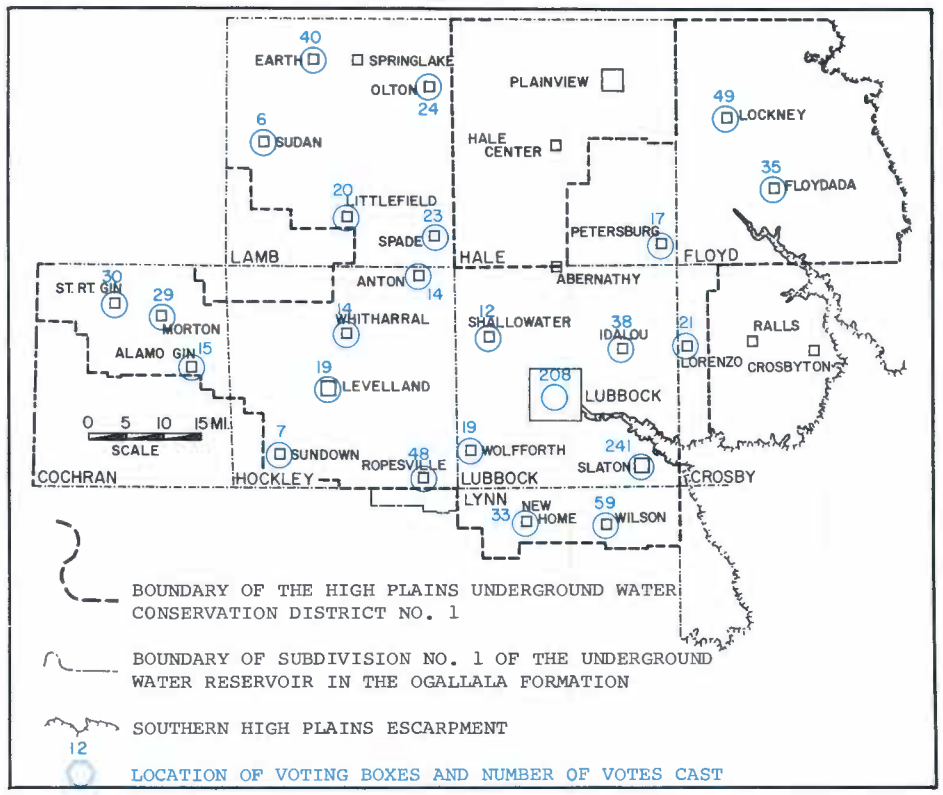
Lubbock County
Glenn Blackmon
Andrew Turnbow
Alex Bednarz

Lynn County
O. R. Phifer, Jr.
S. B. Rice
W. R. Steen

The 1972 Board of Directors, their respective Precincts and the counties contained therein are shown in the listing of Directors on this page (columns 1 and 2). The County Committeemen for each county are also shown in these listings. The year (in January of same) in which the Committeeman's term expires, and the Committeeman's address are also shown.

Voting Light

A total of 1,021 votes were cast at the 24 polling places provided on January 11th. Although this represents three more places than the 21 polling places provided in the 1970 election in these same counties, 149 more votes were cast in January 1970. However, there were only five candidates listed on the 1972 ballots for the three District Director's positions, while eight candidates sought these positions in 1970. The votes cast this January represent approximtaely 1.3 percent of the eligible voters residing within the District in these eight counties.



Map showing the locations of polling places for the election of January 11, 1972, and the number of votes cast at each polling place.

Mr. Lowry Hershey is shown casting his absentee ballot for the District's January 1972 election. On January 7, 1972, Lowry became the first 18-year-old to vote in the District's 21 years of annual elections. Lowry is a student of Harding College, Searcy, Arkansas. He is a registered voter in Lubbock County. His parents, Mr. and Mrs. Sam Hershey, reside in Lubbock.

Facts of Life . . .

. . . continued from page 1

involved, yet anyone who tries to balance the cost-benefit ratio resulting from a more stringent use of chemicals or restrictions on pollution must agree that to accomplish this we will need:

1. *More laws* and regulations governing such things as chemical use, licensing of applicators, and livestock pollution;
2. *Vast increase* in enforcing agencies and personnel;
3. *Higher cost* of product to the consumer, since any industry, including agriculture, cannot stand the costs of pollution control out of excess profits alone; and
4. *Fundamental* change in certain methods of production, and more research in new and better methods of production.

If we accept these items as necessary, and there is by no means common agreement even among the experts, then it is essential that the economic cost of certain improvements in our environment be studied carefully.

Agriculture, in particular, must do some "soul-searching". Profits from agriculutral enterprises are meager, labor is scarce, investments are staggering, markets are becoming restricted, government programs supporting agricultural production are being trimmed, and competition with synthetics and imports is fierce. This places the natural food and fiber producer at a disadvantage should he be denied the use of chemicals.

The Good Life Generation

Surprisingly few studies have been undertaken to determine the impact of drastic withdrawal of chemicals on the production base. Of importance is the ultimate cost of food and fiber to the American consumer. These estimates are vital and must be made to the best of our ability if the complete picture is to be presented to the decision-makers of our society. However, there is one factor that is almost impossible to estimate—the effect of poor quality products, together with short supply. Today we have a generation of Americans who:

1. Have never really been exposed to poor quality food products;
2. Believe that food can remain abundant and cheap, without the use of chemicals or massive increases in technology; and
3. Really resent having to buy food in the first place, what with all the other products available in the supermarket.

To provide a base for making a meaningful appraisal of the situation, a task force of specialists at Texas A&M University representing our top authorities in agricultural economics, soil and crop sciences, entomology, and range science were asked to provide guidelines if agriculture was denied the use of chemical pesticides, herbicides and nitrogen fertilizers. In so doing, certain assumptions were necessary:

1. The year 1969 was used as the base in the analysis since it represented the best data for price and cost analysis and projections;
2. All pesticides and nitrogen fertilizers would be eliminated in 1970;
3. The removal of agricultural chemicals would be felt a year following, that is to say, following the 1970 withdrawal;
4. No allowance was made for carryover effects of previous applications of pesticides or fertilizers;
5. Agricultural surpluses would be continued to provide a cushion against drastic reduction in feed supplies;
6. The proportion of crops planted in the U.S. would be held constant, in other words no drastic shift toward crops that would contribute directly to human food;
7. Certain basic crops common to Texas such as grain sorghum, cotton, wheat, rice, vegetables and citrus would be considered, and the estimates of yield reduction would be applied to the U.S. as a whole;
8. All diverted acres resulting from government incentive programs would be returned to production to provide the broadest possible production base;
9. A free market for agricultural and food products would continue, with no imports of food produced with chemical treatment in other countries;
10. Food quality standards would be eliminated, since it would be difficult to maintain quality without chemicals.

Within the framework of these basic assumptions, which were considered necessary to arrive at meaningful estimates, it was possible to obtain some estimates on the reduction in yield and probable cost to the consumer. Assuming that the commonly accepted elasticities of demand would continue to prevail in a free and open market, it was possible to estimate the effect of loss of production on food cost to the consumer. The results are startling, and although they can be improved upon as more data are analyzed in the future, they constitute one of the few estimates available.

Effect On Yields

Using the best experimental data available, plus estimates from the most knowledgeable scientists, it was estimated that yields of certain basic crops in Texas would decline by the amounts shown in Table 1.

Table 1—EFFECT OF WITHDRAWAL OF NITROGEN FERTILIZER, HERBICIDES, AND INSECTICIDES ON OUTPUT OF SELECTED AGRICULTURAL COMMODITIES†

	Per acre yield reduction resulting from withdrawal		
Commodity	*Nitrogen fertilizer and herbicide*	*Insecticide*	*All chemicals*
Grain sorghum	35	18	46.7
Cotton	30	12	38.4
Rice	35	4	37.6
Wheat	30	9	36.3
Fresh vegetables	28	20	42.0
Oranges	10	40	46.0
Grapefruit	10	30	37.0

Effects On Consumer

Using the accepted elasticities of demand (i.e., change in market value of product per unit change in supply) it was possible to obtain an estimate of the value of product to the farmer and the cost to the consumer. The results, as might be expected, were dramatic. When the above estimates of yield reduction were used, the cost of product in the consumer's market basket would advance from $11.7 billion in 1968 to $31.6 billion in 1971. All exports of U.S. feeds and grains would cease. This would occur even with all diverted acres back in production. Recognizing that these reductions in yield are drastic, it was decided to assume an arbitrary figure of 15% reduction, with no attention to quality deterioration. The cost determinations were again undertaken. In brief, the results of the economic analyses are as listed in Table 2.

Table 2—VALUE OF 1971 PRODUCTION IN MILLIONS OF DOLLARS, WITH AN ESTIMATED 15 PERCENT REDUCTION IN YIELD

	1969	1971
Value to Farmer	$ 5.9	$ 9.4
Cost to Consumer	$11.7	$14.4

Change in cost = 23 percent increase

With a restricted supply, and operating in a free market, the farmer might receive more for his production. However, his costs of production might skyrocket. Of prime importance is that the consumer would have to pay dearly in return for a lower quality product. Similar analyses were made on costs to the consumer if all acreage of cotton for example, were diverted into feed grain and food production. In this case, food costs would remain approximately the same, but obviously we would have used up our potential for expanded production in the future.

Chemicals Now A Must

These estimates point up the need for a close look at the probable effect of drastic removal of the chemicals now available to the American farmer if he is to continue to produce in a very competitive and cost-ridden economy. No consideration was given to the reduction in earning power of agricultural production in rural areas, which may have a significant effect on their economy. At present, no alternatives are really available to the producer. Biological methods of control, although a fascinating and intriguing development worthy of much research, are simply not available for practical use at this time. Most drastic and unpredictable would be the effect on quality of product. This has had a vast and beneficial effect on the acceptance of foods in the United States over the past two decades. Most authorities feel that *it simply cannot be maintained should chemicals be withdrawn.*

With all the furor surrounding the use, or misuse, of chemicals, several items must be considered strongly. Among these is the reality that the

—continued on page 4 . . . FACTS

Maps . . .

. . . continued from page 1

Since its inception in 1954, to date, the District's total expenditure on the cost-in-water depletion, income-tax allowance program approaches $400,000. This total (and the values in the table above) does not include the cost of the measurement of the depth to water in nearly 800 wells annually—the backbone of the entire water depletion, tax allowance program. The annual measurements cost an average (at January 1972 prices) of $3.93 per well. This total also does not include the tens of thousands of dollars that the District has expended in upgrading and maintaining the observation well program, and the computerization of its records—as required in order to obtain and process usable water-table decline data.

Recent surveys completed in three counties within the District have shown that approximately $800,000 in income-tax allowances are claimed, as a result of this program, in *each* of these counties annually.

The Directors hope that map purchasers will appreciate the need for the recent price increase, and any possible future price increase that is logically necessary in order to maintain or improve this program. The object of the District's participation in this program is to appraise the landowner and irrigator of the need for the conservation of the area's dwindling groundwater reserves; if this objective is not being realized, then the District is not meeting its obligations to its taxpayers through this program.

Jack Page (center), Internal Revenue Service Engineer, compares a machine-printed hydrograph of a well's water-level measurements with the decline values assigned on the 1971 tax-guideline map. Looking on are Don Smith (seated) and Don McReynolds, the staff geologists who prepared the map.

DIRECTORS REELECTED FOR TWO YEARS

RAY KITTEN

Mr. Ray Kitten took the oath of office to serve as the Member to the Board of Directors of the High Plains Underground Water Conservation District No. 1, representing District Director's Precinct 1 (Crosby, Lubbock and Lynn Counties), on January 18, 1972. First elected to the Board of Directors in 1970, he is commencing his second two-year term on the Board.

Ray's late father and mother, Henry and Kathrene Kitten, moved to the Slaton area from Nebraska in 1916.

Ray drilled his first irrigation well in 1945, and now operates two 8-inch wells. A third well on this farm was not being used, so he loaned it to the Texas Water Development Board. The TWDB installed an automatic recorder on the well to record water-level fluctuations. During 1971, he also entered into a contract with Texas Tech University for the installation of an experimental, artificial recharge well near a lake on his farm.

During his two years as Director, Ray has not missed a single meeting of the Board of Directors, and he can be counted on to attend the numerous special meetings requiring Board representation. The experience he has gained by his two years as District Director, and the many years of unselfish service on many other private and public service boards, makes him eminently qualified to represent the groundwater interests of the residents of District Director's Precinct 1. Experience has taught violators of the District's water conservation rules that Ray's quiet manner is not a sign of weakness, but instead, the fair deliberation on decisions that are likely to effect the District's future.

SELMER SCHOENROCK

After accepting his second oath of office as the Member to the Board of Directors of the High Plains Underground Water Conservation District No. 1, representing District Director's Precinct 2 (Cochran, Hockley and Lamb Counties), Mr. Selmer H. Schoenrock commenced his third year as Director on January 18, 1972.

Selmer farms nearly 2,400 acres. In all, he operates five farms in north central Hockley County. At the height of the drought, in 1956, he drilled his first irrigation well. He now operates 19 irrigation wells. However, Selmer has noted that as a result of the gradual decline of the water table, his best well today produces less than one-half as much water as did his original well. His years of experience operating small capacity irrigation wells has made him a very frugal irrigator. Selmer has both observed and experienced the changes and hardships forced upon the irrigator by a wanning groundwater supply. This experience has forced upon him an energetic interest in seeking solutions to the area's groundwater problems. His knowledge of the consequences of the depletion of the groundwater supply makes him that much less sympathetic to those more fortunately endowed (presently) with high capacity wells, but who insist on the necessity to create tailwater waste.

During his two years as a Member of the Board of Directors, Selmer has attended several conventions, seminars, hearings, and other types of water meetings. He has met and conversed with many of the leaders of the water community and in political circles.

CHESTER MITCHELL

On January 18, 1972, Mr. Chester Mitchell accepted, for the fifth time, the oath of office as the Member to the Board of Directors, representing District Director's Precinct 5 (Hale and Floyd Counties), of the High Plains Underground Water Conservation District No. 1.

Chester was first brought to Floyd County the 5-year old son of the late Travis Mitchell, and Ethel Mitchell. Chester, his mother and brother, R. C. —a well-known certified seed producer—still reside near Lockney.

After graduating from Oklahoma State University, Chester worked as a county agent for seven years in Oklahoma. He returned to Floyd County in 1946 and now operates a 720-acre farm with five irrigation wells. He also has two playa (lake) water recovery systems, and one automated tailwater recirculation system on his farm. He is widely known throughout Floyd County and the District, as a staunch advocate of tailwater return systems. He has repeatedly expressed his conviction that tailwater waste should be totally unacceptable to the High Plains landowner and irrigator. Chester is very proud of his water reclamation projects. A visitor to his farm is always given a thorough tour of his tailwater return systems.

Chester's unprecedented election to a fifth, two-year term is profound testimony of the Precinct 5 voters' recognition and endorsement of his record of service on the District's Board of Directors. This January he entered his 15th year of service to the District, having served six years on the Floyd County Committee, and 8 years on the Board of Directors.

Facts of Life . . .

. . . continued from page 3

producer *can* properly use chemicals, and must do so for his own protection, as well as the protection of others. It is probable that, in the future, only certain skilled and well-trained specialists will handle the dangerous chemicals used in intensified crop production. These *must* be applied properly, and *only as needed,* with full consideration of the entire crop production needs of the area. Thus the treatment of one crop will not adversely effect beneficial insects on others or develop resistance among certain insect populations. Pest control must be considered an integrated part of the total plant or crop production picture. Credit must be given to new mechanical-chemical controls where drastically lower levels of total chemical are required. The intensity of public reaction and restrictive measures adopted must not discourage research and development of new, more potent and safe chemicals, without which we will be at the mercy of massive insect assaults within a few years.

If all the factors—both adverse and beneficial—on the use of chemicals in food and fiber production are carefully weighed, we will benefit from the current public concern. Ultimately, the producer and consumer alike may be able to live in a clean and safe environment, still enjoying the benefits of the agricultural miracle that today yields the most nutritious, wholesome and safe food product the world has ever known, for only 17 percent of the disposable income of the average wage earner.

*Presented at the 45th annual conference of the *Professional Agricultural Workers of Texas,* Kerrville, Texas, November 3, 1971. Dr. L. S. Pope is the Associate Dean of Agriculture, Texas A&M University.

†Taken from the report, "Impact of Drastic Reduction in the Use of Agricultural Chemicals on Food and Fiber Production and Cost to the Consumer, Texas A&M University College of Agriculture Special Report, 1970".

Plan To Attend The 10th Annual West Texas Water Conference

Red Raider Inn, Lubbock, Texas
February 4, 1972

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 18—No. 2 "THERE IS NO SUBSTITUTE FOR WATER" *February, 1972*

Members of the Texas House of Representatives Natural Resources Study Committee meeting in Plainview (left to right), Bryan Poff, Amarillo; Joe Hawn, Dallas; Lindon Williams, Houston; John Allen, Longview (Chairman of the Committee); Bill Clayton, Springlake; Miss Sarah Haynie (Attorney to the Committee); George Baker, Fort Stockton; Walt Parker, Denton; and Phil Cates, Lefors. Also present but not shown was Lynn Nabers of Brownwood.

LEGISLATIVE STUDY COMMITTEE MEETS

The Texas House of Representatives Natural Resources Study Committee held their first public hearing in Plainview, February 18th. The meeting was scheduled to coincide with the annual meeting of Water, Inc.

The Committee is to be commended for their excellent attendance; only two of the eleven Committee members were not present for the hearing. Committee members present included Chairman John Allen, Longview; Vice Chairman Bill Clayton, Springlake; George Baker, Ft. Stockton; Phil Cates, Lefors; Joe Hawn, Dallas; Lynn Nabers, Brownwood; Walt Parker, Denton; Bryan Poff, Jr., Amarillo; and Lindon Williams, Houston. Not present for the hearing were Bill Presnal, Bryan, and Paul Silber, San Antonio.

Chairman Allen opened the hearing by explaining that the Committee was in Plainview to learn of the water needs of the area, and to hear testimony regarding possible solutions to the Texas water problems. Scheduled topics for discussion during the day were ground water management; pollution control; benefits and delays of water projects; and water price, use and priorities.

Frank Rayner, Manager of the District, presented testimony to the Committee regarding the operation of the High Plains Underground Water Conservation District No. 1. He discussed many of the District's activities and stressed their effectiveness in relation to statewide control.

Some of those testifying before the Committee to present their views of Texas water problems were: Gaston Wells, Dumas, President of Water, Inc.; J. W. Buchanan, Dumas, Manager, North Plains Water Conservation District; Felix Ryals, Manager, Panhandle Ground Water Conservation District No. 3; Marvin Shurbet, Petersburg, Vice Chairman, Texas Water Development Board; Hugh Yantis, Austin, Executive Director, Texas Water Quality Board; Harry Burleigh, Austin, Executive Director of the Texas Water Development Board; Otha Dent and Joe Carter, Austin, Texas Water Rights Commissioners; and Arthur Duggan, Jr., Littlefield, of the West Texas Chamber of Commerce Water Committee.

Those persons testifying before the Committee stressed the need for wise use of the area's remaining groundwater.

SOIL MOISTURE REQUIREMENTS

by

O. H. NEWTON and O. C. WILKE[1]

The data collected during the 1971-72 fall and winter soil moisture survey has shown that a very high percent of the South Plains is divided into two water requirement categories. One fairly large section needs a little more water than is produced by normal rainfall, while normal rainfall will rewet the remaining area. A third, and somewhat smaller section, in the north central portion of the South Plains was found to have a high moisture content which will require less than normal rainfall to rewet the top five feet of soil. The soil moisture requirement chart shown in this report defines those areas that need certain amounts of water to rewet the soil layers to a depth of five feet.

Purpose and Significance of the Soil Moisture Survey

The primary purpose of the annual fall and winter soil moisture survey is to determine the average amount of moisture that is held in the top five feet of South Plains soils. This in turn provides a basis for estimating the need for and the amount of preplant irrigation required to rewet the soil and give the farmer the best chance for a profitable crop.

During the early years of South Plains irrigation, it was found that better crops could be produced if the soil was wet prior to spring planting. Years of crop production have not produced a substitute method and the

—continued on page 2 . . . SOIL

MAHON SPEAKS

Speaking before nearly 300 persons from West Texas and New Mexico, U.S. Representative George H. Mahon vigorously attacked the federal government's deficit spending and discussed the importation of water into Texas and Eastern New Mexico. Mahon was speaking at the noon luncheon of the fifth annual meeting of Water, Inc.

"When we think about water importation which would require importing water in quantity from a distance in excess of 700 miles, we have to take into account fiscal resources to implement such a plan. We are thinking in terms of a multi-billion dollar program. It would be unrealistic to approach the problem without reference to the costs and without reference to the benefits—and without reference to the short-range and long-range fiscal problems. If we can generate a healthy economic climate, our future prospects will be enhanced. All demands for federal spending must be considered in the context of the disturbing facts which I have outlined."

Mahon discussed the current reconnaissance study which is studying the possibility of importing excess water from the lower Mississippi River into Texas and Eastern New Mexico. This study he said should be completed in fiscal 1973.

"Now, if the final reconnaissance report is favorable, the next step, and it is a giant one, will be to obtain authorization to proceed with the follow-on *feasibility study*. These are key words—*feasibility* study; this follows the *reconnaissance* study.

"The feasibility study involves the detailed engineering and design and

—continued on page 4 . . . MAHON

SHURBET ELECTED

Marvin Shurbet of Petersburg, Texas, was elected, by the other 5 members of the Board, to a two-year term as Vice-Chairman of the Texas Water Development Board (TWDB) at their January 18th meeting.

A former Floyd County Committeeman for the High Plains Underground Water Conservation District No. 1, Shurbet was serving on the District's Board of Directors in 1957 when Governor Price Daniel appointed him to a four-year term as one of the original members of the newly created Water Development Board. Governor Daniel and Governor John Connally each re-

—continued on page 3 . . . SHURBET

THE Cross SECTION

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

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FRANK A. RAYNER, Editor

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District Office at Lubbock

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Kenneth Gray, 1974, ... Lorenzo
W. O. Cherry, 1976 ..... Lorenzo
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M. T. Darden, 1976 ..... Lorenzo

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L. B. Worthan, 1973 ..... Rt. 3, Hereford
Frank Zinser, Jr., 1973 ..... Rt. 5, Hereford
George Ritter, 1975 ..... Westway, Hereford
Harry Fuqua, 1975 ..... Rt. 1, Hereford

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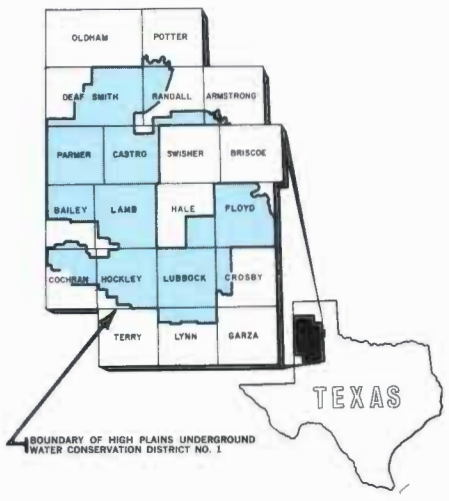
Pat Frizzell, 1974 ..... Box 1046, Lockney
Malvin Jarboe, 1976 ..... Route 4, Floydada
Connie Bearden, 1976 ..... Route 1, Floydada
M. M. Smitherman, 1976 ..... Silverton Star Route, Floydada



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J. B. Mayo, Secretary
Mayo Ins., 1617 Main, Petersburg
Don Hegi, 1974 ..... Box 179, Petersburg
Henry Kveton, 1974 ..... Route 2, Petersburg
Clint Gregory, Jr., 1976 ..... Box 98, Petersburg
Henry Scarborough ,1976 ..... Route 2, Petersburg
Homer Roberson, 1976 ..... Route 2, Peterbsurg

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Jimmy L. Price, 1974 ..... Route 3, Levelland
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Gene Templeton, 1976 ..... Star Route 1, Earth
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Orville Maeker, 1974 ..... Route 1, Wilson
O. R. Phifer, Jr., 1976 ..... New Home
S. B. Rice, 1976 ..... Route 1, Wilson
W. R. Steen, 1976 ..... Route 2, Wilson

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Webb Gober, 1973 ..... RFD, Farwell
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Guy Latta, 1975 ..... 1006 W. 5th, Friona
Edwin Lide, 1975 ..... Rt. 1, Bovina

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Vic Plunk, 1973 ..... Rt. 1, Amarillo
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Richard Friemel, 1973 ..... Rt. 1, Canyon
Marshall Rockwell, 1973 ..... Canyon
John F. Robinson, 1975 ..... 1002 7th St., Canyon
Fred Begert, 1975 ..... 1422 Hillcrest, Canyon

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

Soil Moisture . . .

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need for a well saturated soil profile prior to planting still holds. Until recent years, farmers could only guess at the amount of water needed to wet the soil, but with modern techniques, it has been possible to make a reliable estimate of additional preseason water needs. Farmers who irrigate in excess of that which is needed probably will lose money and valuable water and could lose nutrients which may be leached out of the soil.

The Effect of Rainfall and Past Season Irrigation

Subnormal rainfall was the general rule over the South Plains during 1970 and during the first seven months of 1971. South Plains soils lost moisture during this period and the need for irrigation reached a high level by early summer, 1971. In most areas where water was available, irrigation was heavy and only nonirrigated areas remained dry. Significant rains developed in August and continued through most of October. This moisture added to irrigated fields probably produced over-saturation and brought nonirrigated fields to a high moisture level. Because of cold weather and low evaporation rates, much of this moisture remained in the soil and was evident during the recent soil moisture survey.

Soil Moisture Evaluation Methods

It would be highly preferable to evaluate the soil moisture in every field in the South Plains to determine water needs; but, because this is well beyond the scope of this survey, a wide-spaced sampling technique was used. Up to 12 representative locations were selected in each of the 14 counties in which the amount of available moisture was determined. Since South Plains soils are quite variable in texture and thus water-holding capacity, the values found were compared to the highest values ever found during previous readings. In most cases this high value was recorded during the 1969-70 survey which followed an excessive rainfall period. The technique further involved the best information available on the water-holding capacity of various soils in the area. The accuracy of this technique was proven at two locations where heavy irrigation had been applied. In each case, the additional water needed to wet the soil was indicated to be very near zero.

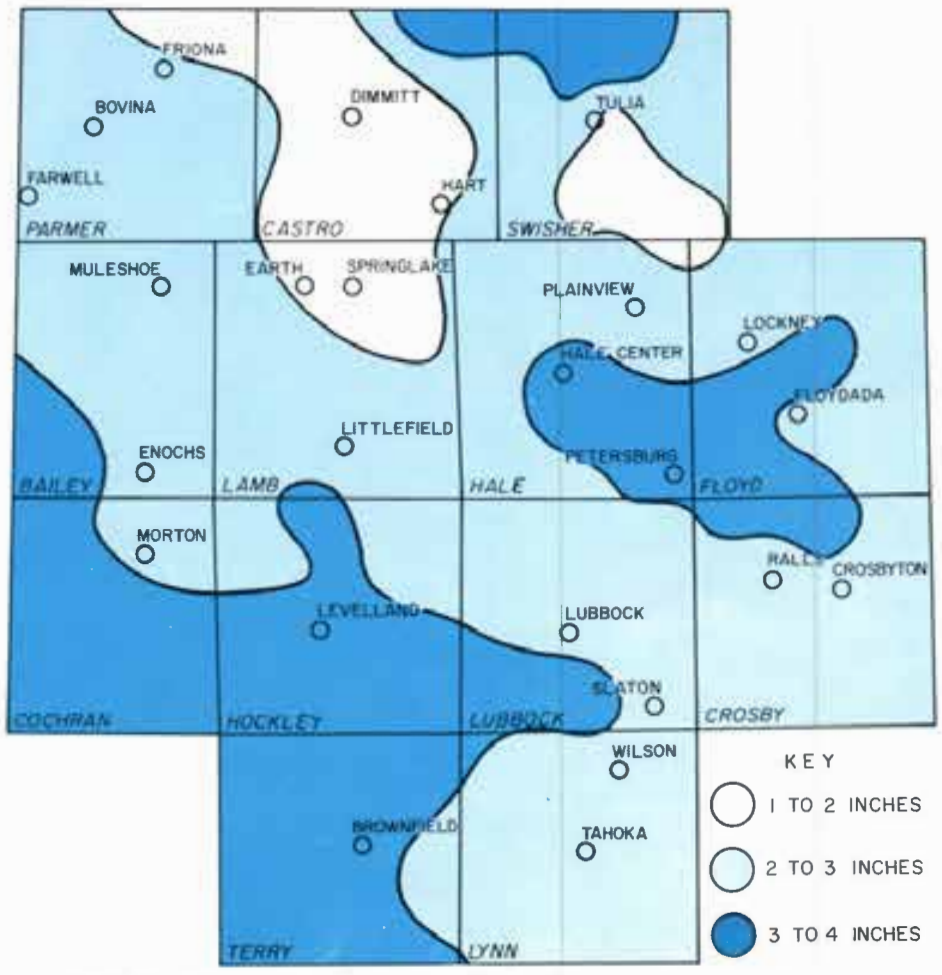
Probabilities of Spring Rainfall

The probability of spring rains is also an important consideration for the farmer as he applies a preplant irrigation. It may be true that we cannot be sure that the coming season will produce above or below normal precipitation but seasonal trends are reliable. The chance for rain does increase rather rapidly starting the last few days of March and continuing well into May. If farmers are to take advantage of this rainfall, they must have room to store the water. This means that the soil must be unsaturated if it is to store even a part of the spring rains.

Rainfall records at Lubbock have been examined and a 5-year period subjected to computer analysis to determine the rainfall probability from March 20 to May 31. A table showing the percent probability for rainfall is presented.

How can this information on rainfall probabilities be applied? Suppose a farmer has put on a light preplant and needs 1½ inches of rain to wet the soil. The rain probability table shows that there is only a 40-percent chance up to April 30, but by May 20 the probability has gone up to 81 percent. This means that eight

—continued on page 4 . . . SOIL



WATER, IN INCHES, NEEDED TO SATURATE THE 0 TO 60-INCH SOIL LAYER

THE WEST TEXAS WATER CONFERENCE

During the noon luncheon of the Tenth Annual West Texas Water Conference, held February 4th in Lubbock, the Officers, Directors and members presented an award to Dr. J. R. (Rex) Johnston for his contributions to water-oriented programs.

Dr. Johnston, Chief of the Southern Plains branch of the Soil and Water Conservation Research Division, Agriculture Research Service, was awarded a citation and the Distinguished Service Award for his "meritorious contribution to the development of conservation and wise use of West Texas water resources". Dr. Johnston's past experience includes Research Soil Scientist for the Soil Conservation Service, U. S. Department of Agriculture, and Assistant to the Director of the Texas Agriculture Experiment Stations, headquartered at Texas A & M University.

Dr. Johnston, a founder of the West Texas Water Institute, presently serves as President of the Soil Conservation Society of America and Chairman of the Research Committee, National Water Resources Association.

Engineer Evaluates

Dr. Dan M. Wells, Professor of Civil Engineering and Director of the Texas Tech University Water Resources Center, presented his findings from research projects conducted at Texas Tech. In his paper, "Water Research at Texas Tech", Dr. Wells expressed his belief that more basic research in water should be conducted by Tech and other state-supported schools.

"I think it is positively sinful that we know so little about the geology of the Ogallala, about the amount of runoff collecting in playa lakes each year, about the actual net withdrawal from storage each year, and about the timing and application rates of water needed to provide the greatest benefits to crop production."

Dr. Wells said the water now stored in the Ogallala is probably worth $6 billion, and "It may be worth ten times as much to the economy of the region. I think we might be able to afford to spend $6 million a year in seeking better ways to utilize it." Toward this end Dr. Wells said the four universities in the state (the University of Texas, Texas Tech, Texas A & M and the University of Houston) are requesting that the next legislature appropriate $500,000 as a line item for water research in the state.

Dr. Wells pointed out that Texas Tech, in cooperation with the High Plains Underground Water District No. 1, is refining a mathematical management model for an unconfined aquifer. He said, "Perhaps the most remarkable thing about this project is the fact that it is needed at this stage of the development of the Ogallala. It should have been started thirty years ago."

The Director also noted that since research in water conservation appears to offer the greatest immediate and long-term economic benefit to the West Texas area, a considerable fraction of the total research effort at Tech is devoted to water conservation. He cited some of the efforts along this line as being research on the Tech farm for the reuse of municipal wastewater for crop irrigation; the investigation of the efficiencies of various cropping systems in the use of available water and light energy for estimating and predicting the optimum irrigation scheduling for various crops; and the development of better design criteria to determine the feasibility of using either trickle irrigation or sprinkler irrigation systems for water conservation.

Dr. Wells concluded, "It seems to me to be unlikely that any water will be imported to this region for at least twenty-five years, perhaps not in the Twentieth Century. I therefore think that we need to be much more concerned than most of us are with stretching the available supply as far as possible."

Economist Reports

In another presentation, James E. Osborn, Associate Professor, Department of Agricultural Economics, Texas Tech University, discussed the economic benefits that are a direct result of irrigation.

His paper, based on a comprehensive economic study of the economy of the state of Texas for 1967, noted that the major source of new capital in the Texas High Plains is agriculture, and that irrigation has significantly increased that production in recent years. Osborn estimated the increase of irrigated acres to be from 250,000 in 1940 to nearly five million acres in 1967. "The economic importance of irrigation to the region was indicated by the value of crop production. In 1967, the value of crop production was $775.8 million. Nearly 82 percent of the value of crop production was associated with irrigation," said Osborn.

For dryland cotton, there was an output of $58.1 million on 447 thousand acres, an average of $129.98 per acre. The figures for irrigated cotton were $254.1 million on 1,208 thousand acres, the average being $210.26 per acre.

Osborn also pointed out that there were $271.4 million of direct and indirect benefits from the net increase in crop production due to irrigation on the High Plains in 1967. Similar figures were calculated for food grains, feed grains and other crops.

Osborn estimated that the benefits from irrigation on crops in the Texas High Plains was $1,561.1 million of the $16,299 million of production of products in the region.

Other speakers whose papers were not available at press time were Lew Seward, planning director of the Texas Water Development Board, Austin; William D. Miller, chairman of the Department of Geosciences, Texas Tech; C. C. Reeves, Jr., associate professor, Geosciences, Texas Tech; Jim Mertes, assistant professor, Texas Tech; R. Nolan Clark, agricultural engineer, Southwestern Great Plains Research Center, Bushland, Texas; Edward A. Hiler, associate professor, Texas A&M University, and Walter Wells, manager, ASCS Office, Lubbock.

Dr. William Lyle, Professor of Agricultural Engineering at Texas Tech and conference program chairman, noted the purpose of the Institute is to bring together those in water research, teaching, extension, farming, and all others interested in conserving water in order to coordinate their efforts in that direction.

Dr. William D. Miller (right) congratulates Dr. Rex Johnston (left) on receipt of the special recognition award presented to Johnston by the West Texas Water Institute. (Photograph courtesy of the Lubbock Avalanche-Journal.)

Shurbet . . .

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appointed him to subsequent six-year terms.

In February, 1970, Shurbet was appointed Chairman of the TWDB by Governor Preston Smith; however, the Governor later forced Shurbet to relinquish that title when he appointed Searcy Bracewell of Houston as the Board's Chairman. At that time Shurbet was elected Vice-Chairman of the Board. Shurbet's present term on the six-man Board extends through 1973, thus making him eligible to be elected by the present Board Members as Vice-Chairman for a two-year term. Bracewell served as Chairman of the TWDB for only the first three months in 1971. During Bracewell's term, Jack Fickessen, then the Acting Executive Director of the TWDB, resigned and the Board's present Executive Director, Harry Burleigh was employed.

The present Chairman of the TWDB, W. E. (Buck) Tinsley of Austin, was appointed to this position by Governor Smith on April 12, 1971. Tinsley's present six-year term on the Board expired on December 31, 1971; however, he will continue to serve in this capacity until reappointed and approved by the Senate or a successor is named by the Governor.

Governor Smith recently reappointed Mr. Robert Gilmore, Dallas, to another six years on the Board. The Members of the TWDB are all appointed for six-year terms by the Governor of Texas. The present Members to the TWDB are Shurbet, Gilmore, John H. McCoy (New Boston), Milton Potts (Livingston), and Carl Illig (Houston).

Shurbet is the farmer-rancher representative on the Board. He is also the only West Texas resident serving on this Board.

Shurbet and his wife, Mildred, were the principal litigants in the now-famous Shurbet vs. United States, cost-in-water-depletion, income-tax allowance case, sponsored by the District. His efforts, along with the efforts of many others, have culminated in millions of dollars in income-tax allowances for groundwater owners in this area.

West Texans are fortunate to have a man of Shurbet's stature representing them on the TWDB.

Reviewing the program of the Tenth Annual West Texas Water Conference are (left to right), Dan Wells, Edward Hiler, Tom Longnecker and Nolan Clark. (Photograph courtesy of the Lubbock Avalanche-Journal.)

SCHOOL FOR WATER WELL DRILLERS

The Lone Star Water Well Association of Texas (LSWWA) will be sponsoring a geology short course for drillers in March. Sessions will begin at 7 p.m., March 23, and will conclude on Sunday, March 26, with a field trip. However, the site for the course has not been established. For specific information on the short course, contact Taylor Virdell, Virdell Bros. Drilling, Llano, Texas.

The sessions on hydrology, general geology, well-site geology, regulatory agencies and information sources will be of interest to all water well drillers. The session on geology of the Central Texas region will be appropriate for those operating in the area of the LSWWA Central Texas region.

The course will be presented by William D. Miller and John P. Brand, Texas Tech University Department of Geosciences; and Ed R. Leggat, U.S. Geological Survey, Austin, Texas. These presentations will be made possible through the efforts of Taylor Virdell, Owen Jensen and other members of the Lone Star Water Well Association.

Course content includes the following:

GROUNDWATER HYDROLOGY
- Basic Principles of Groundwater Hydrology
- Pumping Tests and Interpretation
- Water Quality and Testing
- Pollution and Contamination

GENERAL GEOLOGY
- Common Minerals and Rocks
- Elementary Principles of Stratigraphy
- Recognition of Rocks
- Interpretation of Topographic, Geologic and Structural Maps
- Construction and Interpretation of Hydrologic Maps

WELL-SITE GEOLOGY
- Sample Observation and Logging
- Other Well Logging Techniques

SOURCE OF INFORMATION
- Local, State and Federal Agencies
- Individuals and Consultants

STATE AND FEDERAL REGULATIONS OF INTEREST TO THE WATER WELL DRILLER

GEOLOGY OF CENTRAL TEXAS
- Geology and Stratigraphy of Specific Areas of Interest

Soil Moisture . . .

. . . continued from page 2

years out of ten he will get the 1½ inches or more by that date.

1971-72 Soil Moisture Conditions and Requirements

There is no doubt that summer and fall rains in 1971 wet the soils over the South Plains and were responsible for the high soil moisture levels and relatively low irrigation needs indicated in the chart. The chart shows that about two-thirds of the South Plains fields will be rewet to a depth of five feet by adding less than three inches of water. Small sections to the north need even less water. The drier areas to the southwest need three or four inches to rewet the soil. The slightly drier condition in this area is probably due to somewhat lower rainfall amounts late in the year plus a slightly longer freeze-free season which allowed crops to extract more of the moisture stored by August and September rains.

The importance of a wet soil profile at planting has already been noted. This survey is conducted to help farmers decide whether they need to apply a preplant irrigation and, if so, how much water is required to rewet the soil.

To take advantage of spring rains that may occur, farmers should prepare their land early and delay the preplant irrigation as long as their water supply will permit. Then if two inches of water or less is required to fill the soil profile, there is a reasonably good chance that early spring rains will provide this moisture and rewet listed beds and thus eliminate the need for a preplant irrigation.

Normal furrow irrigation of the permeable Amarillo loam soils often results in the application of excess amounts of water. Smaller amounts can be applied by irrigating alternate furrows and by decreasing the time of irrigation sets and the number of furrows watered per set.

The survey showed relatively uniform moisture conditions within any given area. However, moisture conditions do vary among fields, depending on the soil texture and depth, on the land slope, and on the previous seasons' rainfall, and cropping and irrigation practices.

[1]The authors, O. H. Newton and O. C. Wilke, are, respectively, Advisory Agricultural Meteorologist, National Weather Service for Agriculture, and Assistant Professor of Agricultural Engineering, Texas A&M University Agricultural Research and Extension Center at Lubbock.

Ross Goodwin (left), President of the Board of Directors of the District, chats with representative George Baker at the conclusion of the Legislative hearing in Plainview, on February 18, 1972.

Mahon Speaks . . .

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costing of the project features, allocation of benefit costs, and a determination of repayment requirements. It also includes full consideration of all the environmental aspects of the project plan. All in all it is a very complex and time-consuming process, especially in a project of this magnitude. The final report, if favorable, becomes the basic document used in securing final congressional authorization for the actual construction of the project.

"Of course, it is impossible at this moment for any of us to know what the report of the reconnaissance study will be. It is scheduled for completion by June 30, 1973. We do not know what the recommendations will be, but we are, of course, hoping for the best because our needs are very great and time is running out.

"West Texas and Eastern New Mexico need the project. Texas needs the project. In a larger and very important sense the U.S. needs and must have the project or an adequate alternative to help maintain the economic strength of this nation. I shall, of course, continue to exert every energy at my command in behalf of the project and toward finding a way to meet the water needs of our State and especially of our immediate area."

Other Speakers

The morning program included talks by Don Maughan of Washington, Director of the National Water Resources Council; Col. Floyd Henk, Fort Worth District Engineer for the Army Corps of Engineers, and State Rep. John Allen of Longview, Chairman of the Texas Natural Resources Study Committee.

Afternoon speakers included Norman Flaigg, Area Planning Officer of the Bureau of Reclamation in Austin, and Harry Burleigh of Austin, Executive Director of the Texas Water Development Board. Emcee was State Representative Ralph Wayne.

PERCENT PROBABILITY FOR RAINFALL (equal to or greater than amount stated)

Rainfall	Time Intervals				
(inches)	3-21/4-20	3-21/4-30	3-21/5-10	3-21/5-20	3-21/5-31
1.0	39	57	77	90	94
1.5	23	40	61	81	87
2.0	14	28	50	69	80
2.5	9	19	40	59	70
3.0	5	14	31	48	62
3.5	3	9	24	39	54
4.0	2	6	19	32	47

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 18—No. 3 "THERE IS NO SUBSTITUTE FOR WATER" *March, 1972*

Dan Wells, Morton Bittinger, Ed Altouney, and Orlo E. Childs look over the District's report on the geology of the Phase II Model Study Area.

Model Research Reviewed

High Plains Water District personnel and Texas Tech University researchers met on the Texas Tech campus March 2 to review progress and to discuss problem areas in the cooperative research project on a Mathematical Management Model of the Ogallala Aquifer. (See "Slaton Valley" story in this issue.) Dr. Edward Altouney, Water Research Scientist for the Office of Water Resources Research (OWRR), U. S. Department of the Interior, and Dr. Morton W. Bittinger, President, M. W. Bittinger and Associates, a private consulting engineering firm in Fort Collins, Colorado, were present to advise and comment on aquifer modeling problems, their possible solutions, and to review the overall status of the project.

Altouney, representing the funding agency, OWRR, was briefed on the problems and costs of data acquisition for model application. As a result of this discussion, he suggested a need for the development of an outline for an area considering future use of a groundwater model.

The Tech-District aquifer-model project was initially funded in 1968 by a $98,578.00 grant from OWRR. A similar grant of $100,263.00 was awarded to Tech and the District in 1970 to continue with the second phase of the research.

It has been the objective of the study to develop a digital computer mathematical model that is capable of predicting aquifer response to various schemes of well-field development, management and recharge. The current study is also an attempt to model a section of the aquifer where the irregular base of the aquifer affects the rate and extent of groundwater pumpage.

Anticipating the scheduled August 31st termination of the project, Tech-District personnel discussed a procedural outline for the remaining work objectives and final report.

Meeting with Altouney and Bittinger were Dr. Dan M. Wells, Director of the Texas Tech Water Resources Center; Dr. Bill J. Claborn, Associate Professor of Civil Engineering, and

—continued on page 3 . . . MODEL

Aspects of Aquifer Management *

by
Leslie G. McMillion
and
Diane Olsson

During the past few decades we have witnessed a remarkable change in public attitude toward management of water resources. Most noticeable has been the evolvement of ideas and government-sponsored plans for development and redistribution of water over such large areas as entire states and, in some instances, regional areas that include several states. The most highly publicized situations have involved surface water; however, there have been many significant happenings, both physical and legal, in matters pertaining to groundwater. Perhaps, changes resulting from legislation at the State level have been the most important; but activities of civil courts, especially those regarding groundwater rights adjudication have had a profound impact on groundwater management. When viewed in terms of their nationwide or cumulative effects, these changes are quite impressive.

A person can be benefited in his efforts to understand the various legal and administrative systems that exist on management of groundwater if he first gains a knowledge of the pertinent legal doctrines of water rights and something of their historical background, particularly as they have undergone changes when challenged by the principles of hydrology. A logical approach is to view the legal doctrines as being in two major categories—Common-Law Doctrine and Prior-Appropriation Doctrine.(1)

COMMON-LAW DOCTRINE

The Common-Law Doctrine is often referred to as the English Doctrine because its roots are traceable to English common law. First mention of it in recorded English cases is in *Mason v. Hill* in 1833,(2) which concerned a surface water problem. The doctrine was then applied to a groundwater matter in *Acton v. Blundell* in 1843.(3) Since that time, it has developed principally in England and the eastern United States.

The expressed interest of this doctrine is protection of land-based property rights. Originally, the doctrine considered percolating groundwater as being only a mere ingredient of the soil, and the owner was entitled to remove the water that was there and whatever water came there; he could even pump his water to the extent that it drained all the water from under his neighbor's land with the neighbor having no recourse for action or compensation.(4) Also, the landowner retained ownership of underlying water even if he made no use of it.

From this English rule of absolute ownership, several variations gradually developed as water was less abundant. One of the earliest variations, known as the American Doctrine, or principle of reasonable use, recognized that even though the landowner owned the underlying waters, he could not waste the water but was obliged to put it to reasonable, beneficial or economic use.

The "correlative rights," or California law, is a variation of the reasonable use concept in that it "provides that each overlying property owner of percolating water is entitled to use the water for beneficial purposes, but—and it is in this respect that it differs from the usual statement of the reasonable use theory—in time of shortage 'each may use only his reasonable share.' While under reasonable use, one owner may take all the water, the correlative rights doctrine requires that the water be equitably apportioned."(5) The California courts have developed this law and have described a precedent for adjudicating water rights in a groundwater basin in the Raymond Basin case (*City of Pasadena v. City of Alhambra*).(6,7)

PRIOR-APPROPRIATION DOCTRINE

Where a system based on the Common Law Doctrine grants water rights to owners of lands overlying a groundwater source and no rights to anyone else, the Prior-Appropriation Doctrine provides exclusive rights to those first making use of the water, without regard to whether the user is an owner of overlying property. Under this system, a water right may be lost by nonuse, while under the Common Law system water rights belong unconditionally to the landowners. The essence, therefore, of the Prior-Appropriation Doctrine is that the waters belong to the public; individuals acquire rights to use of water through an appropriation system; the water must be put to "beneficial" use; and the rule of "first in time is first in right" determines which users will be entitled to water in times of scarcity.

The doctrine of Prior-Appropriation was

—continued on page 2 . . . AQUIFER

Frank Rayner, Don Smith, Ed Altouney, Morton Bittinger and Albert Sechrist review a three-dimensional view of the Slaton Channel study area. (Photo courtesy of Texas Tech Information Services.)

THE Cross SECTION

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

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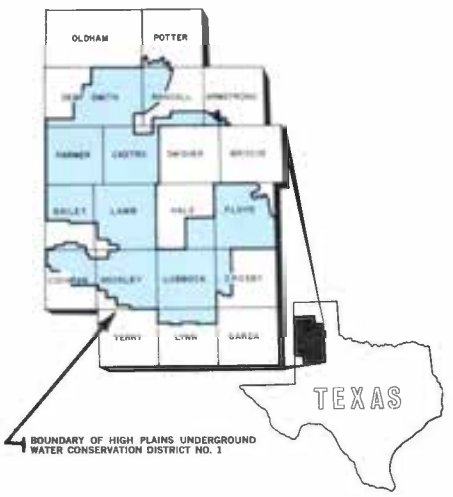

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

Aquifer Management

. . . continued from page 1

developed in Western United States where aridity dictated that water, not land, was of major importance and value. The gold miners of California were one of the first groups to develop rules regarding Prior-Appropriation. Their rules concerned rights to use surface water in working their mining claims. From this beginning, the doctrine spread throughout the Western States where today it is the basis of the principal legal system of water rights.

APPLICATION OF DOCTRINES

Generally speaking, the Western States adopted Prior-Appropriation as the legal doctrine on water rights for surface water several decades before they adopted it for groundwater. During the early development of the West, many considered that a better system for determining surface water rights was needed to assure water for new industries, mining, and the large irrigation projects that were being built by the Bureau of Reclamation and others. During this time groundwater was also being developed and used, but its development was at a different pace because of lagging technology in well construction and pumping equipment, as well as a lack of readily available energy sources for large-capacity pumps. When these missing elements became available shortly after World War II, there was a rapid increase in the rate at which groundwater was developed and put to use. As a consequence, the users and the responsible State governmental agencies and leaders became concerned about the intense competition for groundwater and the undesirable effects such as salt water encroachment, serious water shortages and land subsidence that might develop if overdraft were allowed to occur in groundwater basins. The end result has been that most of the Western States have turned to the Prior-Appropriation Doctrine and rejected the Common-Law concept on groundwater rights. Table 1 (adopted from Water Rights by Beauscher[8]) shows that 12 of the 17 Western States had adopted the Prior-Appropriation Doctrine by 1959, whereas prior to 1939, only five operated under an appropriation system with two of the five having restrictions on the areas wherein the doctrine could be applied.

Since 1959, Montana and Alaska have legislated statutes that provide for appropriation of groundwater.[9] This means that only three of the 17 Western States have not adopted the Prior-Appropriation Doctrine.

Even with the changes reported by Table 1 and above, the pattern of water-rights doctrines still follows a climatic pattern as shown on Figure 1.[10] The Common-Law (landownership) Doctrine persists in the Eastern States where there is generally abundant rainfall and available water supplies, and appropriation is widely accepted in the more arid west.

REGULATORY PROGRAMS

By the very definition of the *absolute ownership* and *reasonable use* concepts of the Common-Law Doctrine, one would expect to find only situations of unlimited groundwater use with essentially no government regulation in the states that adhere to those legal concepts. This is not the case; several states have resorted to regulation of groundwater use under statutes that invoke the police powers of the state to assure the "public welfare, safety, and health." Piper reported that by 1960, Indiana, Iowa, Maryland, Minnesota, New Jersey, and New York had adopted such statutes.[1] Since New Jersey has initiated considerable effort to control pumpage in certain areas, its system is described briefly to illustrate the types of regulation that are possible. The New Jersey statute provides that areas shall be delineated where groundwater diversions exceed or threaten to exceed the natural replenishment rate or where water-quality impairment results. In these areas permits must be issued to users who withdraw more than 100,000 gallons per day; the permit requests may be refused, or if granted, may include stipulations for groundwater conservation.[11]

New Jersey has designated two areas as "protected areas". The manner in which pumping permits are issued produces an effect similar to that achieved by a Prior-Appropriation system. A permit is issued for a limited period and at the end of the period it is renewed if conditions warrant but may be cancelled or reduced if the groundwater basin appears to be fully developed or overdeveloped.[12]

Operating under the principle of *correlative rights*, California has been one of the most active states on aquifer management. The opportunities for successful aquifer management are not happenstance. There are many groundwater basins with high sustained yields; there are pressing water demands in much of the state; financial resources are generally available for development of comprehensive water management programs; and imported water is often available for use in projects where groundwater overdraft has to be corrected.

The Raymond Basin case mentioned earlier not only marked the beginning of a new era for water management in California, it also established an example for determining groundwater rights and establishing management programs in other basins. The case, concerned with a part of the San Gabriel Valley in Los Angeles County, went to court in 1939. Pumpage from the basin had been in excess of the replenishment rate since 1916; the pumpage in 1938 was 31,000 acre-feet, an overdraft of 8,260 acre-feet when compared to the basin's "safe yield" (defined in the case as "an amount equal to the average natural replenishment of the basin").[7] The City of Pasadena, which overlies the basin, requested that the court require total groundwater withdrawals be reduced to the safe yield. The City further requested adjudication of all groundwater rights in the basin since Alhambra and several other cities not overlying the basin had for a long time been pumping water from it.

The court's decision granted rights to continue using water to those who had actually been using it and unused landownership rights ceased to exist. It is interesting to note that overlying users and appropriators (nonoverlying users) were treated equally.

The court held that pumpage from the basin must be reduced to the amount of the safe yield. It stated that the reduction would be shared proportionately by each of the parties involved; consequently, each user's right became about 70 percent of his previous actual pumpage.[12]

The court judgment established an administrative program for the basin to provide that the operation of wells and the groundwater conditions would be adequately monitored. The reduction in total pumpage was attained by Pasadena obtaining water from the Colorado River and by other basin users acquiring permission to pump under Pasadena's rights by paying Pasadena for the proportionate share that they pump; under this arrangement it was not necessary to reduce the annual pumping rate of any user.

The Raymond Basin experience has been followed by other basinwide adjudications.[13] These court judgments are providing the foundation on which some comprehensive aquifer management programs are being conducted; most of these programs are conducted by water districts that have been created by the State Legislature.

Since the underlying purpose of statutes that bring groundwater under the control of an *appropriative system* is eventual regulation and management, every state that has adopted the doctrine either has or is planning administrative programs of implementation. If space allowed, we could cite many excellent case studies; as this is not practical, the best approach seems to be a brief examination of the New Mexico situation since it was the first to develop a wide administrative operation for appropriation of groundwater.

Enactment of the New Mexico statute in 1927 was prompted by public alarm over rapidly declining artesian water levels in the Roswell area. The appropriation system which developed under this statute received general acceptance after it proved useful in controlling and improving conditions there. Presently, the State exerts authority over appropriation of groundwater only in areas specified as groundwater basins.

New Mexico has been a front runner in recognizing that under certain conditions there is a close relationship between groundwater and surface water and that regulatory programs should reflect this relationship.[14]

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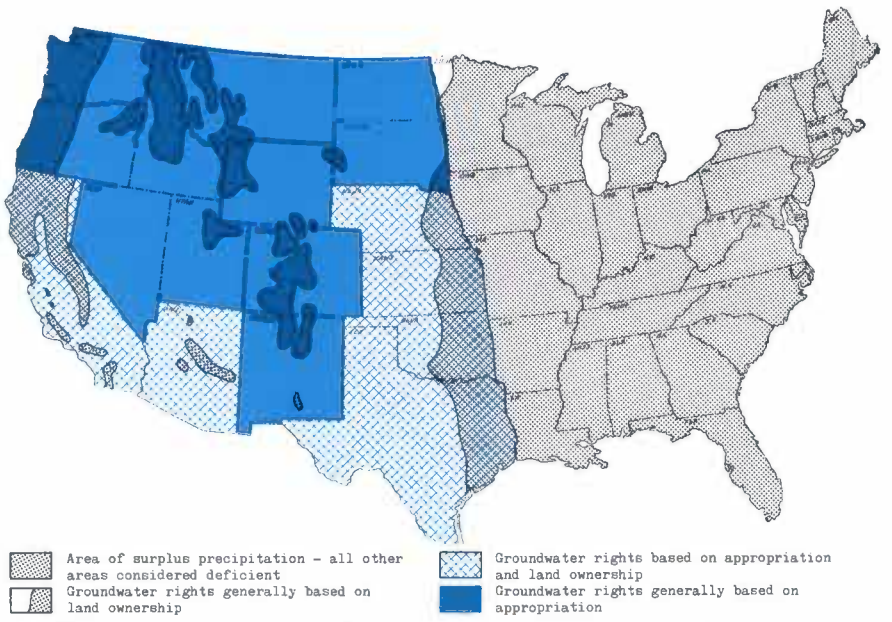


FIGURE 1—Map of the United States showing areas of moisture surplus and deficiency as outlined by Thornthwaite, and basis of groundwater rights by States. (Modified from Thomas, 1955)[10]

"SLATON CHANNEL"—A BURIED VALLEY

by D. D. SMITH

As a part of the data necessary for completion of the Office of Water Resources Research funded project (see companion story in this issue), a brief study of the geology and groundwater hydrology of the "Slaton Channel" area was recently undertaken. The area selected for study consists of a portion of the southeast part of Lubbock County and the northeast part of Lynn County.

The primary objective of the geologic study was to locate the areal and vertical extent of the Slaton Channel, an ancient river valley now filled with rocks of the Ogallala formation. Interpretation of the many well logs throughout the area and on-site inspections and measurements have enabled the preparation of maps depicting the base of the Ogallala formation (bottom of water sands) for the area.

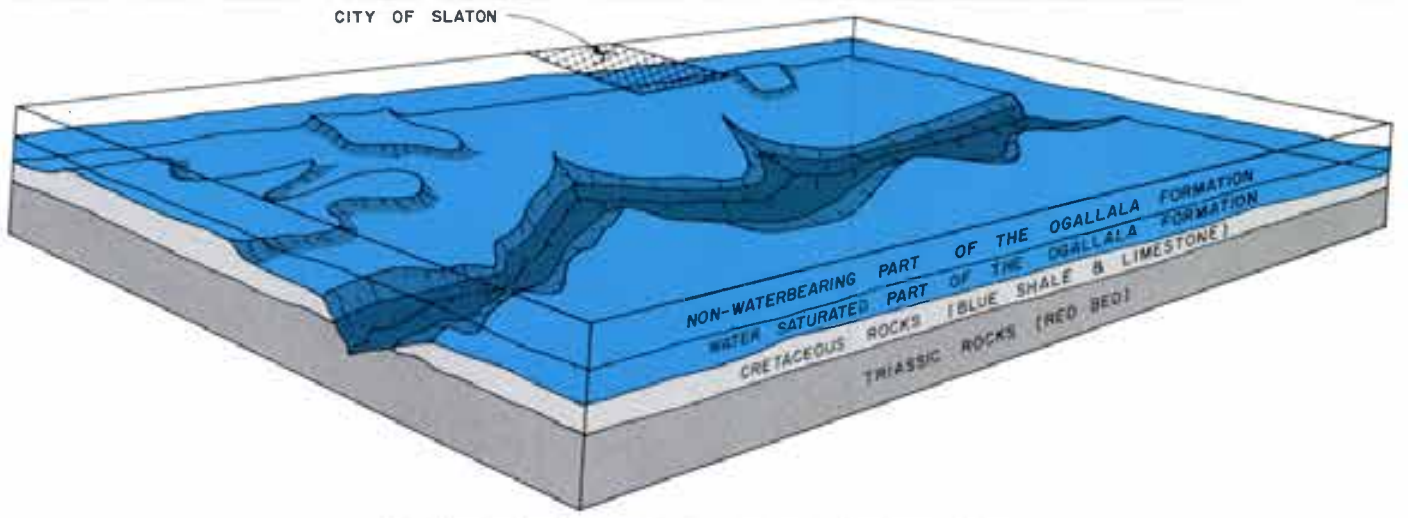
Geologic History

Following the Laramide revolution (mountain-making era), some 60 million years ago, the oceans of Cretaceous time withdrew from this area and the lands were subjected to erosion for the next 50 million years. Major drainage patterns were established on the erosional land surface. An ancient stream cut the valley through the Slaton area during this time interval.

Renewed uplift in the Southern Rocky Mountains accompanied by an increase in rainfall over the region gave birth to new streams carrying heavy loads of sand, gravel and silt from the mountain highlands. As the stream gradients decreased, sands and gravels were deposited along their routes. The remnants of these deposits (the Ogallala formation) constitute the land area known today as the High Plains.

The stream flowing through the Slaton Valley carried the Ogallala sediments eastward. Prior to the end of the Ogallala deposition (about one million years ago) the stream had deposited so much material along its channel and built itself up so high that it had completely filled the valley, and the topographic low forced the stream(s) to shift the route to another location.

Today's land surface gives no indication of the buried valley. Alert observers might note the peculiarity of a number of large-capacity water wells along the tortuous route of the underlying Slaton Channel with small wells on both sides. Instead of the usual 100 feet to the base (yellow or blue shale of Cretaceous age), happy land owners have found that they can drill wells upwards of 300 feet deep before encountering basal rocks of the redbed series (Triassic age rocks). The additional amount of water-saturated sands within the confines of the buried valley makes possible the development of wells with relatively large yields.



GENERALIZED VIEW OF THE "SLATON CHANNEL" AREA

Preplant Irrigation Studied

The following is a news release submitted to *The Cross Section* by Jim Valliant, Research Director for the High Plains Research Foundation, Plainview.

Possibilities of eliminating one of the more inefficient irrigation practices —preplant irrigation, that during March and April spills millions of gallons of ground water across High Plains croplands—are being examined by High Plains Research Foundation scientists.

Results listed in the 1971 research report indicate that preplant irrigations may be limited, and, in some cases, eliminated in favor of irrigation after planting to provide moisture to germinate grain sorghum seed.

According to Jim Valliant, as much as 30 to 60 percent of water applied at preplant is wasted. "This irrigation is usually applied three weeks to one month before planting. And after this irrigation, a farmer usually works his beds with an implement such as rod weeder, bed shaper or rolling cultivator prior to planting.

"Now what happens to the soil every time it is moved? It dries out. As a result, 30 to 60 percent of the water applied is lost before any seed is placed in the soil," he said.

Two main reasons for preplant irrigation are to provide adequate planting moisture on large acreages that will be planted in a relatively short time for a more uniform emergence of the planted crops, and to germinate weed seeds for eliminating by cultural practices.

"This is why a preplant irrigation may remain necessary on fields following grain sorghum production. Farmers still will need to germinate viable sorghum seeds from the previous season to rid their fields of volunteer sorghum problems. However, the preplant on grain sorghum land following other crops might not be necessary," Valliant said.

First Year's Findings

Explaining findings in the first year's study, Valliant said that irrigation for germination after grain sorghum is planted provides immediate water for germinating and growing the plant. It should provide additional amounts of available water during early stages of plant growth. In instances where uniform soil moisture is a problem, irrigation for germination will produce more uniform stands.

And in areas where irrigation water is limited, irrigation at germination would insure water availability when the plants most need it. "Some farmers reported that it was so dry last year that, by the time the preplant irrigation had been completed, the first areas irrigated were too dry to plant," Valliant said.

Irrigation for germination will also help delay water stress periods to fit a farmer's irrigation schedule. For example, in an area that takes 10 days to irrigate, if the area is preplant irrigated and then planted in two or three days, it will all go into moisture stress at the same time. However, if the same area is dusted in and then irrigated for germination, it will go into moisture stress according to the irrigation schedule.

In the Foundation's study, grain sorghum was planted May 19 at 11 pounds of seed per acre in two rows 11 inches apart on 40-inch beds. All cultural practices except the preplant and germination irrigations were the same. Water was allowed to run until the beds were adequately wetted. All irrigations were metered to determine amounts applied, Valliant said.

Greater Returns Noted

Results indicated that equal yields were obtained with lesser amounts of water; therefore, greater returns were noted on the grain sorghum plots that were "watered up", Valliant noted. The germination irrigation area produced 6,861 pounds of grain while using 40.4 inches of irrigation water and returned a net of $87.13 per acre. Under the preplant irrigation method, yields produced were 6,835 pounds per acre with 50.6 inches of irrigation water for a net of $76.07 per acre.

The area receiving irrigation for germination produced 169.8 pounds of grain per inch of water or 34.4 pounds per inch more than the preplant irrigation area.

The lack of moisture during the winter resulted in limited moisture in the root zone. Because of this, the first three irrigations required large amounts of irrigation water with the largest amount applied to the preplant irrigation area. Soil moisture samples taken prior to irrigation showed available moisture levels in the preplant area were 10 to 20 percent below the germination area.

Model Research . . .

. . . continued from page 1

Tommy Knowles and Bill Black, Research Assistants in Civil Engineering. Representing the Water District were Frank Rayner, Manager, Albert Sechrist and Don Smith.

Joining the group at a noon luncheon were Dr. Orlo E. Childs, Vice President for Research and Special Programs at Texas Tech; Dr. Ernst W. Kiesling, Chairman of the Department of Civil Engineering; Dr. Robert M. Sweazy, Assistant Director, Water Resources Center, and Mrs. Rebecca Clinton of the District staff.

Aquifer Management

. . . continued from page 2

New Mexico has had considerable difficulty in applying the Prior-Appropriation Doctrine to the situation in its High Plains region where groundwater, if it is to be utilized at any significant rate, must be treated as a nonrenewable resource since the rate of replenishment is almost nil in comparison to the rate at which water can be withdrawn for many decades from the vast quantity existing in aquifer storage. Thus, these conditions simply do not fit under the strict definition of the Prior-Appropriation Doctrine, which was described by the U.S. Supreme Court as the right to take from the same source and to use the same quantity of water annually forever.(15) Obviously, if water in an aquifer is being depleted, it will not be available annually and forever.

At first the State in administering water rights in the High Plains attempted to restrict pumpage to something close to the estimated annual rate of recharge. If this approach had been adhered to rigidly, the end result would have been, for practical purposes, a nonuse policy. However, after a few years of operation under this approach, the State, in response to public opinion, which was expressed in public hearings and court cases, drastically changed its policies. Adopted in 1952, the revised policy provides that rights to use of groundwater in the designated basins would be determined on the basis that the aquifer would be depleted in 40 years. The calculations concerning rate of depletion and the issuance of water rights are figured for each township.(16)

Now that the New Mexico system in the High Plains is well advanced, it is apparent that the end results will be similar to those being achieved in adjoining areas of Texas where groundwater is considered private property of landowners and where conservation programs are conducted by special underground water conservation districts.(17) The programs of the districts provide for spacing of wells and prevention of water waste—the two basic functions to be provided by the "revised" appropriation system in New Mexico.

Even though the water rights systems being used in both New Mexico and Texas may eventually produce similar results in the High Plains region, the Texas system appears to offer some advantages in an aquifer situation where groundwater depletion is occurring without serious side effects such as salt water encroachment or land subsidence. One apparent advantage is that groundwater management should be less cumbersome since it is conducted by a district run at the local level by local leadership, and funded by local taxation.(18) Another advantage may be that the individual will be careful to use the water as efficiently as possible since he should be mindful that it is his property and that it is being exhausted; this should be especially true for those who bought land knowing that a sizeable portion of the purchase price was payment for the underlying groundwater. This concept has been emphasized by the provision of the Internal Revenue Service that permits a tax allowance for water depletion in the Ogallala Formation of the High Plains, south of the Canadian River.(19)

GROUNDWATER QUALITY

A major factor that has prompted requests for regulation of groundwater is the actual or threatened deterioration of groundwater quality. Programs of aquifer management that go beyond regulation of pumpage have also been requested in some instances. The principal water quality situation that has opened eyes to these needs is salt water encroachment in coastal aquifers. Encroachment constitutes a matter of serious concern in this Nation; the problem has developed in practically every coastal aquifer, and it is or is becoming especially acute in many large metropolitan areas. California has led the way in conducting projects to combat salt water encroachment. The individual programs, under the direction of local districts, include ingenious schemes for regulating pumpage, developing hydraulic salt barriers, artificially recharging the aquifer, and instituting projects for water reclamation and reuse.

Tightening up of state water pollution control laws began a few years ago. While the main objective concerned the effects of waste disposal on surface waters, the laws generally were written broadly enough to include protection of groundwater. The inclusiveness of these revised laws can be appreciated by examining the Suggested State Water Pollution Control Act of the U.S. Public Health Service, which states in its caption that it is "an act to establish a State water pollution control agency, and to authorize the control, prevention, and abatement of pollution of the surface and underground waters of the State."(20)

In 1967, Gindler reported that the laws of three-fourths of the states include all or parts of the provisions of the Suggested State Water Pollution Control Act.(21) Activities of the states on groundwater pollution are numerous and are certainly having a great impact on attention given the importance of groundwater as a resource and the need for regulations and controls that will preserve groundwater quality for optimum use.

Groundwater concerns have been noticeably absent from Federal laws and regulations on water pollution until quite recently. The change was brought about by the recent national awareness of environmental matters. President Nixon has been the able spokesman on this important issue; it was his July 9, 1970, message to Congress that established many of the current ideas and approaches. In this address, he said that the environment should be regarded as a "single, interrelated system" and that it should be dealt with accordingly in pollution control matters. He emphasized that the impact of pollutants on the "total environment" should be the measure of a successful program.(22)

Drafts of a bill in the House and the Senate of the U.S. Congress to revise the Federal Water Pollution Control Act reflect many of the ideas expressed by President Nixon. It appears that the bill, if enacted, will give considerable emphasis to groundwater situations and particularly will point out that attempts of Federal agencies to alleviate obvious pollution problems should be mindful of the less obvious areas of the environment, such as subsurface waters and the oceans, to insure that these are properly protected.

CONCLUSIONS

In conclusion, the legal and regulatory aspects of aquifer management are fairly complex because they represent a continually changing process of man's efforts to manage effectively a resource which he can neither see nor feel while it is in its native environment.

The advent of sound hydrologic principles and better subsurface geologic methods has provided an understanding of the behavior of groundwater in the several different environments in which it can occur and the types of management techniques needed for maximum utilization. Many well-trained hydrologists have worked with water users and government officials in the structuring and initiation of legal systems and management operations. These efforts have been aided by the use of electrical analog models and mathematical models for digital computers, since these give the layman more confidence in knowledge derived from the science of hydrology.

In the future, we can expect greater and greater emphasis on conservation of our total water resources, and we can anticipate that legislative statutes and management programs will reflect to a high degree the present national concern over preservation and improvement of our total environment.

TABLE 1

THE TREND IN DOCTRINES APPLICABLE TO PERCOLATING GROUNDWATER(8)

1939

English Law	*Reasonable Use*	*Correlative Rights*	*Appropriation*
Arizona	Nebraska	California	Colorado
Kansas	North Dakota		Idaho
Montana	Oklahoma		New Mexico
Nevada	Washington		Oregon
North Dakota			Utah
South Dakota			
Texas			
Wyoming			
Alaska			

1959

Montana	Arizona	California	Colorado
Texas	Nebraska		Idaho
Alaska			Kansas
			Nevada
			New Mexico
			North Dakota
			Oklahoma
			Oregon
			South Dakota
			Utah
			Washington
			Wyoming

REFERENCES

1. Piper, Arthur M., "Interpretation and Current Status of Ground-Water Rights," U.S. Geological Survey Circular 432, p. 1, 1960.
2. *Mason v. Hill,* 5 Barn. Adol. 1, 110 Eng. Reprint 692, 1833.
3. *Acton v. Blundell,* 12 M. W. 324, 1843.
4. *Bassett v. Salisbury Mfg. Co.,* 43 N. H. 569, 82 Am. Dec. 179, 1862.
5. Sax, Joseph L., *Water Law: Cases and Commentary,* Boulder, Colorado, Pruett Press, Inc., 1st Ed., p. 252, 1965.
6. *City of Pasadena v. City of Alhambra,* 33 Calif. 2nd. 908, 207 P. 2d 17, 1949.
7. Bookman, "Procedures for Adjudication of Rights to Ground Water in California," Presented to California Irrigation Districts Association Convention, May 9, 1956.
8. Beuscher, J. H., *Water Rights,* Madison, Wisconsin, College Printing and Typing Co., Inc., pp. 1-63, 1968.
9. Clark, Robert E., and others, *Water and Water Rights,* Vol. 1, Indianapolis, Indiana, Allen Smith Co., p. 165, 1967.
10. Thomas, H. E., "Water Rights in Areas of Ground-Water Mining," U.S. Geological Survey Circular 347, 1955.
11. *New Jersey Laws of 1947,* Chapter 375.
12. McGuinness, C. L., "Water Law with Special Reference to Ground Water," U.S. Geological Survey Circular 117, 1951.
13. Sax, Joseph L., *Water Law, Planning and Policy: Cases and Materials,* Indianapolis, Indiana, The Bobbs-Merrill Co., Inc., p. 472-476, 1968.
14. Reynolds, S. E., J. C. Yates, and P. D. Akin, "Coordinated Administration of Surface and Ground Water Under the Doctrine of Prior Appropriation," International Conference on Water for Peace, Washington, D.C., May 23-31, 1967.
15. *Arizona v. California,* 283 U.S. 423, 1931.
16. Flint, F. Harlan, "Groundwater Law and Administration: A New Mexico Viewpoint," Proceedings of the Fourteenth Annual Rocky Mountain Mineral Law Institute, Tucson, Arizona, July 13, 1968.
17. Rayner, F. A., and L. G. McMillion, "Underground Water Conservation Districts in Texas," Texas Board of Water Engineers, M60, August, 1960.
18. Rayner, F. A., "The Local Institution For Groundwater Basin Management," *The Cross Section,* October, 1971.
19. Rayner, F. A., "Ground Water Management on the High Plains of Texas," Presented to the American Society of Civil Engineers, Irrigation and Drainage Division, Austin, Texas, November 5, 1969.
20. Division of Water Supply and Pollution Control, Public Health Service, Department of Health, Education, and Welfare, *Suggested State Water Pollution Control Act,* (Revised), 1965.
21. Gindler, Burton J., "Water Pollution and Quality Controls," Vol. III of *Waters and Water Rights,* Indianapolis, Indiana, Allen Smith Co., p. 301, 1967.
22. *Environment Reporter—Federal Laws,* pp. 21:0261-21:0278, 1971.

*Presented at the national meeting of the American Institute of Chemical Engineers, Dallas, Texas, February 22, 1972.

NOTE: *The authors, Leslie G. McMillion and Diane Olsson, are, respectively, Geologist for the National Ground Water Research Program, Environmental Protection Agency in Ada, Oklahoma, and Water Quality Standards Analyst for the Water Quality Standards Division of the Environmental Protection Agency in Washington, D.C.*

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THE Cross SECTION

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

Volume 18—No. 4 "THERE IS NO SUBSTITUTE FOR WATER" *April, 1972*

THE ANNUAL WATER STATEMENT, 1971-1972

By D. D. SMITH

In the month of January, personnel of the District and the Texas Water Development Board (TWDB) measured the depths to water in "observation" wells located in the 15 counties comprising the High Plains Underground Water Conservation District No. 1. Currently there are 809 wells in the program of which 756 (93.5 percent) were measured. District personnel measured the wells in Bailey, Floyd, Hockley, Lamb and Lubbock Counties. Adverse weather conditions hampered activities for several days, but the District staff was able to measure 413 of the 430 "current" wells (those maintained in the records as being measurable, and subject to annual measurements) in the aforementioned counties and had completed the task in less than two weeks. TWDB personnel measured the wells in Armstrong, Castro, Cochran, Crosby, Deaf Smith, Hale, Lynn, Parmer, Potter and Randall Counties. They were able to measure the depth to water in 343 of the 379 wells scheduled for measurement in these counties.

On the following pages, statistical tables and location maps are presented for the wells. The tables include the depth to water measurements for 1971 and 1972, the decline (or rise) in water level during the past year, the average annual decline during the period from 1962 to 1972, and the standard deviation of all measurements. The average annual decline value represents the 1962 depth to water measurement subtracted from the 1972 depth to water measurement, and the difference divided by the number of intervening years (10). In those instances where a 1962 and/or 1972 measurement is not available, the average value is calculated using the earliest (after 1962) and latest available measurements, divided by the number of intervening years. Plus signs (+) indicate a rise in the water level. The standard deviation values represent the disagreement that was, on the average, common to every annual change in water level for each well, when compared to the average annual change in the depth to water in that well.

A small standard deviation value indicates that the depth to water measurements in the well follow a smooth pattern of consistent change. In most instances, the accuracy of the measurements could be interpreted as being more reliable. A large standard deviation value would suggest questionable or atypical measurements. The values are included herein *only* as a guide to users of these data, and validity of the measurements must remain a judgment decision after consideration of all controlling factors.

Values given as the net change in the water level for each observation well are not to be used for the calculation of depletion allowances. The only acceptable depletion guidelines for calculating cost-in-water-depletion are the contoured county maps approved by the Internal Revenue Service. These contour maps are prepared annually and must adjust for water level rises and account for all previous declines assigned to each well. The amount of actual decline (or rise) and the amount of assigned decline must be kept near a zero balance difference.

Validity of Measurements

The depths to water, listed in the tables, are taken from field measurement records. No attempt has been made to delete apparently inconsistent or anomalous measurements. A limited number of measurements are listed which may not be representative of the static water level in the well to which it is accredited. Federal agricultural programs favoring the growing (and watering) of winter wheat have, in some areas, changed the recovery time period so that the static water level may not have been reached in early January. Insufficient recovery time was noted in several Floyd County observation wells.

The table, "Summary of Water Level Measurements" (see page 8), presents the minimum and maximum depths to water as measured in 1962 and 1972. The table also gives the average depth to water by county for the years 1962 and 1972. Each county is experiencing a lowering of its water table. Those counties with the largest available supply, and, consequently, the largest pumpage, continue to experience the largest average decline of the water table.

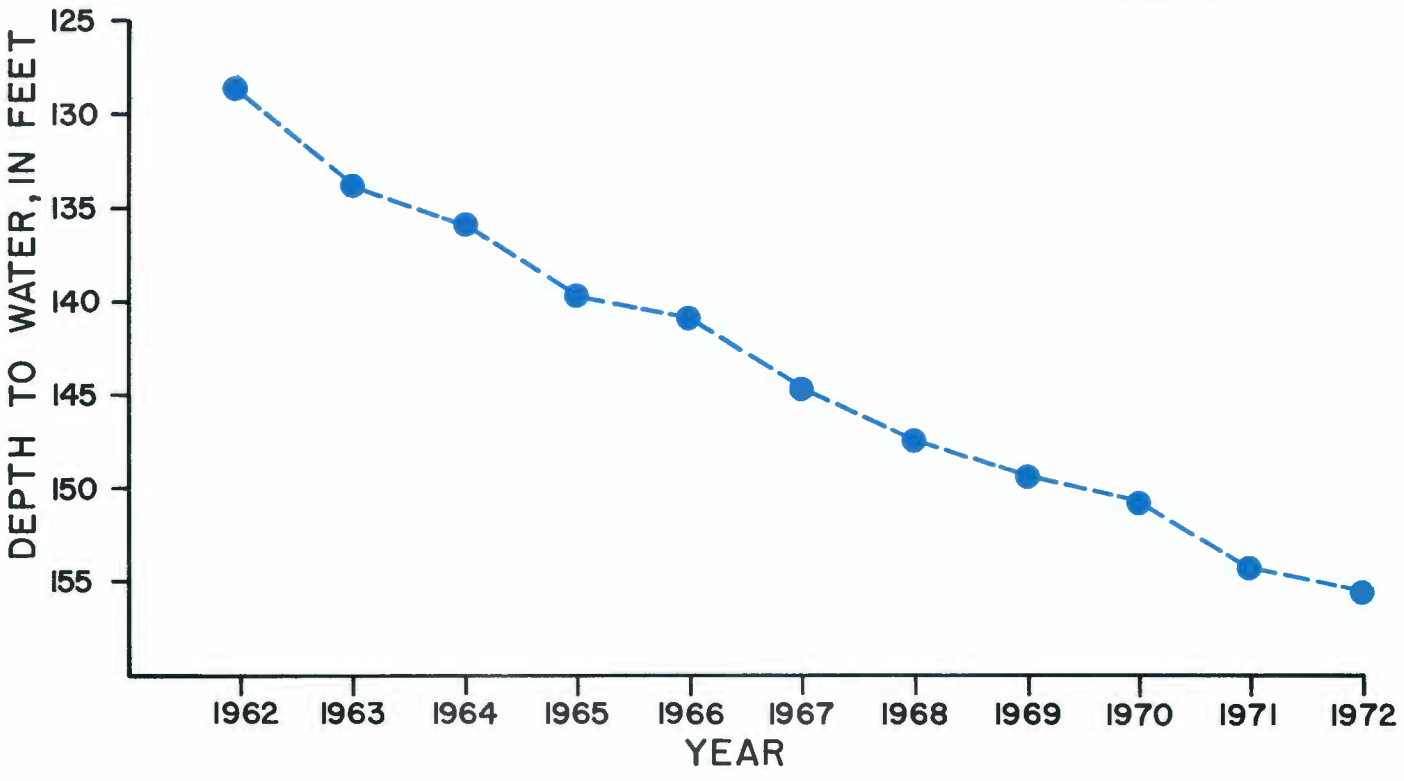
The table, "Average Decline of Water Table", presents the average annual decline in water levels of all wells within each county for the period 1962 to 1972 and the decline for the past year, 1971 to 1972. It can be noted that 10 counties indicate declines smaller than their long term averages. Relatively heavy rainfall late in the 1971 growing season probably reduced overall pumpage, and allowed for a longer period for the recovery of the cone of depression developed around the observation wells during the irrigation season.

AVERAGE DECLINE OF WATER TABLE

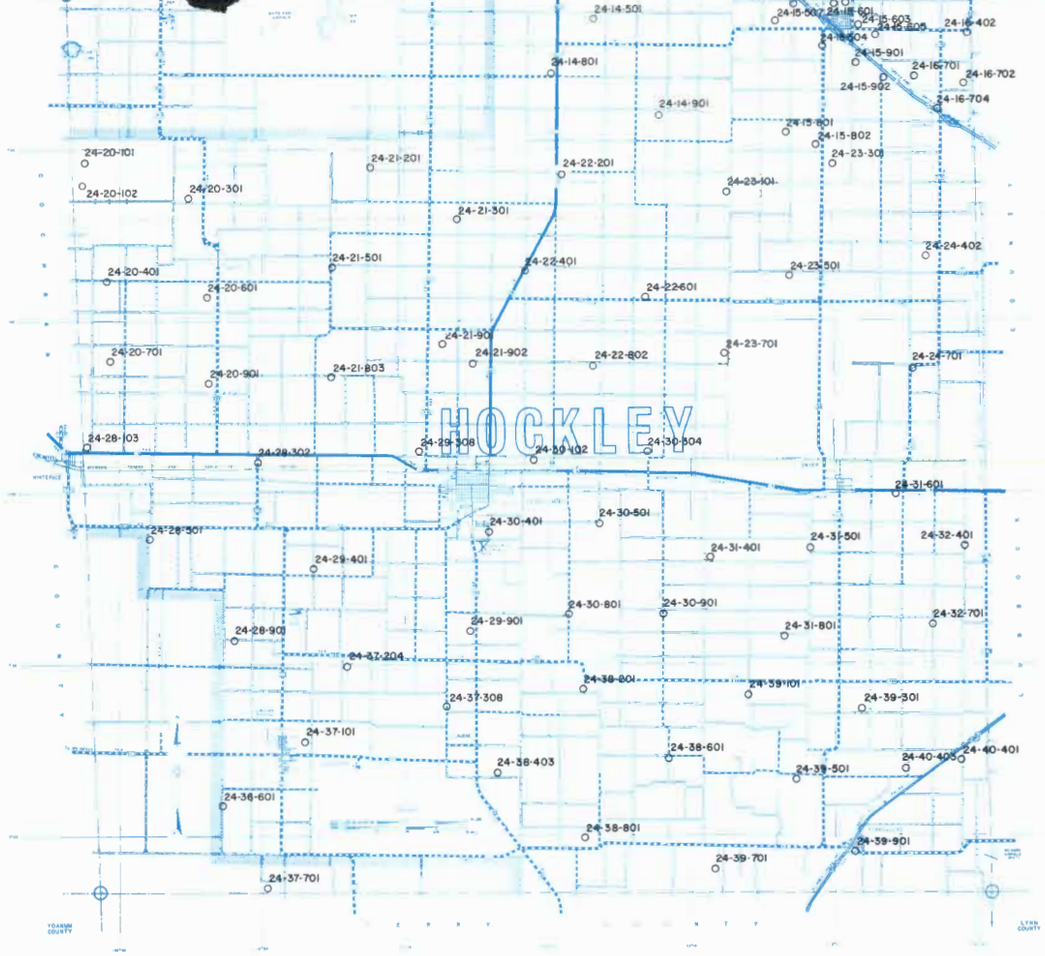
County	Average Decline ft. 1971-1972	Average Annual Decline ft. 1962-1972
Armstrong	2.02	1.86
Bailey	1.42	1.47
Castro	2.15	3.37
Cochran	3.29	1.31
Crosby	3.17	3.76
Deaf Smith	2.25	2.98
Floyd	2.28	3.59
Hale	1.86	2.95
Hockley	1.07	1.22
Lamb	2.53	2.18
Lubbock	1.93	1.66
Lynn	1.89	.72
Parmer	.83	3.67
Potter	+ .26	3.26
Randall	.42	2.16

During 1971, Potter County was the only county to post a net rise in the water table. However, since two of the county's four observation wells were not measured, no particular significance should be attached to the county's average value. Only one well was measured for both years (1971-1972) and, consequently, the average is attributable only to this one well's performance. Cochran County's water table appears to have been lowered more than any other area during the past year. However, since the calculated average decline of 3.29 feet is more than 250 percent larger than the county's long term average, these data should not be considered factual until

—continued on page 8 . . . WATER



Hydrograph of the Average Depth to Water for all Observation Wells within the District.



HOCKLEY COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
24-14-501	107.52	108.37	0.85	0.326	1.19
24-14-801	54.67	51.87	+2.80	0.160	2.82
24-14-901	99.98	100.44	0.46	0.501	2.83
24-15-501	76.17	76.16	+0.01	1.226	1.62
24-15-504	67.03	69.61	2.58	0.771	1.49
24-15-507	78.98	80.21	1.23	0.590	5.02
24-15-601	105.98	107.48	1.50	1.746	2.64
24-15-602	118.68	120.78	2.10	1.892	0.78
24-15-603	117.14	118.67	1.53	2.035	1.61
24-15-605	96.65	96.99	0.34	1.273	1.13
24-15-801	0.0	142.81	0.0	0.716	2.89
24-15-802	179.29	180.75	1.46	0.745	2.37
24-15-901	44.15	44.54	0.39	0.334	3.25
24-15-902	45.67	46.76	1.09	1.212	5.12
24-16-402	128.88	131.72	2.84	0.743	1.49
24-16-701	64.28	65.70	1.42	0.732	1.28
24-16-702	95.67	96.10	0.43	1.063	3.51
24-16-704	104.06	105.81	1.75	2.643	6.73
24-20-101	158.32	159.75	1.43	3.038	6.63
24-20-102	144.24	147.45	3.21	2.741	4.14
24-20-301	132.96	133.57	0.61	1.836	5.64
24-20-401	123.33	122.79	+0.54	1.171	2.46
24-20-601	151.08	151.84	0.76	1.860	3.51
24-20-701	147.98	148.05	0.07	0.586	1.18
24-20-901	144.29	144.28	+0.01	2.086	2.24
24-21-201	45.11	44.53	+0.58	0.664	1.37
24-21-301	92.83	93.74	0.91	1.187	1.05
24-21-501	154.79	153.37	+1.42	1.619	4.00
24-21-803	160.98	163.37	2.39	2.234	2.49
24-21-901	158.41	159.71	1.30	1.794	1.29
24-21-902	171.87	175.62	3.75	2.510	2.77
24-22-201	76.79	77.15	0.36	0.291	2.04
24-22-401	86.32	86.93	0.61	0.325	0.71
24-22-601	102.32	103.17	0.85	0.547	1.11
24-22-802	122.52	124.46	1.94	1.058	2.47
24-23-101	110.01	111.10	1.09	0.683	0.51
24-23-301	197.87	202.30	4.43	2.370	1.99
24-23-501	106.35	107.57	1.22	0.744	2.23
24-23-701	104.80	106.18	1.38	0.869	0.92
24-24-402	154.32	156.00	1.68	1.634	2.10
24-24-701	125.75	126.58	0.83	0.261	0.73
24-28-103	147.41	146.94	+0.47	0.914	2.68
24-28-302	124.83	125.16	0.33	+0.304	1.74
24-28-501	150.94	150.81	+0.13	0.761	5.98
24-28-901	163.41	165.51	2.10	1.621	2.61
24-29-308	148.43	148.28	+0.15	1.871	1.83
24-29-401	141.36	143.17	1.81	0.456	4.02
24-29-901	189.51	192.72	3.21	2.238	2.08
24-30-102	138.74	141.34	2.60	1.854	2.56
24-30-304	107.52	107.68	0.16	1.289	1.02
24-30-401	129.71	131.70	1.99	1.453	1.60
24-30-501	126.09	128.32	2.23	1.788	1.51
24-30-801	173.85	174.22	0.37	1.279	1.61
24-30-901	156.82	158.21	1.39	1.460	2.81
24-31-401	0.0	134.70	0.0	1.960	1.41
24-31-501	82.60	80.59	+2.01	0.770	1.27
24-31-601	118.55	119.33	0.78	0.552	1.24
24-31-801	147.12	147.94	0.82	0.728	0.84
24-32-401	103.72	105.03	1.31	0.553	1.89
24-32-701	115.82	116.81	0.99	0.563	1.59
24-36-601	146.53	146.72	0.19	0.313	3.86
24-37-101	148.49	149.26	0.77	1.572	2.34
24-37-204	148.39	150.96	2.57	1.511	1.20
24-37-308	148.21	149.03	0.82	2.053	4.09
24-37-701	151.99	152.52	0.53	0.152	0.77
24-38-201	173.54	173.65	0.11	2.132	1.32
24-38-403	163.10	163.36	0.26	1.286	1.05
24-38-601	136.28	138.96	2.68	1.916	2.54
24-38-801	166.01	166.14	0.13	1.248	2.18
24-39-101	153.33	157.36	4.03	1.526	2.20
24-39-301	151.05	151.94	0.89	1.071	1.12
24-39-501	135.77	138.43	2.66	0.960	2.98
24-39-701	119.07	120.23	1.16	1.462	2.25
24-39-901	96.59	96.95	0.36	0.625	0.48
24-40-401	143.23	143.46	0.23	1.194	1.29
24-40-403	147.72	148.55	0.83	0.976	1.70

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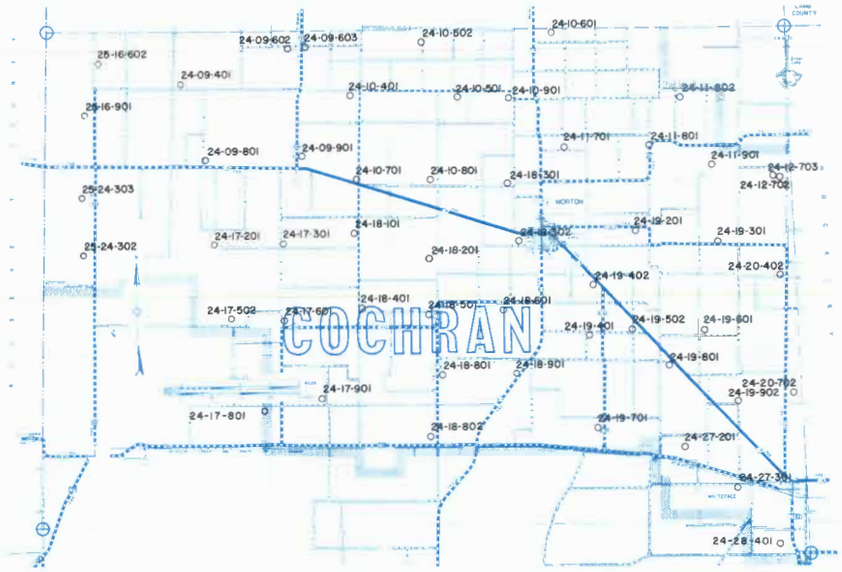

COCHRAN COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
24-09-602	121.24	122.89	1.65	1.921	1.41
24-09-603	116.05	118.34	2.29	1.670	2.28
24-09-801	122.00	122.65	0.65	0.189	0.77
24-09-901	102.19	0.0	0.0	0.962	1.73
24-10-401	110.50	113.51	3.01	0.721	1.35
24-10-501	94.20	97.06	2.86	0.410	0.99
24-10-502	86.60	87.54	0.94	0.105	0.77
24-10-601	91.79	91.80	0.01	0.907	0.92
24-10-701	158.24	168.57	10.33	2.041	4.10
24-10-801	134.02	141.96	7.94	1.798	2.60
24-10-901	93.33	94.85	1.52	0.313	1.17
24-11-701	125.07	127.55	2.48	0.533	1.44
24-11-801	107.03	106.47	+0.56	0.304	1.20
24-11-802	110.69	113.29	2.60	1.505	1.46
24-11-901	124.55	125.68	1.13	1.059	1.02
24-12-702	147.60	150.52	2.92	3.041	3.70
24-12-703	141.37	143.12	1.75	2.589	3.66
24-17-201	143.32	141.08	+2.24	+1.583	1.12
24-17-301	142-53	147.91	5.38	2.056	1.75
24-17-502	160.54	160.75	0.21	0.243	3.74
24-17-601	149.39	151.26	1.87	1.483	1.73
24-17-801	152.20	156.42	4.22	0.280	2.55
24-17-901	166.79	172.95	6.16	1.317	4.36
24-18-101	150.28	150.70	0.42	0.740	0.61
24-18-201	174.68	175.89	1.21	1.855	1.54
24-18-301	130.60	135.96	5.36	1.014	1.75
24-18-302	160.30	172.25	11.95	2.952	3.68
24-18-401	149.11	156.60	7.49	1.854	3.15
24-18-501	194.35	195.72	1.37	+0.020	1.13
24-18-601	175.14	181.56	6.42	3.050	3.25
24-18-801	189.08	191.34	2.26	1.739	8.00
24-18-802	167.38	0.0	0.0	0.479	2.19
24-18-901	113.87	114.98	1.11	+0.039	1.24
24-19-201	145.91	146.88	0.97	1.276	2.42
24-19-301	167.52	168.81	1.29	1.844	1.73
24-19-401	150.41	162.66	12.25	2.209	3.82
24-19-402	145.12	147.25	2.13	1.422	1.78
24-19-502	167.29	175.97	8.68	2.379	4.25
24-19-601	155.77	163.66	7.89	1.909	2.32
24-19-701	162.69	161.92	+0.77	1.134	4.69
24-19-801	162.75	165.27	2.52	2.092	2.13
24-19-902	0.0	169.57	0.0	0.0	0.0
24-20-402	149.10	152.91	3.81	1.830	1.59
24-20-702	154.71	155.16	0.45	1.188	2.76
24-27-201	182.80	192.14	9.34	2.344	3.06
24-27-301	180.77	180.50	+0.27	0.384	0.60
24-28-401	186.58	196.25	9.67	2.988	3.88
25-16-602	73.44	74.49	1.05	1.227	0.13
25-16-901	90.38	91.16	0.78	0.063	0.62
25-24-302	145.10	148.93	3.83	0.065	2.28
25-24-303	124.82	124.37	+0.45	+0.662	0.32

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THINK

WATER CONSERVATION

ARMSTRONG COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
11-12-401	117.95	119.06	1.11	1.156	0.61
11-12-601	107.90	110.15	2.25	0.935	1.55
11-12-701	134.40	138.01	3.61	2.536	3.99
11-12-702	150.50	0.0	0.0	3.415	3.06
11-12-801	143.98	143.59	+0.39	1.879	3.66
11-12-802	147.80	151.98	4.18	2.163	3.68
11-12-803	124.40	127.55	3.15	1.865	1.33
11-12-901	125.10	126.56	1.46	1.756	0.86
11-13-701	108.80	109.56	0.76	1.408	2.20

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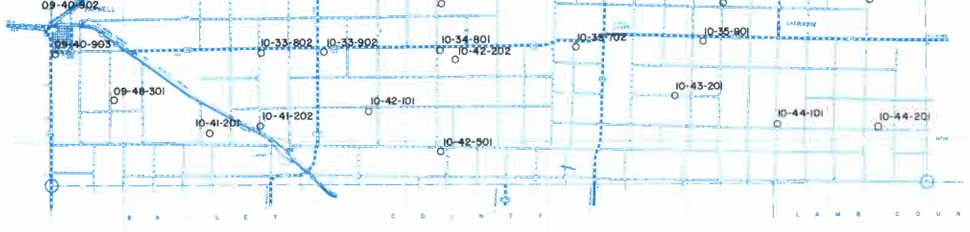

PARMER COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
09-24-601	325.19	325.40	0.21	3.341	4.96
09-32-901	231.37	238.75	7.38	0.835	5.24
09-40-901	256.90	260.21	3.31	2.969	3.29
09-40-902	240.76	241.08	0.32	4.794	3.08
09-40-903	252.19	0.0	0.0	5.090	11.44
09-48-301	232.98	217.29	+15.69	1.542	11.46
10-17-301	192.53	193.38	0.85	0.297	6.82
10-17-401	274.13	274.09	+0.04	2.149	4.32
10-17-501	258.83	261.53	2.70	3.153	1.57
10-18-501	299.63	300.24	0.61	4.149	2.40
10-18-701	251.63	248.58	+3.05	4.523	4.12
10-18-901	253.35	251.20	+2.15	4.352	5.22
10-19-101	271.63	273.82	2.19	4.182	1.24
10-19-301	265.89	268.90	3.01	3.625	6.65
10-19-602	224.64	229.61	4.97	3.000	1.50
10-20-401	227.80	231.73	3.93	4.421	2.73
10-20-502	172.31	0.0	0.0	2.330	4.03
10-25-101	0.0	290.81	0.0	3.448	14.46
10-25-301	295.27	296.91	1.64	2.141	2.00
10-25-501	169.04	170.74	1.70	0.931	1.31
10-25-701	256.78	262.06	5.28	4.812	3.88
10-26-101	0.0	317.38	0.0	4.787	6.65
10-26-301	309.42	315.40	5.98	3.587	3.05
10-26-601	279.53	284.47	4.94	4.025	0.96
10-26-701	207.22	212.40	5.18	3.100	2.57
10-26-801	222.89	222.05	+0.84	3.692	9.59
10-27-102	262.91	265.01	2.10	4.854	1.96
10-27-301	302.32	300.46	+1.86	4.831	3.27
10-27-501	328.29	334.00	5.71	4.128	3.76
10-27-901	247.29	249.02	1.73	4.102	1.81
10-28-201	274.15	275.89	1.74	3.368	5.87
10-28-501	286.13	290.30	4.17	4.204	2.52
10-33-101	278.01	282.23	4.22	4.398	5.28
10-33-301	261.87	241.91	+19.96	3.428	11.41
10-33-401	277.60	281.49	3.89	2.198	3.76
10-33-601	282.28	281.85	+0.43	4.340	2.49
10-33-802	207.13	203.61	+3.52	2.912	3.15
10-33-902	212.42	203.14	+9.28	3.716	5.31
10-34-102	211.14	214.54	3.40	2.598	0.53
10-34-301	221.39	224.30	2.91	3.750	7.15
10-34-401	284.47	277.67	+6.80	4.282	7.29
10-34-801	207.66	211.85	4.19	3.220	6.89
10-34-802	235.47	243.01	7.54	4.197	3.86
10-35-304	209.49	207.42	+2.07	3.209	2.39
10-35-401	246.54	240.13	+6.41	3.070	6.24
10-35-501	226.20	0.0	0.0	3.497	5.66
10-35-601	206.48	219.89	13.41	5.029	3.28
10-35-702	214.86	218.33	3.47	1.227	5.63
10-35-901	242.99	245.10	2.11	4.296	5.49
10-35-902	246.15	241.60	+4.55	4.870	5.84
10-36-101	212.80	208.92	+3.88	4.312	4.16
10-36-601	193.21	203.92	10.71	5.340	3.18
10-36-801	187.85	190.07	2.22	3.325	8.39
10-41-201	170.29	170.75	0.46	3.823	5.97
10-41-202	155.91	0.0	0.0	3.704	0.31
10-42-101	176.31	178.48	2.17	4.180	10.21
10-42-202	197.96	201.73	3.77	3.793	2.07
10-42-501	153.39	156.86	3.47	3.397	1.25
10-43-201	205.03	205.83	0.80	4.198	7.07
10-44-101	194.03	181.16	+12.87	5.053	9.75
10-44-201	0.0	201.46	0.0	7.750	0.81

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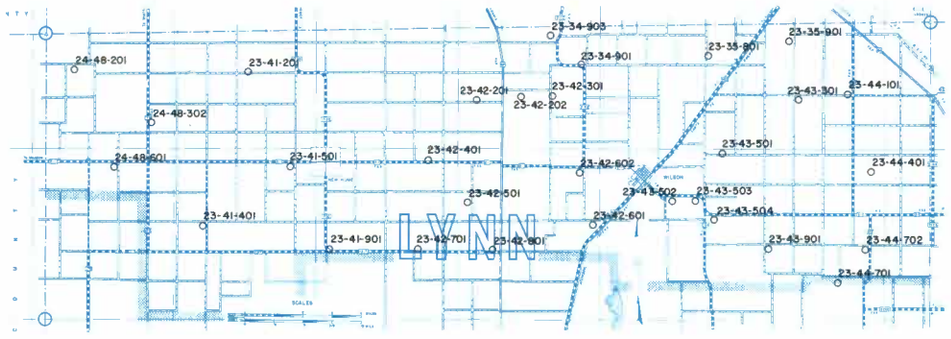

LYNN COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
23-34-901	138.87	141.22	2.35	2.161	1.64
23-34-903	148.18	152.96	4.78	1.924	6.31
23-35-801	87.69	87.68	+0.01	0.630	4.50
23-35-901	91.23	97.06	5.83	1.042	3.29
23-41-201	105.96	103.69	+2.27	0.986	3.43
23-41-401	90.38	93.73	3.35	1.005	1.43
23-41-501	74.67	83.16	8.49	1.459	3.02
23-41-901	128.62	130.26	1.64	0.729	1.49
23-42-201	128.94	129.41	0.47	0.045	1.52
23-42-202	124.34	124.77	0.43	0.434	4.06
23-42-301	108.97	109.78	0.81	0.710	2.86
23-42-401	115.61	116.02	0.41	0.739	2.48
23-42-501	100.02	107.02	7.00	1.142	4.71
23-42-601	46.78	46.63	+0.15	0.552	2.97
23-42-602	84.18	87.56	3.38	0.838	1.58
23-42-701	104.99	106.97	1.98	+0.640	3.38
23-42-801	69.76	70.32	0.56	0.553	3.39
23-43-301	28.41	33.60	5.19	0.771	4.43
23-43-501	71.25	72.83	1.58	0.288	2.48
23-43-502	78.77	79.13	0.36	0.493	3.98
23-43-503	86.11	85.95	+0.16	0.289	1.00
23-43-504	77.72	82.70	4.98	0.702	1.67
23-43-901	60.99	60.49	+0.50	+0.425	2.16
23-44-101	65.49	64.38	+1.11	0.624	4.10
23-44-401	42.19	42.70	0.51	+1.624	4.85
23-44-701	82.92	82.77	+0.15	4.847	6.27
23-44-702	32.97	29.97	+3.00	+0.761	2.82
24-48-201	101.33	101.72	0.39	1.002	1.53
24-48-302	109.02	116.92	7.90	1.786	3.60
24-48-601	92.33	94.00	1.67	1.028	1.38

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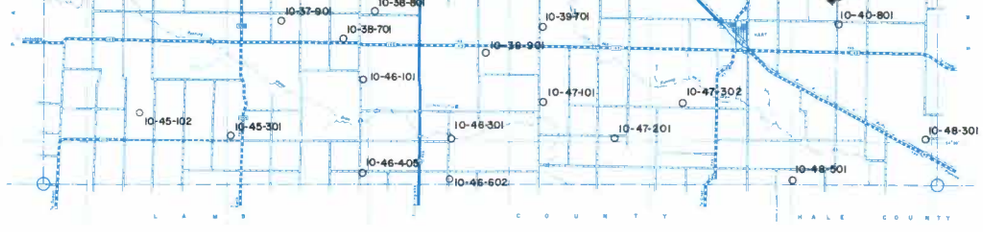

CASTRO COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
10-21-401	0.0	0.0	0.0	3.850	1.98
10-21-402	0.0	154.90	0.0	0.0	0.0
10-21-501	146.75	152.28	5.53	4.045	1.33
10-21-601	164.55	164.83	0.28	4.680	2.74
10-21-701	204.40	209.28	4.88	4.563	3.59
10-21-801	184.10	194.05	9.95	5.766	1.83
10-21-901	155.34	160.43	5.09	3.966	1.39
10-22-201	159.55	161.44	1.89	3.097	3.04
10-22-301	121.64	115.67	+5.97	1.086	3.84
10-22-401	137.53	141.79	4.26	3.522	2.04
10-22-501	138.93	141.71	2.78	3.912	3.10
10-22-702	0.0	159.20	0.0	0.0	0.0
10-22-801	152.39	154.48	2.09	3.636	2.00
10-22-901	145.32	142.72	+2.60	2.397	4.95
10-23-701	0.0	115.40	0.0	+5.070	9.64
10-23-801	150.61	150.74	0.13	0.224	0.44
10-24-202	176.24	175.96	+0.28	0.935	2.19
10-24-401	190.38	189.80	+0.58	1.330	2.09
10-24-601	159.54	159.40	+0.14	+1.675	4.76
10-24-701	187.08	188.10	1.02	1.837	0.75
10-24-801	0.0	183.12	0.0	2.365	1.57
10-28-301	275.87	278.34	2.47	5.986	3.85
10-29-302	262.12	266.01	3.89	4.964	1.04
10-29-601	0.0	249.67	0.0	5.008	3.04
10-29-701	245.42	250.49	5.07	4.960	4.59
10-29-901	222.67	221.53	+1.14	4.140	4.58
10-30-101	0.0	234.89	0.0	5.740	4.16
10-30-201	0.0	0.0	0.0	4.848	1.81
10-30-202	0.0	233.47	0.0	0.0	0.0
10-30-401	247.78	250.90	3.12	4.297	1.82
10-30-505	222.06	224.48	2.42	2.400	2.16
10-30-601	0.0	0.0	0.0	3.217	2.00
10-30-603	201.49	203.42	1.93	1.930	0.0
10-30-801	209.11	216.40	7.29	4.422	3.56
10-30-901	232-79	236.09	3.30	4.033	1.99
10-31-201	174.13	172.55	+1.58	3.337	2.61
10-31-301	178.57	176.85	+1.72	1.479	3.04
10-31-501	208.18	210.11	1.93	2.237	2.87
10-31-601	162.05	163.32	1.27	3.120	1.28
10-31-701	246.08	250.32	4.24	2.248	2.58
10-32-201	166.47	167.60	1.13	2.461	1.85
10-32-501	134.26	134.14	+0.12	0.901	6.26
10-32-703	222.01	226.38	4.37	4.759	3.03
10-32-801	200.85	206.87	6.02	4.094	2.55
10-37-201	193.84	197.36	3.52	4.409	2.62
10-37-401	161.66	165.23	3.57	3.638	2.32
10-37-601	141.26	145.03	3.77	3.200	2.90
10-37-901	148.97	148.47	+0.50	3.359	3.53
10-38-401	156.67	160.14	3.47	2.766	1.38
10-38-601	0.0	0.0	0.0	3.126	4.65
10-38-701	0.0	0.0	0.0	3.303	1.99
10-38-801	155.77	156.30	0.53	3.120	1.78
10-38-901	140.83	145.53	4.70	3.203	3.05
10-39-101	197.56	197.38	+0.18	4.408	2.45
10-39-301	0.0	221.65	0.0	0.0	0.0
10-39-401	173.92	169.07	+4.85	3.200	4.37
10-39-501	169.90	174.75	4.85	4.521	1.42
10-39-701	146.29	0.0	0.0	4.382	3.33
10-39-801	155.89	158.67	2.78	3.288	2.92
10-40-401	176.80	180.43	3.63	4.162	2.63
10-40-502	209.09	211.23	2.14	2.813	3.55
10-40-801	180.92	183.48	2.56	3.656	3.30
10-45-102	162.94	165.40	2.46	3.360	1.12
10-45-301	166.68	0.0	0.0	2.863	1.66
10-46-101	0.0	148.00	0.0	0.0	0.0
10-46-301	0.0	0.0	0.0	3.332	0.78
10-46-405	168.45	170.22	1.77	3.356	3.64
10-46-602	168.89	168.70	+0.19	4.000	4.19
10-47-101	132.67	134.40	1.73	2.872	3.83
10-47-201	170.29	173.37	3.08	3.819	1.96
10-47-302	153.12	158.68	5.56	4.586	0.85
10-48-301	153.11	154.98	1.87	4.858	3.40
10-48-501	155.29	0.0	0.0	5.278	1.77

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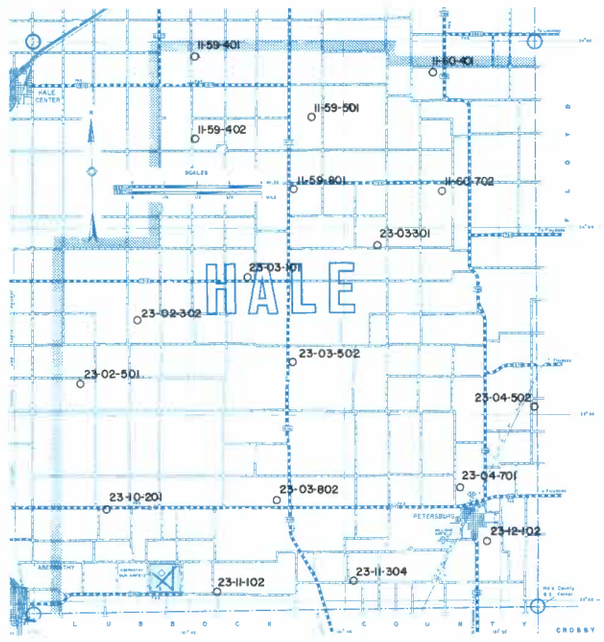

HALE COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
11-59-402	99.50	0.0	0.0	3.311	5.05
11-59-501	81.88	0.0	0.0	0.316	2.90
11-59-801	108.25	107.77	+0.48	0.791	1.56
11-60-401	92.05	93.27	1.22	1.449	0.48
11-60-702	97.75	99.14	1.39	2.162	2.01
23-02-302	112.47	111.44	+1.03	0.571	5.15
23-02-501	171.85	0.0	0.0	4.216	5.82
23-03-103	0.0	117.16	0.0	0.0	0.0
23-03-301	102.22	100.26	+1.96	1.376	2.37
23-03-502	121.62	121.60	+0.02	6.066	12.43
23-03-802	166.23	169.02	2.79	3.683	3.26
23-04-502	188.32	190.96	2.64	6.250	4.26
23-04-701	148.93	150.50	1.57	3.261	2.04
23-10-201	162.05	168.52	6.47	3.703	3.37
23-11-102	189.80	195.69	5.89	5.139	3.51
23-11-304	169.02	172.57	3.55	3.345	4.43
23-12-102	175.12	177.32	2.20	2.894	4.87

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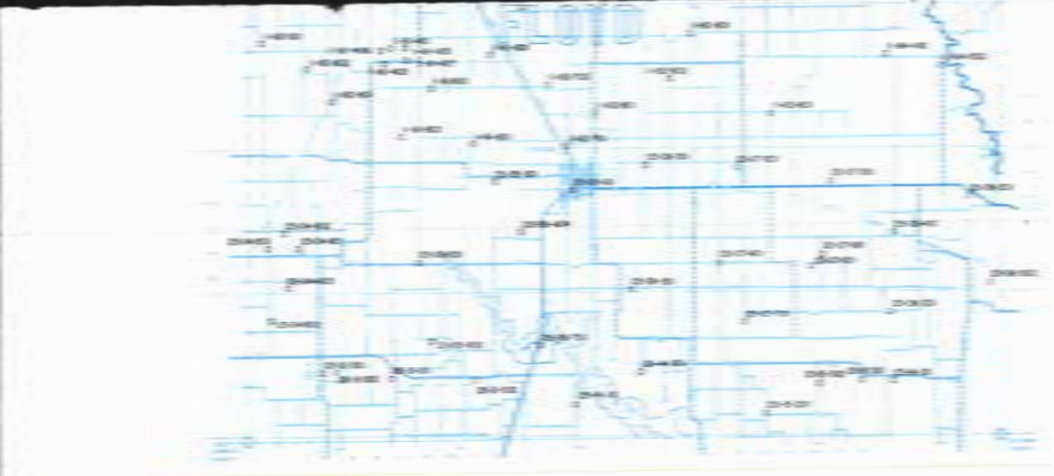

FLOYD COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
11-44-901	136.04	144.28	8.24	4.200	4.68
11-44-902	133.92	138.05	4.13	3.429	2.21
11-45-802	159.22	162.53	3.31	3.285	4.50
11-45-803	166.39	167.32	0.93	1.822	4.60
11-45-902	172.35	174.18	1.83	2.726	4.94
11-46-701	197.97	199.24	1.27	4.084	3.11
11-47-701	227.39	228.73	1.34	+0.620	3.57
11-52-301	150.45	150.64	0.19	4.151	5.68
11-52-302	160.50	161.74	1.24	4.006	1.42
11-52-303	181.99	183.98	1.99	4.865	3.03
11-52-304	171.42	172.08	0.66	4.578	3.57
11-52-603	170.13	170.30	0.17	4.357	4.92
11-52-801	167.63	0.0	0.0	4.442	6.46
11-52-901	179.30	180.49	1.19	3.488	1.83
11-52-902	165.68	177.43	11.75	3.464	4.98
11-52-903	171.38	173.61	2.23	2.464	1.94
11-52-905	174.62	177.31	2.69	3.054	1.01
11-52-906	173.30	175.51	2.21	3.031	3.44
11-53-102	177.59	180.62	3.03	3.030	0.0
11-53-201	156.16	158.05	1.89	3.167	1.14
11-53-204	160.56	160.47	+0.09	1.957	4.97
11-53-205	147.73	149.51	1.78	1.485	0.25
11-53-402	162.88	173.29	10.41	4.808	3.23
11-53-501	198.02	201.01	2.99	4.127	2.20
11-53-701	173.81	173.02	+0.79	2.692	3.69
11-53-702	165.17	166.07	0.90	3.169	2.15
11-53-703	165.62	167.49	1.87	2.311	5.80
11-53-903	157.58	159.56	1.98	1.980	0.0
11-54-302	258.80	260.83	2.03	2.030	0.0
11-54-401	177.04	178.29	1.25	1.297	0.73
11-54-901	222.24	221.64	+0.60	1.854	1.44
11-55-701	231.94	232.35	0.41	1.765	3.89
11-55-901	279.44	281.79	2.35	1.683	5.37
11-60-301	160.49	0.0	0.0	2.845	3.46
11-60-302	172.85	176.09	3.24	3.736	0.88
11-60-303	171.22	176.98	5.76	4.057	1.62
11-60-501	171.66	176.47	4.81	5.434	3.15
11-60-602	172.67	176.81	4.14	4.211	4.71
11-60-901	165.33	169.68	4.35	4.832	3.71
11-61-101	179.96	181.74	1.78	3.383	3.38
11-61-103	178.94	179.86	0.92	3.958	2.08
11-61-104	182.06	185.33	3.27	4.120	1.12
11-61-105	188.80	198.90	10.10	5.778	2.49
11-61-110	183.30	183.50	0.20	3.590	2.60
11-61-203	198.96	204.67	5.71	4.785	1.96
11-61-204	191.95	194.97	3.02	4.455	1.51
11-61-401	201.46	214.43	12.97	6.854	3.64
11-61-403	186.98	204.89	17.91	6.675	4.79
11-61-405	204.22	217.44	13.22	7.502	3.81
11-61-406	197.85	210.82	12.97	8.590	4.13
11-61-407	211.85	216.40	4.55	7.261	3.53
11-61-601	52.86	53.65	0.79	0.370	0.93
11-61-801	206.46	211.36	4.90	5.796	5.39
11-61-802	203.32	206.50	3.18	6.567	10.22
11-61-901	191.05	194.38	3.33	4.802	4.06
11-62-201	143.10	143.30	0.20	1.074	3.51
11-62-401	0.0	62.02	0.0	+0.575	1.27
11-62-601	150.86	149.79	+1.07	0.237	3.75
11-62-701	125.49	126.04	0.55	0.683	0.81
11-62-702	101.20	101.55	0.35	0.847	0.86
11-62-801	109.43	104.94	+4.49	1.558	3.15
11-62-902	156.13	155.68	+0.45	+0.450	0.0
11-63-101	160.26	162.10	1.84	0.664	0.78
11-63-801	205.05	205.98	0.93	0.756	2.63
11-64-101	238.25	242.41	4.16	3.223	5.96
11-64-401	236.68	236.89	0.21	+0.443	1.68
11-64-502	264.89	265.57	0.68	0.224	4.01
23-04-501	0.0	0.0	0.0	6.868	1.46
23-04-601	0.0	187.82	0.0	4.493	2.50
23-04-602	191.33	193.11	1.78	4.422	1.82
23-04-603	191.90	194.06	2.16	5.238	4.49
23-04-802	194.17	185.23	+8.94	+8.940	0.0
23-05-301	189.44	194.33	4.89	4.089	4.19
23-05-501	205.36	208.12	2.76	3.940	4.64
23-05-802	221.02	221.82	0.80	0.800	0.0
23-06-101	169.88	170.89	1.01	2.265	1.01
23-06-301	165.56	166.55	0.99	1.114	3.76
23-06-404	225.65	234.06	8.41	7.259	5.13
23-06-501	228.15	227.02	+1.13	3.999	3.67
23-06-701	231.58	227.32	+4.26	6.888	8.75
23-07-103	253.29	251.73	+1.56	1.760	3.58
23-07-301	234.77	231.69	+3.08	1.139	8.20
23-07-401	286.63	288.40	1.77	6.727	5.44
23-07-501	289.36	290.02	0.66	7.074	8.21
23-07-601	292.61	295.00	2.39	5.125	5.29
23-07-701	212.38	208.97	+3.41	1.666	3.61
23-08-201	267.10	268.22	1.12	0.586	2.00
23-08-401	305.17	0.0	0.0	4.955	9.28
23-08-502	269.65	269.82	0.17	1.752	3.43
23-08-701	277.99	278.99	1.00	1.979	1.86
23-12-301	188.70	191.61	2.91	5.264	5.70
23-12-302	203.70	202.90	+0.80	3.800	3.80
23-13-101	191.70	192.46	0.76	3.549	2.34
23-13-302	225.77	226.50	0.73	3.701	8.35
23-14-101	246.19	252.27	6.08	6.447	9.28
23-14-301	0.0	231.24	0.0	4.991	7.97
23-15-201	270.98	269.09	+1.89	2.689	5.25
23-15-301	298.43	300.05	1.62	4.037	4.80
23-15-302	297.59	293.20	+4.39	3.888	7.39
23-16-101	303.70	304.61	0.91	4.357	8.51

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POTTER COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
06-49-501	0.0	192.94	0.0	1.855	3.64
07-56-401	225.19	0.0	0.0	3.485	4.00
07-56-501	219.24	218.98	+0.26	2.553	4.38
07-56-601	219.23	0.0	0.0	4.417	3.35

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LUBBOCK COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
23-09-501	159.91	162.68	2.77	1.986	1.74
23-09-601	143.64	144.06	0.42	2.097	2.78
23-09-701	155.41	158.24	2.83	3.029	1.59
23-09-901	194.75	198.19	3.44	2.865	2.82
23-10-501	183.38	0.0	0.0	3.117	2.85
23-10-801	167.81	170.09	2.28	2.554	2.35
23-11-401	189.65	194.99	5.34	4.754	3.77
23-11-601	165.17	166.64	1.47	2.076	1.77
23-11-701	187.02	193.27	6.25	4.634	2.39
23-11-702	172.47	180.32	7.85	3.738	2.18
23-11-901	163.28	162.70	+0.58	2.865	2.48
23-11-902	162.01	163.26	1.25	2.134	1.39
23-11-903	166.09	167.78	1.69	3.917	2.14
23-12-401	175.10	178.80	3.70	3.691	3.81
23-12-402	175.14	181.56	6.42	3.123	1.99
23-12-803	173.40	177.16	3.76	3.946	1.95
23-17-202	144.72	152.15	7.43	2.191	2.37
23-17-501	125.28	127.64	2.36	1.551	2.31
23-17-502	72.96	74.11	1.15	0.583	1.41
23-17-701	109.91	105.07	+4.84	0.897	3.78
23-17-703	94.17	94.13	+0.04	0.654	4.26
23-17-704	76.28	75.51	+0.77	0.476	0.75
23-17-705	81.81	82.38	0.57	0.302	2.54
23-17-706	100.69	102.09	1.40	1.887	3.53
23-17-801	85.71	88.16	2.45	0.782	1.77
23-17-802	70.71	73.17	2.46	1.883	6.47
23-17-901	76.60	76.10	+0.50	0.199	3.60
23-18-201	156.52	158.59	2.07	2.962	1.83
23-18-301	180.11	183.55	3.44	3.799	4.05
23-18-402	132.60	141.08	8.48	2.881	2.93
23-18-403	125.25	125.54	0.29	1.242	1.64
23-18-404	141.89	146.09	4.20	2.752	1.75
23-18-408	60.58	0.0	0.0	0.0	0.0
23-18-502	124.91	128.87	3.96	2.255	1.74
23-18-601	141.44	0.0	0.0	2.870	2.05
23-18-701	83.55	85.07	1.52	+0.437	1.67
23-18-703	84.59	83.19	+1.40	+2.246	2.99
23-18-704	86.48	81.74	+4.74	0.216	1.96
23-19-301	192.22	198.14	5.92	4.903	2.97
23-19-302	191.63	199.03	7.40	5.940	3.85
23-19-402	156.95	167.70	10.75	4.090	3.51
23-19-403	161.81	168.84	7.03	3.502	2.05
23-19-501	0.0	189.95	0.0	3.175	0.58
23-19-701	94.74	97.14	2.40	2.046	5.12
23-19-802	96.21	99.49	3.28	1.648	1.92
23-19-804	96.58	99.82	3.24	2.111	1.87
23-19-901	148.68	157.89	9.21	4.960	5.53
23-20-401	178.59	182.17	3.58	4.299	3.26
23-20-507	188.65	189.88	1.23	0.368	0.59
23-20-701	179.12	181.87	2.75	7.763	11.18
23-20-802	173.60	179.77	6.17	5.273	4.63
23-25-101	143.43	145.34	1.91	1.082	2.21
23-25-102	144.17	145.82	1.65	1.405	1.86
23-25-302	62.03	59.40	+2.63	+2.226	1.95
23-25-304	55.89	0.0	0.0	+1.391	1.94
23-25-401	141-60	143.69	2.09	0.817	1.79
23-25-701	124.61	128.09	3.48	1.767	2.81
23-25-902	104.26	106.01	1.75	+2.562	7.42
23-26-101	63.48	63.56	0.08	+0.678	2.53
23-26-301	94.12	95.28	1.16	0.468	0.79
23-26-603	6.84	12.81	5.97	+0.001	4.10
23-26-901	50.09	49.44	+0.65	0.520	3.68
23-27-101	96.89	97.64	0.75	0.863	0.96
23-27-201	90.61	92.05	1.44	0.870	3.08
23-27-202	89.38	92.61	3.23	1.881	3.69
23-27-203	89.19	91.42	2.23	2.057	1.60
23-27-204	91.14	92.74	1.60	1.354	2.53
23-27-302	78.91	79.29	0.38	1.251	1.68
23-27-601	86.17	86.79	0.62	1.213	1.28
23-27-602	92.05	93.27	1.22	0.617	3.11
23-27-701	81.08	80.71	+0.37	+2.028	2.35
23-28-701	64.22	61.39	+2.83	0.177	2.36
23-33-201	129.46	130.89	1.43	0.419	1.26
23-33-401	106.30	106.73	0.43	0.660	0.82
23-33-501	112.00	112.43	0.43	0.690	1.16
23-33-601	107.03	107.41	0.38	0.601	1.01
23-33-801	100.58	101.25	0.67	0.708	2.22
23-34-101	115.11	117.26	2.15	1.043	2.27
23-34-402	116.35	116.67	0.32	0.218	1.03
23-34-502	136.69	138.55	1.86	1.958	4.01
23-34-503	118.19	118.91	0.72	0.359	1.98
23-34-601	122.23	125.30	3.07	1.146	1.68
23-34-701	119.34	120.15	0.81	0.487	0.63
23-34-801	146.40	146.02	+0.38	1.710	2.18
23-34-804	136.82	138.55	1.73	0.597	3.30
23-34-805	139.45	140.66	1.21	0.880	0.35
23-34-806	135.99	138.22	2.23	1.411	1.78
23-34-902	131.48	132.68	1.20	1.075	1.09
23-34-904	130.10	0.0	0.0	1.387	2.87
23-35-101	79.36	81.67	2.31	0.020	3.46
23-35-301	113.99	116.30	2.31	+0.145	2.96
23-35-502	98.64	99.22	0.58	0.042	0.79
23-35-701	131.95	135.71	3.76	2.656	3.75
23-35-703	132.34	133.90	1.56	1.723	1.85
23-35-802	115.56	116.60	1.04	0.984	0.99
23-35-902	147.83	150.92	3.09	1.193	1.37
23-36-401	105.16	104.55	+0.61	+0.338	0.37
23-36-501	176.11	178.09	1.98	+1.661	8.20
23-36-701	116.99	117.66	0.67	+0.428	1.23
23-36-702	217.91	216.20	+1.71	+2.090	0.38
24-16-501	120.31	119.55	+0.76	1.136	1.35
24-16-601	127.63	127.78	0.15	0.562	2.89
24-16-901	168.32	169.99	1.67	0.766	2.33
24-16-902	163.78	162.09	+1.69	1.763	3.13
24-24-201	65.22	65.72	0.50	0.436	6.31
24-24-302	150.33	0.0	0.0	2.987	3.72
24-24-501	137.98	138.37	0.39	2.205	2.83
24-24-901	161.28	162.71	1.43	1.831	8.45
24-32-301	141.63	143.17	1.54	1.465	2.28
24-32-501	123.39	124.13	0.74	0.993	2.95
24-32-601	129.58	131.59	2.01	1.098	1.61
24-32-602	141.63	143.40	1.77	2.219	3.11
24-40-201	135.19	136.54	1.35	2.819	3.05
24-40-301	144.49	145.92	1.43	0.624	3.83
24-40-601	120.81	122.58	1.77	0.596	3.07
24-40-901	69.96	69.99	0.03	0.124	0.80

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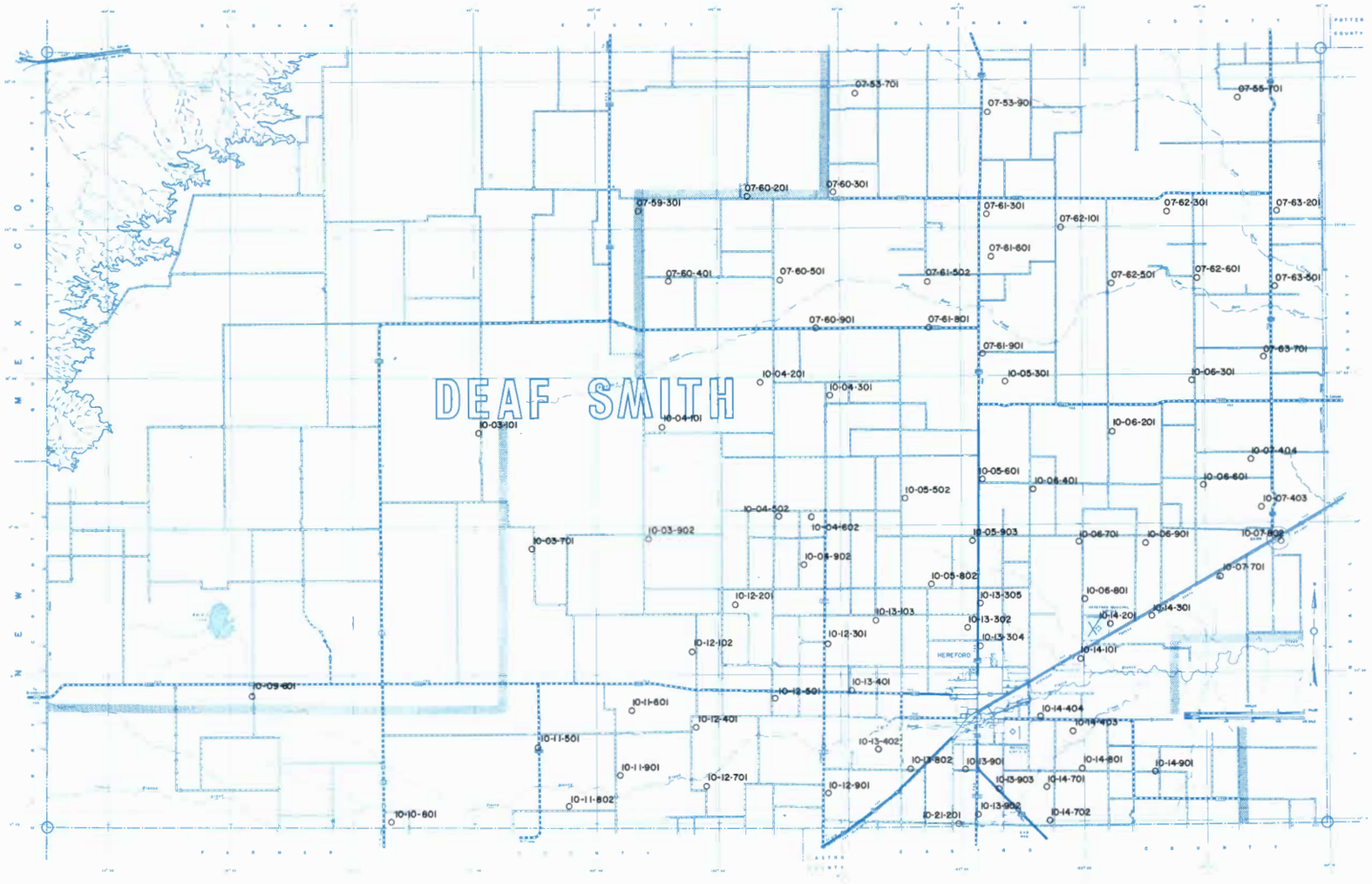
Water Level Measurements In Observation Wells In High Plains Water District



DEAF SMITH COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
07-53-701	225.03	226.00	0.97	0.508	1.19
07-53-901	0.0	217.12	0.0	4.169	5.49
07-55-701	211.33	214.44	3.11	3.537	4.36
07-59-301	313.32	325.67	12.35	3.744	5.98
07-60-201	285.23	286.57	1.34	2.871	1.93
07-60-301	259.49	264.09	4.60	3.769	2.06
07-60-401	288.25	289.50	1.25	4.550	6.37
07-60-501	249.41	252.05	2.64	4.611	2.47
07-60-901	208.54	210.82	2.28	1.808	1.50
07-61-301	0.0	215.80	0.0	4.128	3.45
07-61-502	189.15	191.59	2.44	3.285	0.85
07-61-601	187.22	190.00	2.78	3.298	1.00
07-61-801	186.38	187.44	1.06	2.607	1.67
07-61-901	163.14	164.89	1.75	2.593	1.38
07-62-101	203.67	208.36	4.69	3.711	3.74
07-62-301	176.07	178.40	2.33	1.653	3.83
07-62-501	159.38	161.65	2.27	3.052	2.81
07-62-601	181.45	183.70	2.25	4.066	2.56
07-63-201	186.56	0.0	0.0	5.080	3.05
07-63-501	121.29	124.10	2.81	1.124	3.84
07-63-701	154.28	155.04	0.76	2.882	4.78
10-03-101	299.94	306.99	7.05	2.063	3.56
10-03-701	0.0	229.00	0.0	+0.601	2.59
10-03-902	246.69	249.64	2.95	3.764	0.92
10-04-101	311.30	318.99	7.69	4.158	1.83
10-04-201	274.50	270.67	+3.83	2.677	4.60
10-04-301	271.80	275.40	3.60	4.917	1.72
10-04-502	0.0	235.22	0.0	0.0	0.0
10-04-602	233.35	235.70	2.35	0.950	1.40
10-04-902	180.62	184.36	3.74	3.363	3.66
10-05-301	156.22	161.25	5.03	2.635	3.31
10-05-502	0.0	183.32	0.0	0.0	0.0
10-05-601	141.53	0.0	0.0	3.061	3.46
10-05-802	148.86	147.83	+1.03	2.940	2.71
10-05-903	159.71	162.10	2.39	3.698	2.02
10-06-201	148.05	149.28	1.23	2.775	6.12
10-06-301	170.15	170.50	0.35	3.177	1.93
10-06-401	0.0	0.0	0.0	4.040	2.81
10-06-601	156.26	0.0	0.0	5.377	4.84
10-06-701	81.55	77.95	+3.60	2.689	3.89
10-06-801	78.06	77.90	+0.16	+0.571	3.15
10-06-901	137.70	140.26	2.56	3.621	1.54
10-07-403	137.13	140.81	3.68	4.411	2.15
10-07-404	147.89	148.73	0.84	2.588	2.42
10-07-701	121.50	126.73	5.23	1.033	4.21
10-07-802	145.90	142.48	+3.42	1.911	17.17
10-09-601	58.85	61.36	2.51	+0.362	4.21
10-10-801	0.0	0.0	0.0	1.700	0.79
10-11-501	187.02	188.94	1.92	1.695	3.18
10-11-601	167.89	163.56	+4.33	1.365	5.42
10-11-802	200.95	204.45	3.50	4.206	1.31
10-11-901	168.84	169.79	0.95	2.376	0.93
10-12-102	160.37	158.96	+1.41	2.530	4.84
10-12-201	70.23	71.52	1.29	0.386	2.98
10-12-301	161.90	0.0	0.0	3.632	5.86
10-12-401	198.01	204.84	6.83	5.873	3.59
10-12-501	196.73	200.90	4.17	1.617	4.94
10-12-701	159.38	161.88	2.50	4.329	2.54
10-12-901	147.72	153.14	5.42	4.290	3.36
10-13-103	179.19	183.78	4.59	5.575	0.98
10-13-302	141.58	139.98	+1.60	3.923	7.86
10-13-304	150.72	0.0	0.0	4.716	5.45
10-13-305	134.20	135.63	1.43	2.617	5.64
10-13-401	148.19	156.87	8.68	3.809	2.88
10-13-402	123.52	126.29	2.77	3.120	0.35
10-13-802	144.13	146.80	2.67	5.670	3.00
10-13-901	147.99	151.32	3.33	2.925	1.54
10-13-902	159.48	0.0	0.0	3.517	1.49
10-13-903	162.46	165.08	2.62	3.846	2.48
10-14-101	75.60	82.95	7.35	2.895	2.98
10-14-201	113.47	110.63	+2.84	1.444	6.18
10-14-301	79.10	78.77	+0.33	0.576	5.13
10-14-403	122.18	122.86	0.68	2.917	1.36
10-14-404	128.89	130.97	2.08	4.105	2.58
10-14-701	172.62	175.48	2.86	3.593	4.08
10-14-702	173.78	172.89	+0.89	3.384	8.88
10-14-801	143.10	145.90	2.80	2.364	1.17
10-14-901	111.88	109.62	+2.26	0.758	2.38
10-21-201	188.53	191.68	3.15	2.727	2.99

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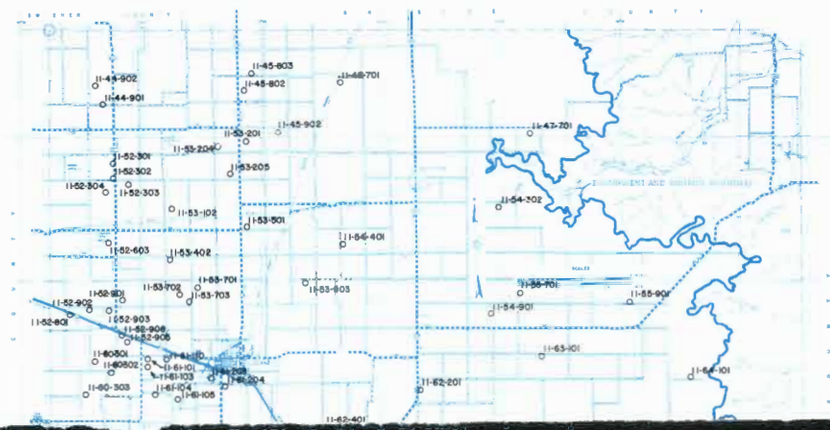

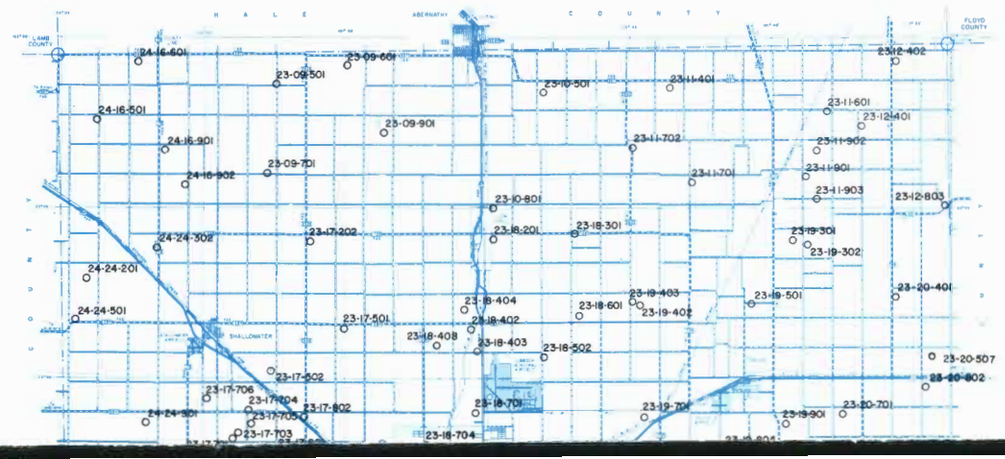

RANDALL COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
06-49-701	222.83	233.86	11.03	5.206	3.41
06-49-902	203.99	204.85	0.86	0.481	1.35
06-57-202	190.20	191.29	1.09	1.974	1.60
06-57-401	173.97	172.39	+1.58	4.270	3.70
06-57-601	0.0	171.97	0.0	2.335	1.99
06-57-802	150.58	152.95	2.37	2.912	4.36
07-55-901	193.84	195.42	1.58	4.232	4.32
07-56-701	204.84	208.88	4.04	4.299	1.77
07-56-702	225.10	230.64	5.54	2.910	3.44
07-56-902	196.65	203.07	6.42	4.114	2.60
07-63-301	213.52	204.66	+8.86	5.470	9.95
07-63-601	153.63	155.17	1.54	3.187	1.86
07-63-902	137.60	138.43	0.83	3.737	2.27
07-64-101	204.14	205.34	1.20	4.483	5.95
07-64-302	152.03	154.00	1.97	3.158	4.02
07-64-402	105.70	103.70	+2.00	0.402	2.51
07-64-501	137.69	0.0	0.0	0.506	1.23
07-64-903	144.76	143.38	+1.38	1.723	4.76
10-07-301	134.82	130.44	+4.38	1.708	4.61
10-07-601	100.10	99.29	+0.81	0.991	5.16
10-08-102	139.56	140.54	0.98	1.012	0.98
10-16-901	174.72	180.39	5.67	0.668	7.61
11-09-301	167.90	158.10	+9.80	0.259	5.37
11-09-501	180.10	182.53	2.43	1.086	3.89
11-09-601	199.14	197.39	+1.75	1.028	2.66
11-09-801	190.64	187.31	+3.33	1.691	2.72
11-09-901	197.90	0.0	0.0	3.760	1.69
11-10-301	125.84	125.75	+0.09	0.710	0.80
11-10-402	175.10	173.51	+1.59	0.403	4.71
11-10-802	181.25	178.92	+2.33	2.021	4.14
11-11-502	162.16	161.44	+0.72	+1.271	3.75
11-11-801	112.60	116.30	3.70	2.147	1.02
11-11-901	121.20	121.28	0.08	2.143	2.92

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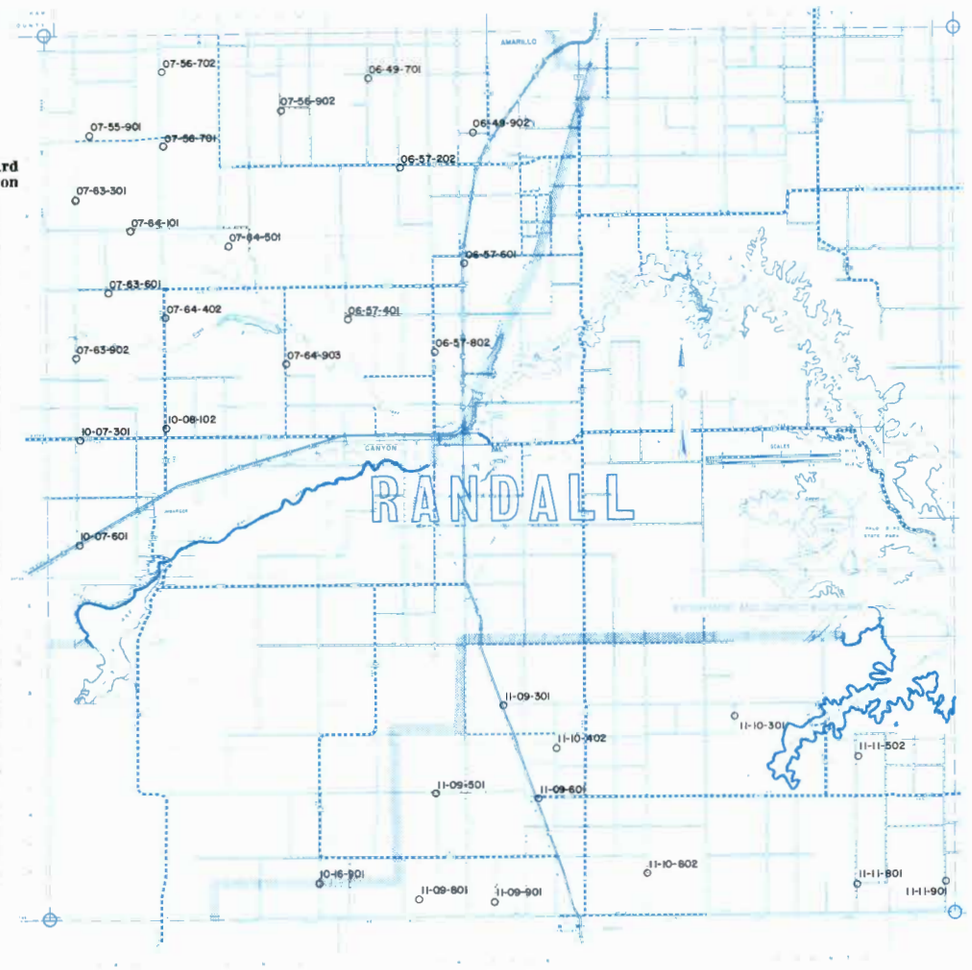

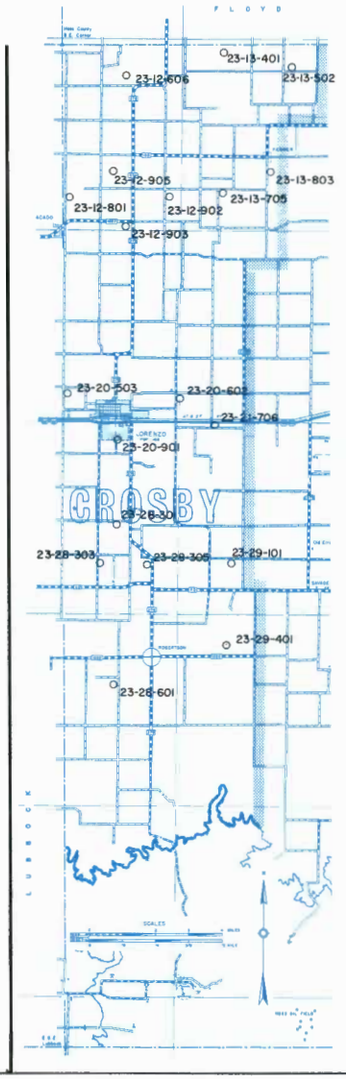

CROSBY COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
23-12-606	169.67	174.14	4.47	2.040	2.43
23-12-801	192.25	199.81	7.56	5.252	3.75
23-12-902	208.58	209.91	1.33	2.630	2.65
23-12-903	207.00	209.78	2.78	3.805	6.15
23-12-905	198.25	206.98	8.73	5.890	2.84
23-13-401	181.60	183.68	2.08	3.700	1.62
23-13-502	200.63	203.01	2.38	2.565	0.18
23-13-705	209.36	207.34	+2.02	5.304	6.64
23-13-803	197.98	200.09	2.11	3.075	0.97
23-20-503	191.30	0.0	0.0	4.249	2.85
23-20-602	203.42	206.57	3.15	4.117	8.71
23-20-901	194.00	199.45	5.45	4.290	3.88
23-21-706	198.40	201.58	3.18	4.149	3.62
23-28-301	160.20	0.0	0.0	1.983	3.21
23-28-303	127.05	131.02	3.97	1.380	6.73
23-28-305	150.80	152.12	1.32	0.660	6.76
23-28-601	150.15	153.22	3.07	6.422	6.86
23-29-101	203.50	206.45	2.95	3.401	9.01
23-29-401	206.80	208.24	1.44	3.976	5.07

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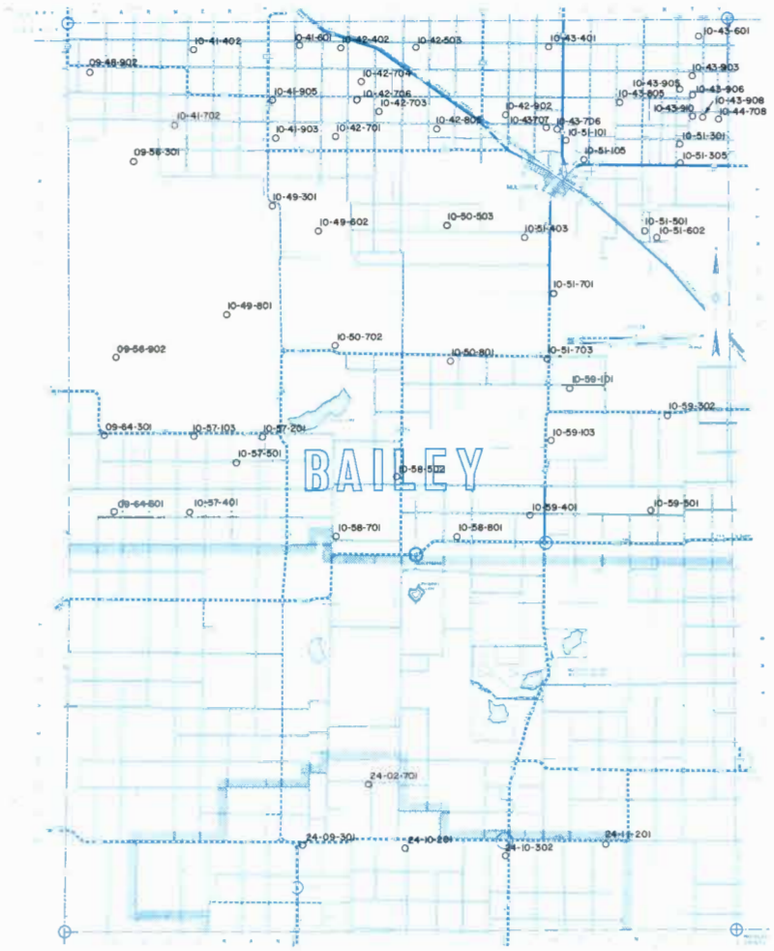

BAILEY COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
09-48-902	133.84	138.14	4.30	2.624	2.95
09-56-301	72.29	73.74	1.45	1.229	5.75
09-56-902	40.28	40.48	0.20	0.214	0.07
09-64-301	57.52	56.12	+1.40	0.589	2.54
09-64-601	133.46	128.48	+4.98	0.268	4.20
10-41-402	146.87	155.63	8.76	3.971	1.92
10-41-601	136.71	139.52	2.81	4.264	3.01
10-41-702	90.94	94.06	3.12	0.381	5.56
10-41-903	80.65	82.24	1.59	2.194	5.69
10-41-905	105.56	109.05	3.49	2.676	3.06
10-42-402	0.0	125.48	0.0	2.403	1.62
10-42-503	116.07	118.17	2.10	2.454	3.98
10-42-701	92.74	95.25	2.51	2.978	1.71
10-42-703	96.30	98.78	2.48	2.068	6.42
10-42-704	112.82	111.55	+1.27	2.364	5.33
10-42-706	107.15	111.35	4.20	2.797	1.12
10-42-805	82.48	80.11	+2.37	2.336	6.67
10-42-902	83.46	85.26	1.80	2.141	5.64
10-43-401	114.32	118.02	3.70	3.002	2.87
10-43-601	122.72	127.36	4.64	3.297	1.19
10-43-706	82.82	84.38	1.56	1.658	1.97
10-43-707	82.49	84.91	2.42	1.184	2.38
10-43-805	86.74	89.18	2.44	2.552	1.79
10-43-903	102.29	104.78	2.49	2.899	6.74
10-43-905	91.14	92.69	1.55	2.275	4.31
10-43-906	90.54	92.57	2.03	3.160	1.13
10-43-908	81.32	84.34	3.02	1.584	1.53
10-43-910	83.19	84.61	1.42	2.248	2.10
10-44-708	86.63	0.0	0.0	2.538	1.59
10-49-301	35.26	36.55	1.29	1.067	2.52
10-49-602	54.34	53.90	+0.44	0.228	3.89
10-49-801	76.24	76.78	0.54	0.282	0.24
10-50-503	65.29	69.20	3.91	3.605	3.59
10-50-702	89.15	89.67	0.52	0.841	0.88
10-50-801	71.49	73.99	2.50	0.465	1.67
10-51-101	68.03	70.86	2.83	1.127	1.06
10-51-105	59.42	60.12	0.70	1.727	3.46
10-51-301	72.77	0.0	0.0	3.646	4.28
10-51-305	68.02	67.70	+0.32	2.232	4.03
10-51-403	39.47	43.30	3.83	1.364	2.47
10-51-501	41.94	41.37	+0.57	1.221	2.30
10-51-602	42.40	45.77	3.37	2.042	1.59
10-51-701	66.10	64.85	+1.25	0.538	5.18
10-51-703	90.00	93.20	3.20	1.120	4.92
10-57-103	80.06	79.73	+0.33	0.233	4.23
10-57-201	28.39	28.41	0.02	0.265	1.74
10-57-401	111.29	113.29	2.00	0.284	2.80
10-57-501	32.90	38.05	5.15	+0.264	3.46
10-58-502	73.20	73.61	0.41	+0.142	1.18
10-58-701	47.44	47.43	+0.01	0.118	1.52
10-58-801	21.95	22.79	0.84	0.448	2.97
10-59-101	113-36	114.00	0.64	1.030	2.24
10-59-103	105.10	107.79	2.69	1.244	3.98
10-59-302	108.91	108.13	+0.78	0.227	5.58
10-59-401	114.14	114.39	0.25	1.080	6.33
10-59-501	100.23	99.50	+0.73	+1.667	5.28
24-02-701	58.69	59.47	0.78	0.016	1.69
24-09-301	87.17	87.18	0.01	+0.256	0.57
24-10-201	112.04	115.67	3.63	1.560	6.50
24-10-302	91.79	87.79	+4.00	0.483	6.40
24-11-201	107.38	105.24	+2.14	+0.802	9.05

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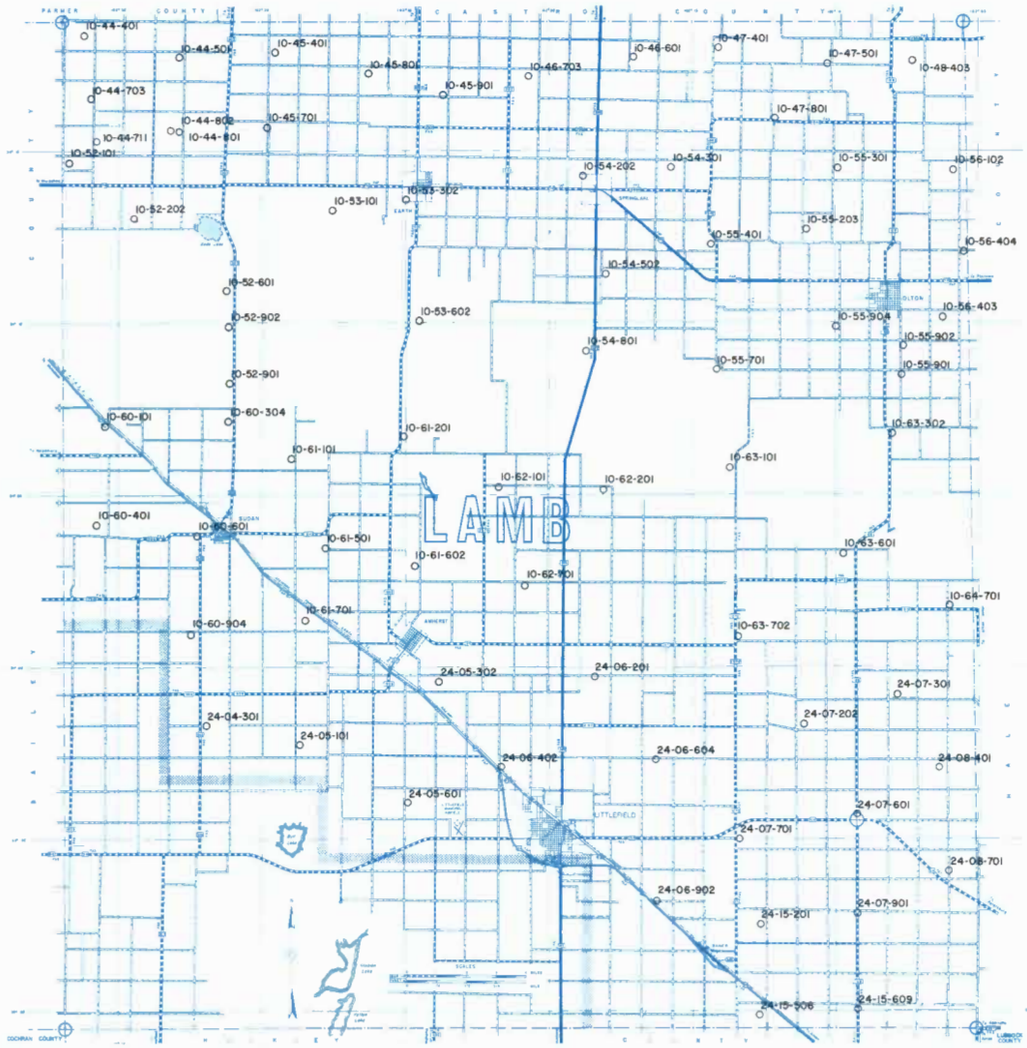

LAMB COUNTY

Well No.	Depth To Water 71	Depth To Water 72	Decline 1971 1972	Average Annual Decline 62-72	Standard Deviation
10-44-401	136.64	139.69	3.05	3.627	5.77
10-44-501	135.94	139.68	3.74	3.767	2.13
10-44-703	98.78	101.62	2.84	3.428	1.30
10-44-711	0.0	85.83	0.0	1.460	0.0
10-44-802	80.61	83.87	3.26	2.827	0.98
10-45-401	135.75	141.13	5.38	3.663	1.24
10-45-701	94.36	98.16	3.80	2.973	1.15
10-45-801	149.18	155.32	6.14	2.911	2.27
10-45-901	154.56	157.21	2.65	3.124	2.43
10-46-601	173.57	181.60	8.03	4.039	3.12
10-46-703	164.79	168.99	4.20	3.320	0.97
10-47-401	151.54	154.35	2.81	3.527	1.87
10-47-501	146.58	151.01	4.43	3.916	2.00
10-47-801	176.14	183.12	6.98	3.607	1.62
10-48-403	167.56	164.70	+2.86	4.068	3.78
10-52-101	74.54	78.66	4.12	2.102	1.86
10-52-202	0.0	53.03	0.0	1.870	0.0
10-52-601	33.38	34.05	0.67	0.592	0.44
10-52-901	67.90	70.99	3.09	1.197	1.05
10-52-902	51.87	52.46	0.59	0.601	0.38
10-53-101	65.04	67.30	2.26	2.157	1.79
10-53-302	85.35	88.51	3.16	2.500	1.14
10-53-602	0.0	54.34	0.0	1.351	0.70
10-54-202	136.20	139.65	3.45	2.713	1.68
10-54-301	164.78	168.22	3.44	3.594	2.13
10-54-502	102.42	105.62	3.20	2.251	2.28
10-54-801	69.19	69.49	0.30	0.956	0.40
10-55-203	166.68	169.15	2.47	3.529	1.34
10-55-301	186.46	191.34	4.88	4.222	1.57
10-55-401	159.88	0.0	0.0	2.366	4.02
10-55-701	82.24	84.58	2.34	1.494	4.45
10-55-901	122.74	126.15	3.41	3.021	0.99
10-55-902	147.11	149.20	2.09	3.410	1.46
10-55-904	140.67	142.49	1.82	3.183	1.53
10-56-102	191.38	196.10	4.72	4.776	1.79
10-56-403	173.84	180.70	6.86	4.823	1.22
10-56-404	193-50	198.55	5.05	6.341	7.09
10-60-101	121.94	121.50	+0.44	1.153	2.18
10-60-304	76.63	81.06	4.43	1.550	3.59
10-60-401	127.21	127.15	+0.06	1.853	3.65
10-60-601	98.64	95.88	+2.76	+1.395	4.02
10-60-904	139.27	140.79	1.52	0.343	4.04
10-61-101	0.0	79.53	0.0	0.195	3.18
10-61-201	57.50	59.25	1.75	1.049	2.45
10-61-501	115.42	119.46	4.04	1.665	4.58
10-61-602	92.99	95.35	2.36	0.646	3.14
10-61-701	119.08	123.33	4.25	2.137	2.04
10-62-101	53.65	55.68	2.03	1.039	0.80
10-62-201	100.56	103.87	3.31	1.385	1.63
10-62-701	123.24	128.28	5.04	2.297	2.83
10-63-101	69.88	70.55	0.67	3.243	9.96
10-63-302	101.92	105.59	3.67	2.317	1.71
10-63-601	105.26	107.42	2.16	0.754	3.95
10-63-702	139.40	140.52	1.12	2.313	1.54
10-64-701	117.87	118.38	0.51	1.574	2.18
24-04-301	55.11	57.04	1.93	0.388	2.48
24-05-101	40.14	40.35	0.21	0.358	0.67
24-05-302	108.38	111.97	3.59	2.627	1.51
24-05-601	85.13	86.44	1.31	+0.421	6.15
24-06-201	132.66	136.15	3.49	2.295	4.93
24-06-402	88.82	88.42	+0.40	0.602	1.56
24-06-604	121.00	123.29	2.29	1.732	4.37
24-06-902	99.64	97.22	+2.42	1.745	3.17
24-07-202	146.74	151.83	5.09	2.032	3.25
24-07-301	135.21	132.25	+2.96	1.476	2.41
24-07-601	145.84	147.75	1.91	1.719	1.50
24-07-701	138.56	141.31	2.75	1.826	2.30
24-07-901	112.39	113.60	1.21	1.371	3.96
24-08-401	148.04	150.22	2.18	1.907	2.77
24-08-701	127.99	130.52	2.53	1.942	2.24
24-15-201	114.94	115.46	0.52	1.505	5.17
24-15-506	77.14	0.0	0.0	1.024	2.54
24-15-609	131.18	131.33	0.15	0.999	3.80

0.0—Denotes data not available

THE Cross SECTION

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1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

FRANK A. RAYNER, Editor

REBECCA CLINTON, Asst. Editor

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District Office at Lubbock

WATER . . .

. . . continued from page 1

subsequent years' records become available.

The figure, "Hydrograph of the Average Depth to Water For All Observation Wells Within the District", depicts the averaged decline of water levels in the Ogallala formation from January, 1962, to January, 1972. The average depth to water was 128.49 feet in 1962 and has increased to 155.49 feet in 1972. Dividing by the time interval (10 years), a value of 2.7 feet of water level decline has been experienced annually over the entire District.

Frank Rayner, left, discusses with Dolph Briscoe a report published by the District detailing the structure and activities of groundwater conservation districts.

Albert Sechrist, right, explains water-level hydrographs to Dolph Briscoe.

Operation FACT

Operation FACT (Food and Agricultural Communications Tour), a seven-city national tour designed to take agriculture's story to the urban consumer, was launched April 18 at a Washington, D.C., news conference. At that time a representative group of agricultural producers joined Secretary of Agriculture Earl Butz, U.S. Senator Carl Curtis (R-Nebr.) and House Appropriations Chairman George Mahon (D-Tex.) to describe the purpose of the tour.

During the next ten days tour participants were scheduled to reach consumers in Washington, New York, Boston, Chicago, Los Angeles, Houston and Atlanta through meetings with consumers, consumer representatives and also via the news media. In announcing the tour, National Agricultural Institute Board Chairman E. L. Hatcher of Lamar, Colorado, emphasized the "two-way aspect" of the communication desired. "This will not be the type of project in which farmers lecture consumers, or chide them for their failure to properly appreciate us. Instead, the objective is first to find out what's on the consumer's mind, and to try to respond to that concern," said Hatcher.

Commenting on the tour announcement, Senator Curtis said, "The important and encouraging thing about this tour is that it is sort of a people-to-people project. It has not been and will not be carried out by politicians or slick advertising and public relations experts. It is not designed to sell a product by creating a quick, favorable image in a spot television commercial. It is an honest, straightforward attempt by down-to-earth, straight-talking people to create better public understanding of the role agriculture plays in society and in the economy of this country."

Congressman Mahon noted, "Agriculture continues to set record after record and as a result we continue to spend a smaller and smaller percentage of our take-home pay on food. This is one extremely important aspect of the food price issue which the American public needs to understand. And I am very hopeful that the planned tour of farmers and ranchers will help in getting that point across. It is a good and valid point."

BRISCOE VISITS DISTRICT

Dolph Briscoe, Democratic candidate for Governor of Texas, paid a surprise visit to the offices of the High Plains Underground Water Conservation District No. 1 on April 12. He was seeking information on the status of groundwater conditions in the High Plains area, and on the water conservation activities of this District.

The District's staff reviewed the activities of the District and answered Mr. Briscoe's questions about groundwater conditions in the High Plains area. The District is very pleased that a candidate for public office was interested in becoming appraised as to groundwater management practices in the High Plains area. On April 13, the District extended invitations to all other candidates in the primary races for Governor to visit our offices in the same manner as Briscoe's visit.

By press time, on April 25th, Governor Preston Smith had written that his overcrowded schedule would prevent his visiting the District's office at this time. John Hall, Republican candidate for Governor, telephoned to note that he would not be able to visit the District in April.

SUMMARY OF WATER LEVEL MEASUREMENTS

	1962				1972			
	No. of Wells	Depth to Water (Feet)			No. of Wells	Depth to Water (Feet)		
County	Measured	Min.	Max.	Avg.	Measured	Min.	Max.	Avg.
Armstrong	8	95.48	124.90	110.50	8	109.56	151.98	128.31
Bailey	41	25.11	142.72	67.22	59	22.79	155.63	86.37
Castro	45	52.64	224.41	143.71	64	115.40	278.34	182.46
Cochran	45	55.40	176.66	128.32	49	74.49	196.25	145.08
Crosby	10	116.48	179.34	151.60	17	131.02	209.91	191.38
Deaf Smith	61	52.25	286.40	137.66	71	61.36	325.67	178.16
Floyd	89	37.29	264.96	156.08	97	53.65	304.61	197.30
Hale	16	69.70	151.60	110.79	14	93.27	195.69	141.09
Hockley	37	34.64	178.60	109.96	76	44.53	202.30	127.77
Lamb	36	28.13	147.10	97.76	71	34.05	198.55	117.68
Lubbock	100	12.82	194.70	111.86	110	12.81	216.20	128.35
Lynn	29	25.89	133.73	81.97	30	29.97	152.96	91.18
Parmer	48	123.35	306.14	202.89	57	156.86	334.00	242.80
Potter	0	———	———	———	2	192.94	218.98	205.96
Randall	12	123.30	187.97	156.53	31	99.29	233.86	168.49

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 18—No. 5 "THERE IS NO SUBSTITUTE FOR WATER" *May, 1972*

Well Location Measurements

By A. W. SECHRIST

In order to obtain a permit to drill a well, the applicant must know the exact legal survey description of the property, have accurately measured the distances to the proposed well site, and have accurately measured the distances from the proposed well site to the three nearest existing wells within one quarter of a mile.

The correct legal description of the property includes the county in which the property is located as well as the correct legal survey description of the property. The legal survey description will include a combination of descriptors such as survey, block, section, township, range, league, labor, homestead or abstract number.

The correct location of the proposed well site further requires that the distance, in yards, to the proposed site be accurately measured from two non-parallel legal and physical boundary lines. These measurements must be made from the legal and physical boundary lines and not from property lines, unless, as is usually the case, such lines are the property lines. The District has, in the past, accepted measurements from property lines; however, that policy created problems when the property was further subdivided or combined and the property line was no longer physically recognizable. Also, experience has shown that there is considerable confusion as to the location of property lines, and there are no maps available from which the District could determine such lines. For these reasons, the District policy was changed in 1970, and property line measurements are no longer accepted.

Roads as Section Lines

Much of the land in the District has a public road, either a graded dirt road or a paved road, along the legal and physical boundary between sections. In those situations where a farmer must measure the distance of a proposed well site from a roadway, which forms the legal division, the measurement must be made from the center line of the road and *not* from the edge of the farmed land. The picture on page 3 shows two men measuring from the center of a road to a proposed well site. Note the tape stretched across the roadway ditch.

It is necessary that measurements be made from the center line of the roads for two reasons. First, the center line of the road is, in almost every case, the actual legal survey divider between land sections. The land was surveyed and divided prior to the development of the roads. The roads were usually built by taking land equally from owners on each side of the dividing line; therefore, the center line of the road is the original land division line. The second reason for measuring from the center line of the road is to provide a consistent standardized procedure for accurately measuring the well site location and subsequently for locating or measuring the well location. Figure 1 (page 3) shows an example of the proper measurements for locating a well from the road.

There are some situations in the High Plains where a road was built entirely on one side of a section line rather than equally on each side of the

—continued on page 3 . . .WELL

District Welcomes New Employee

The High Plains Underground Water Conservation District No. 1 recently employed a new field representative, George Tull. Born in Dallas, Tull graduated from Lubbock's Monterey High School in 1965.

Formerly employed with Tull Supply, a cotton gin supply house in Wolfforth, Tull fulfilled his military obligation with the United States Army in Fort Benning, Georgia, Germany and Viet Nam. He served from 1965-1969.

Tull and his wife, Carol, have a 14-month-old son named George. The Tulls attend Faith Temple Church in Lubbock.

The Cross Section welcomes George Tull to the District.

GEORGE TULL

Ross Goodwin (right), President of the District's Board of Directors, is shown submitting a check for one thousand dollars to Dr. Thomas C. Longnecker, Executive Vice President and Director of the High Plains Research Foundation, Halfway, Texas. This grant was awarded to the Foundation to continue its search for possible reasonable alternatives for preplant irrigation. In their discussion of this research, at the general called meeting of the Board of Directors on April 4, 1972, all of the five District Directors expressed doubts that a reasonable substitute for preplant irrigation was eminent, particularly for those areas of very limited groundwater supplies, such as in the southern part of the Water District. However, they unanimously concurred in awarding this research grant, noting that all avenues of research must be explored that could lead to better water conservation practices, and the prolonging of this area's groundwater supply.

EVAPORATION LOSS NOW REPORTED DAILY

By OLIVER NEWTON
and OTTO WILKE*

South Plains irrigation farmers have another management tool at their disposal this year since the beginning of daily evaporation reports from the National Weather Service.

Due to the efforts of the Texas A&M University Agricultural Research and Extension Center at Lubbock, five locations in the area are now reporting surface water evaporation each 24 hours. The results are averaged and then disseminated through the weather wire service to mass media outlets on the South Plains.

This data is offered in such a way that farmers can use the information in deciding when to irrigate and how much water is needed. This will be especially useful to producers with adequate water supplies and allow them to plan their irrigations better.

The information is gathered from evaporation pan readings taken daily at Lubbock, Locketville, Needmore, Plainview and Spur. Studies conducted by the Center have indicated a relationship between evaporation losses and the amount of soil moisture extracted by crops.

The water loss from the pans and the water loss because of a crop are not the same, but a high correlation does exist. Many factors influence water use by plants, including weather conditions, age and growth stage of the crop, size of the plants, and the availability of soil moisture. But since crops use water relative to the drying rate, it is possible to evaluate this weather factor by measuring the amount of water lost from an open water surface.

The information is reported as total losses to evaporation for selected periods. These totals will be for the past 1, 3, 5, 7, 10 and 15 days.

The data will be most useful for a well-irrigated crop because, as soil dries out, the water use by plants becomes more dependent on soil moisture conditions than on weather conditions.

The fraction of the pan irrigation used by well-irrigated cotton and sorghum during several stages of growth has been estimated by Texas Agricultural Experiment Station researchers. The amount of irrigation needed can be figured by multiplying the fraction of pan evaporation at the crop's development stage by the total amount of evaporation since the last irrigation.

The information can also be useful

—continued on page 2 . . . EVAPORATION

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REBECCA CLINTON, Asst. Editor

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District Office at Lubbock

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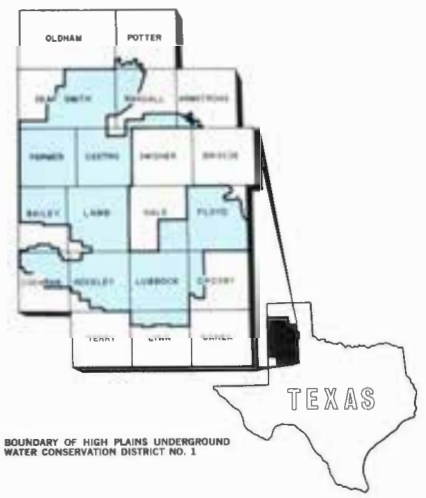
Obbie Goolsby	Field Representative
J. Dan Seale	Field Representative
George Tull	Field Representative
Clifford Thompson	Head, Permit Section
Mrs. Dana Wacasey	Secretary-Bookkeeper
Mrs. Norma Fite	Secretary
Mrs. Rebecca Clinton	Public Education



BOUNDARY OF HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

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Donnie Clayton, 1976	Box 276, Springlake

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Dan Young, 1974	4607 W 14th Street, Lubbock
Glenn Blackmon, 1976	Route 1, Shallowater
Andrew (Buddy) Turnbow, 1976	Route 5, Box 151 B, Lubbock
Alex Bednarz, 1976	Route 1, Slaton

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Farm Bureau, 1714 Fifth Ave., Canyon

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Richard Friemel, 1973	Rt. 1, Canyon
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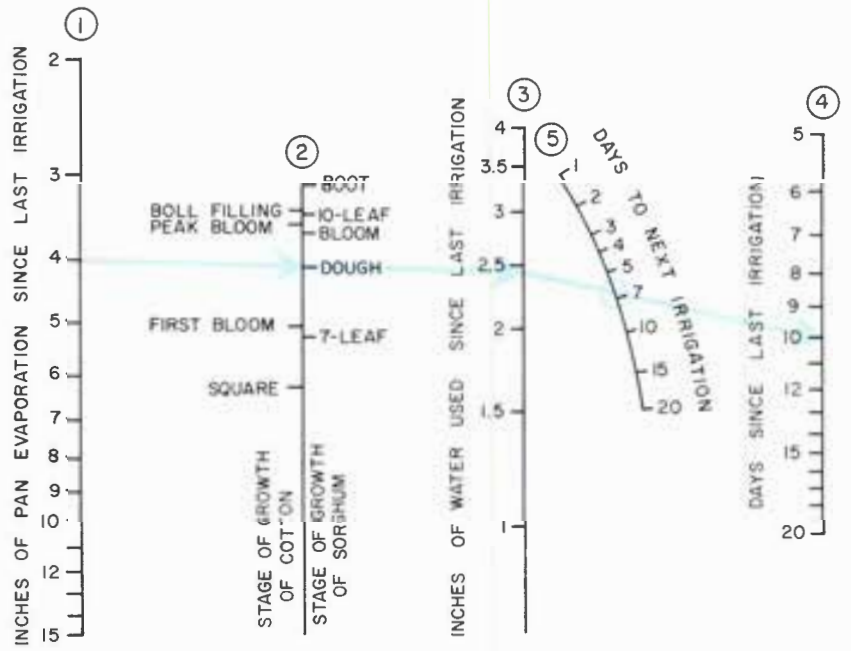
Fred Begert, 1975	1422 Hillcrest, Canyon

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.



IRRIGATION SCHEDULING NOMOGRAPH

EVAPORATION . . .

—continued from page 1

to farmers with limited irrigation water. If producers can delay the first watering, the plants will be smaller and require less water, or a smaller fraction of pan evaporation, for adequate irrigation later.

By carefully choosing planting dates and varieties, farmers can cause the peak water use period of sorghum to occur at a different time than peak needs of cotton. Farmers can then do a better job of watering both crops.

The system admittedly has its weaknesses and is not guaranteed for accuracy. But the daily information can be a valuable tool for farmers who have had to base irrigation decisions on guesswork or obvious signs of plant stress.

How to Use the Nomograph

Following are instructions on how to use the nomograph.

A. Obtain the number of inches of pan evaporation since the last irrigation from the local newspaper.

B. Subtract the inches of rainfall occurring since the last irrigation from the inches of evaporation to obtain a corrected value of evaporation in inches.

C. Draw a straight line from the corrected value of evaporation on Scale 1 through the correct stage of growth on Scale 2 and on to Scale 3. Where the line touches Scale 3, read the inches of water used by the crop since the last irrigation.

D. Draw a straight line from the inches of water used on Scale 3 to the number of days since the last irrigation on Scale 4. Where this straight line crosses Scale 5, read the number of days till the next 4-inch irrigation is due. The schedule should be updated periodically because changing weather conditions will increase or decrease the rate of water use.

EXAMPLE: Suppose that you are scheduling an irrigation for sorghum in the dough stage and that 4 inches of evaporation and no rainfall have occurred in the last 10 days since the last irrigation. On the nomograph in Figure 3 a straight line is drawn from 4 inches on Scale 1 through the "dough" mark on Scale 2 and continuing on to Scale 3. On Scale 3, read that about 2.4 inches of water have been used. Next, a straight line is drawn from 2.4 on Scale 3 to the 10-day mark on Scale 4. From Scale 5, read that about 7 days remain before the next irrigation is due if weather conditions continue unchanged.

*Oliver Newton and Otto Wilke are Agricultural Meteorologist, National Weather Service, and Agricultural Engineer, Texas Agricultural Experiment Station, respectively.

Hill Appointed U.S. Commissioner

Leon W. Hill, Director of Region 5 of the Bureau of Reclamation, has been appointed by President Nixon as United States Commissioner and Chairman of the three-state Canadian River Compact Commission. Hill's retirement with the Bureau of Reclamation was effective April 29.

Hill has worked 36 years in Federal Government service, the last 26 of which were in the Region 5 office in Amarillo. He held positions there as an agricultural economist, Assistant Regional Operation and Maintenance Supervisor, and Regional Supervisor of Irrigation, before being appointed Regional Director in 1959.

A native of Winters, Texas, Hill holds a BS degree in business administration from New Mexico A&M University and an MS in economics from the University of Texas.

During his years as Regional Director, Hill administered all acts laying the groundwork for and leading to the construction of the Canadian River Project—which provides water from Lake Meredith, on the Canadian River northeast of Amarillo, to eleven Southern High Plains cities. Hill also conducted the reconnaissance and feasibility studies for this project.

Hill's new appointment will allow him to remain in Amarillo.

Named to succeed Hill is James A. Bradley, Chief of the Bureau of Reclamation Division of Power in Washington, D.C., since 1970. Prior to going to Washington, Bradley was Assistant Director of the Bureau of Reclamation's Region 6, with headquarters in Billings, Montana. He

—continued on page 3 . . . HILL

NON-FOOD ITEMS INFLATE FOOD COSTS

"The price of pantyhose, paper towels, plants, toothpaste and a whole host of non-food items is all too often figured in the monthly food bill in most households," says Dr. H. O. Kunkel, Dean, College of Agriculture at Texas A&M University.

"In fact, recent surveys of the homemaker's grocery cart revealed that $2.80 out of every $10 spent at the supermarket goes for these non-food items," the dean continued. "But that's only one of the many items that may inflate 'food costs' at the market place. The modern, busy and sometimes working homemaker needs many built-in labor savers in the foods she buys. A wide selection of top quality food items ready to pop into the oven, saucepan or skillet fit her lifestyle, and allow her more time to spend on other personal or family needs. The wide variety of package sizes helps make shopping more pleasant and are much easier to store in the freezer or pantry. These conveniences, as desirable as they are, do increase labor costs. In fact, perhaps as much as 47 percent of the cost of food marketing goes for labor," Kunkel pointed out.

"Another 13 percent goes to packaging," he continued. "Put in round figures, that could mean special packaging takes $13 out of every $100 the homemaker spends on food items. Nationally, it amounted to $8.8 billion out of a $101.6 billion food bill paid by consumers in 1971," he explained. "Unfortunately these costs are often viewed by the consumer as being 'food costs' and not viewed as costs quite separate from costs of the food as produced on the farm or ranch."

Demands Increase

Dr. William Vastine, Food Distribution Specialist with the Texas Agricultural Extension Service at Texas A&M University, contends that food costs have increased due to increased consumer demands and tastes. "Higher quality foods are demanded and more convenience items are requested. Variety and convenience are key words in the present state of food products."

"Granted, food prices have increased, some 3 percent last year, and are expected to increase 4 to 4.5 percent in 1972. But not all food items have gone up in price. Consider poultry and dairy products and pork. All these have experienced price declines in recent months, according to information from the U. S. Department of Agriculture."

The factors of supply and demand have a big effect on food prices, according to the specialist. "A good example is beef. Beef has been in short supply and high demand so, naturally, prices have been higher. In fact, beef prices have increased to the peak level they were in 1952. On the other hand, can you list many other items that are at the same price level they were 20 years ago?"

Processing and retailing costs have also spiraled. And with consumers demanding more processing and special packaging, prices of products on the grocery shelf may be quite high compared to a few years ago. In many cases, home preparation may be the answer to high food prices, contends Vastine.

Only 16 Percent

Kunkel feels that food prices have not increased nearly as much as other consumer goods. "The average consuming family in 1952 spent about 23 percent of its take-home pay on food. In 1971, food costs accounted for only 16 percent. Of course, some families would spend a higher percentage, while others spent less, depending upon the family income-level. It is important to note, however, that some food items, particularly poultry and milk products, are presently in a seasonal downtrend and are exceptionally good buys in most market areas."

Kunkel explained that, as with other consumer goods, the buyers have developed solid preferences and the trend is toward the deluxe standard.

"We're delighted that the consumer values high quality food and food products. The fact that we seem to prefer steaks to the lower-priced cuts, the perfectly shaped apple without blemishes, and crisp, well colored vegetable products is justifiable. To put this type of product on the market, the producer must follow the best production and marketing procedures."

"Defending agriculture comes easy to me . . . for I know of no other industry that has developed the output per man hour that agriculture has achieved to date . . . and I would hate to think what the price of food would be today if the agricultural sector had failed to meet this tremendous record of efficiency," concluded Kunkel.

District Field Representatives, Dan Seale and Obbie Goolsby, locate a well from the center line of the road.

WELL . . .

—continued from page 1

line. In these situations, the measurements to the well site should still be made from the center line of the road. A space on the permit is provided for explanatory remarks which should include an explanation that the road is not the section line, and the measured distance from the center line of the road to the legal survey line. The reason for measuring from the center of the road is to insure that the well's location can be recognized from identifiable landmarks in future years.

Section Lines with no Roads

When there is no paved or maintained graded dirt road along a legal and physical boundary, that boundary must be accurately determined in order to measure the proposed location. The location of that line should be described, in the remarks section of the permit, in sufficient detail that the location can be found in later years. This would require the line to be defined in reference to a maintained road that acts as an extension of the line, a permanent fence line, a permanent boundary marker, or other permanent describable identifiers.

Stake the Proposed Well Site

When the location of a proposed well site is measured, it should be marked with a stake. The stake provides a definite position marker when measuring the well site and when measuring the distance to the nearby wells. The picture on this page shows the well location stake in place. The steel measuring tape can be seen as it is stretched tight in order to make the measurement. Also, the stake should be used to show the driller the exact place to drill the well. If the proposed site is not well marked, the well could easily be drilled at the wrong location, which could result in the well being declared invalid.

Nearby Existing Wells

The distance, in yards, from the proposed well site to the three nearest existing wells within one quarter mile must be measured. These measurements will be the straight line distance from the proposed well site to each well. These distances determine the largest yield that may legally be pumped by a well at the proposed site.

If a farmer will follow the procedures as set forth above in describing his property and accurately measure the distances as explained, he should have no trouble concerning the validity of a well after it is drilled. When the measurements are not made and recorded properly, a farmer is subjecting himself to possible loss of the well and his investment therein. The loss of the investment in a well would be an expensive lesson that could be avoided by simply following the specified requirements.

The problems of applicants for wells questioning the validity of the location of his neighbor's wells has been increasing in frequency. As wells become more and more crowded the competition for valid well locations can be expected to become increasingly severe. The landowner can guarantee the protection of his well by accurately complying with the District's well-permitting and registration procedures.

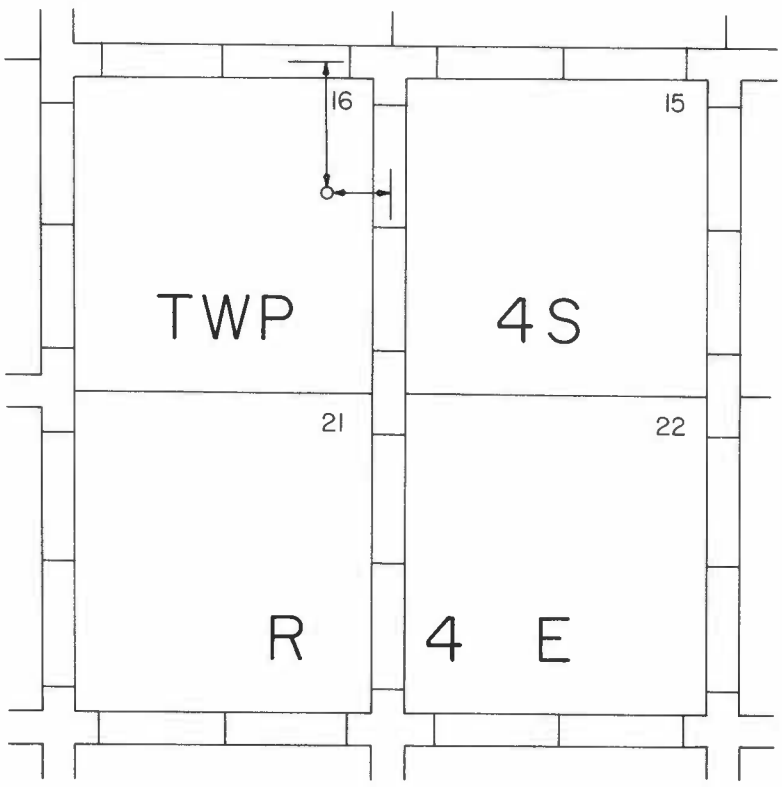


FIGURE 1

HILL . . .

—continued from page 2

was also formerly associated with Region 5.

Bradley began his career with the Bureau in 1948 as an electrical engineer assigned to the South Platte River District office in Estes Park, Colorado.

Also announcing his retirement recently was John Thompson, Assistant Director of Region 5.

One of the few remaining wooden Eclipse Windmills is located on the Cannon Ranch. The diameter of 22½ feet makes it the largest Eclipse Windmill ever made. In the picture below, note the size of the mill with respect to the man half way up the derrick.

Water Supply System Studied

By T. LINDSAY BAKER
and STEVE RAE*

The aim of the Historic American Engineering Record administered by the Department of the Interior is to record and document significant engineering achievements. Our particular project under this program is a study of the development of water supply systems in the Southwest. The project is funded by the National Park Service and Water Resources Center at Texas Tech University. Currently about 50 sites are being studied by a team of investigators from both the departments of Civil Engineering and History at Texas Tech.

One of the most important engineering achievements which influenced the development of West Texas was the windmill. Windmills have been used in Europe since before the 12th century. However, the European mill, often 50 to 100 feet in diameter, was too large to be successfully used and transported in the West. Daniel Halladay, a mechanic from Connecticut, is credited with the invention of the first American windmill in 1854 which proved to be a marketable product. In 1857, the U.S. Wind Engine Company was formed for manufacturing the Halladay windmill.

The first windmills came to West Texas about 1881 with the coming of the railroads. A dependable supply of good quality water was necessary for steam locomotive boiler supply. Both the Southern Pacific (San Antonio to El Paso) and Texas and Pacific (Fort Worth to El Paso) Railroads made use of the windmill for water supply. These railroads used windmills made by the Eclipse Windmill Company. Major W. V. Johnson, owner of the Dixie Ranch in Lubbock County, was probably the first to use windmills on the High Plains in 1884. He had six windmills installed on his ranch for watering cattle.

One of the few remaining wooden Eclipse windmills is located on the Cannon Ranch west of Sheffield, Texas. This windmill which has been restored is a Railroad Pattern Eclipse and has a diameter of 22½ feet, the largest ever made by the Eclipse Company.

ECLIPSE WINDMILL

*T. Lindsay Baker and Steve Rae are Research Assistant, Department of History and Water Resources Center, and Research Assistant, Water Resources Center, respectively.

HERBICIDE RUN-OFF NOT A THREAT

Herbicide run-off from farmland is apparently not a grave threat to the environment, according to studies by Texas Agricultural Experiment Station researchers in the Panhandle.

Dr. Allen Wiese, weed scientist at the USDA Southwestern Great Plains Research Center at Bushland, began a study in the spring of 1968 that has shown only minute amounts of herbicides dissolved in irrigation or rain water that ran off fields.

The chemicals used in the study included Treflan, AAtrex, and Milogard; all common weed control products. In the first season, the fields received either rainfall or irrigation water four to five times.

"The first water samples after herbicide application contained the most chemical, but by fall no herbicides could be detected in the run-off water," Wiese reports.

Milogard had the highest concentration in the water, which was less than a fifth of one part per million. The other two substances had much less concentration than the Milogard.

"That means that if there was one inch of run-off from 100 acres, only a little more than five pounds of the chemical would be collected, which is well below the danger level in this area's playa lakes," the scientist added.

As a further test, the researchers wanted to determine what would happen to herbicides in playa lake water. Small ponds 20 by 50 feet in size were constructed in a playa bed. Treflan and AAtrex were applied at a rate of one pound per acre to the bottom of each pond. In addition, one-half pound of the new brush herbicide Tordon was tested.

The ponds were then flooded with six inches of water and the bottoms were kept covered for two months. Six months later, the ponds were flooded again for one month. The Treflan disappeared from the water and bottom soil at the end of the first flooding period of two months.

"The AAtrex and Tordon persisted for 90 days, but were no longer present in the soil after 18 months," Wiese concludes.

PLAN AHEAD

INSTALL A TAILWATER RECOVERY SYSTEM
BEFORE THE SUMMER IRRIGATION SEASON BEGINS

DRILLING STATISTICS FOR 1971

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Reported Dry Holes
ARMSTRONG	6	6	0	0
BAILEY	102	64	11	1
CASTRO	131	122	10	0
COCHRAN	19	15	1	0
CROSBY	17	15	0	0
DEAF SMITH	189	135	15	2
FLOYD	100	83	4	1
HALE	42	27	4	2
HOCKLEY	120	85	4	4
LAMB	160	109	26	5
LUBBOCK	177	142	14	4
LYNN	36	21	2	1
PARMER	197	156	12	2
POTTER	4	4	0	0
RANDALL	54	41	5	2
TOTALS	1354	1025	108	24

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 18—No. 6 "THERE IS NO SUBSTITUTE FOR WATER" *June, 1972*

Members of the U.S. Geological Survey, standing left to right, are Leon Hughes, Frank Koopman, Al Winslow, Warren Wood, Roy Hendricks, Dale Yost, C. V. Theis, Richmond Brown, Don Signor, Leonard Wood and John Moore.

USGS Group Visits District

The High Plains Underground Water Conservation District No. 1 was recently paid a visit by Roy Hendricks, Chief Hydrologist of the U. S. Geological Survey. He and other members of the survey were in Lubbock as an advisory committee to review work being done on a project at the High Plains Artificial Recharge Research Station in Lubbock.

Hendricks, of Arlington, Virginia, received a Bachelor of Science degree in Civil Engineering from the University of Florida in 1931. Since 1935 he has held several positions with the Water Resources Division of the U. S. Geological Survey.

From 1935 to 1951 he worked on surface-water investigations in Florida, Georgia and Louisiana. Serving as Staff Engineer of the Technical Coordination Branch in Atlanta, Georgia, from 1951 to 1956, Hendricks moved to Washington, D.C., from 1956 to 1960 to act as Chief of the Research Section of the General Hydrology Branch. He also served as Chief of the Surface Water Branch (1960-1962) and Associate Chief of the Water Resources Division (1963-1965), both also in the Nation's capitol. From 1966 to the present he has served as Chief Hydrologist of the U. S. Geological Survey.

Other members of the visiting committee are Leon S. Hughes, head of the Water Quality Lab, Austin; Frank Koopman, Supervisory Hydrologist, Albuquerque, New Mexico District; Al Winslow, Associate District Chief, Austin District; Dale Yost, Texas District Chief of the Water Resources Division, Austin; C. V. Theis, Hydrologist, Albuquerque, New Mexico; Leonard Wood, Hydrologist, Branch of Groundwater, Water Resources Division, Washington, D.C., and John Moore, Assistant Regional Hydrologist, Rocky Mountain Region, Denver, Colorado.

Working on the High Plains Project are Richmond Brown, Project Chief, High Plains Artificial Recharge Research Project, and Warren Wood and Don Signor, both Research Hydrologists from Lubbock.

ROY HENDRICKS

CRASH CLAIMS LIFE OF NOTED GEOLOGIST

Dr. William D. Miller, Chairman of the Geosciences Department of Texas Tech University, died in the crash of a light airplane in the mountains of the Gila Wilderness area of Southwest New Mexico on June 22. The crash site was a few miles east of Glenwood, New Mexico, a town near the Arizona border. Four other geologists, Harry S. Birdseye, Albuquerque, New Mexico; H. B. Renfro of Dallas; Larry Hammond and Kent Perry of Golden, Colorado, and John F. Harrison, an attorney from Dallas, also perished in the crash of the six-passenger, Piper Cherokee-6 aircraft. The crash victims were reportedly on a business trip to the Southwest New Mexico area. Dr. Birdseye was reportedly piloting the aircraft.

Dr. Miller, or Bill, as he was affectionately known to his many friends, and business and professional acquaintances, was a highly respected geologist with many diversified professional and business interests. Bill received his bachelor's and master's degrees in Geology from Texas Tech in 1957 and 1959, and his Doctorate from the University of Missouri in 1963.

For a man whose life was tragically ended at 41 years of age, the magnitude of Bill's professional accomplishments is a most impressive monument to his dynamic energy and expertise in the academic, earth sciences, and business communities. He was an active member of several civic organizations; a Director of the State Savings and Loan Association, Member of the Board of Directors of Silver Monument Minerals Incorporated, President of Cotey Chemical Corporation, and a consultant to nearly 20 different enterprises including government agencies, oil corporations, cattle feeders, county water user's associations, other consultants, and to President Lyndon B. Johnson. He was also a member (at the time of his death) of ten committees and commissions, with memberships in approximately 14 professional associations—holding the chairmanship, directorship, presidential or vice-presidential positions in several such organizations.

After returning to Texas Tech as an Assistant Professor in 1962, Bill directed his energies to the investigation and solution of problems facing the High Plains area—his major field of interest being groundwater and the water well industry. His first professional efforts in the groundwater field resulted in a report on the organic contamination of wells, "Water Well Development Problems", *The Cross Section,* March, 1964. He authored some 12 other reports, treating problems ranging from earthquake damage of water wells, to the sand and gravel resources in the Trinity River Valley

—continued on page 3 . . . MILLER

DR. WILLIAM MILLER

Cross Section Editor Named

In February of this year, Frank Rayner, Manager of the District and Editor of *The Cross Section,* added a new employee to the District staff, Mrs. Rebecca Clinton. Having employed her help on the past four issues of *The Cross Section,* Rayner has decided to turn the editorship over to Rebecca.

A native of Dallas, Rebecca received a bachelor's degree in journalism from Texas Tech University in May, 1970. While at Tech, she was Managing Editor of *The University Daily* (the campus newspaper), President of Gamma Phi Beta social sorority, Vice-President of Theta Sigma Phi women's journalism society, one of Tech's first five women members of Sigma Delta Chi journalism society, and was cited on the Dean's List. She is presently an active alumnus member of Gamma Phi Beta and Theta Sigma Phi.

Prior to coming to the District,

—continued on page 3 . . . EDITOR

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

REBECCA CLINTON, Editor

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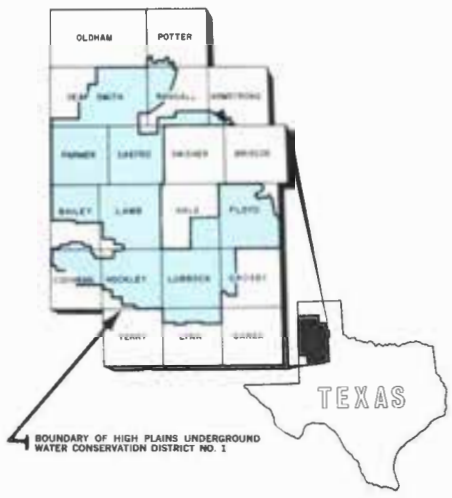


NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

SURVEY SAYS IRRIGATION INCREASES AS WATER TABLE DECREASES

1971 saw a further increase in the amount of irrigated land and the number of irrigation wells in the Panhandle and South Plains, but the wells continue to deliver less water each year.

This and other information is contained in the 1971 edition of the High Plains Irrigation Survey prepared by Leon New, Area Irrigation Specialist with the Texas Agricultural Extension Service, from information provided by county agricultural agents in the 42-county survey area.

According to the survey, the total crop acreage in the 42-county area was about 9.6 million acres in 1971, which was 24,000 less than the year before. Some dryland crops were not planted due to dry weather. Some crops were stressed for moisture during the extremely dry conditions early in the season due to inadequate soil moisture. But more of the total acreage is irrigated than in past years.

High Plains farmers irrigated almost 5.8 million acres in last year, for an increase of 276,000 acres over 1970. An additional half million acres are subject to irrigation, to push the total potential acreage to almost 6.3 million.

Irrigation well statistics shed a light on the state of the High Plains water supply. Some 1,200 were drilled last year to raise the total to more than 66,000. But in 1971, each well irrigated only 87 acres, as compared to 103 acres ten years ago. Available water was spread over slightly more acres this year in an effort to water thirsty crops and offset the effects of the drought. Almost 90 percent of the wells now must lift water more than 125 feet, and almost 75 percent average less than 700 gallons output per minute. As in the past, most wells are powered by natural gas.

A happy note is that using water from playa lakes and other recirculating systems is becoming more common. About 2,500 lakes and 2,200 recirculating systems were used in 1971 to supplement wells. In contrast to irrigation wells, most of these pumping installations were powered by LP gas or electricity.

As in the past, surface irrigation is the most popular method, and accounts for 79 percent of the total. But sprinkler systems are gaining in popularity. They accounted for 21 percent of the total irrigated land in 1971, and enjoyed an eight percent increase over sprinkler-irrigated land in 1970. There are almost 9,000 sprinkler systems currently irrigating an average of 146 acres each. About 150 new systems were added last year.

More Underground Pipe

The survey reports that about 925 additional miles of underground pipe were installed in 1971, and now furnish water to 54 percent of the total irrigated acreage. Underground pipe is found on more than 75 percent of all irrigated farms.

Of the 9.6 million total crop acreage, 38 percent was planted to grain sorghum, 25 percent to cotton and 22 percent to allotted wheat. Alfalfa, castors, and ensilage, along with forage and pasture, accounted for most of the rest of the acreage.

Grain sorghum again led other crops in percentage of irrigated land. The 39 percent total was tops over cotton with 27 percent and wheat with 17 percent.

Corn was the commodity with the largest increase last year, with a 34 percent jump over 1970. All 344,000 acres of corn were irrigated.

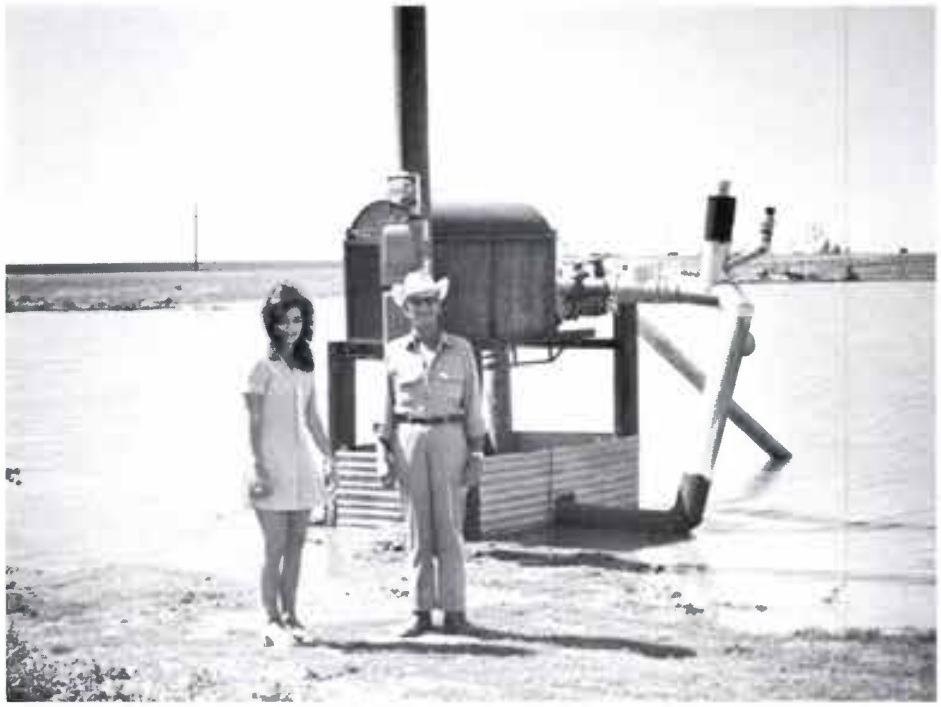
Cotton enjoyed an increase of 11 percent in total acreage over the preceding year. Sixty-four percent was irrigated. Grain sorghum had a jump of seven percent on irrigated acreage, but dropped 14 percent on dryland. This was blamed on the drought conditions during most of the year. Sixty-one percent was irrigated.

Wheat lost seven percent in 1971. Almost a third of the crop was grazed out and an additional quarter million acres were grazed on set-aside acreage.

The survey gives county-by-county statistics on the number of irrigated farms, acres under cultivation and irrigation, and totals on almost every crop grown in the High Plains. In addition to information concerning irrigation wells, the report also indicates trends in irrigation activities of the 42-county area.

Drilling Statistics for Jan., Feb., Mar. and Apr., 1972

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Reported Dry Holes
ARMSTRONG	0	0	0	0
BAILEY	27	16	1	0
CASTRO	39	13	5	1
COCHRAN	14	0	0	0
CROSBY	6	2	1	0
DEAF SMITH	48	33	0	0
FLOYD	38	16	5	0
HALE	9	3	2	1
HOCKLEY	34	20	1	0
LAMB	56	30	10	1
LUBBOCK	74	20	1	4
LYNN	25	17	0	2
PARMER	67	35	7	1
POTTER	0	0	0	0
RANDALL	13	4	0	0
TOTAL	**450**	**209**	**33**	**10**



Rebecca Clinton and Tommy McKinnon stand in front of the centrifugal pump located on his playa lake he recently purchased for the purpose of irrigating his land with surface water.

Tommy McKinnon equipped the lake with this centrifugal pump driven by a 30-horsepower electric motor. It will pump 650-700 gallons per minute.

MILLER . . . continued from page 1

of Texas. In addition to his published works, he had presented groundwater papers at more than ten regional, state and national water conferences.

A Certified Professional Geologist, one of Bill's greatest talents was his ability to develop practical applications for his professional research and expertise. As an example, he was not content to stop at investigating and identifying the magnitude of the organic contamination of wells in the High Plains; he went on to develop and market a chemical to treat wells thus affected. He was constantly searching for ways to put his, and others', knowledge of natural resources to beneficial use.

This drive to apply knowledge to seeking solutions to this area's groundwater and related problems gave new direction to the Department of Geosciences at Tech. After being appointed the Chairman of the Tech Geosciences Department in 1970, by Dr. Grover E. Murray, President of the University, Bill began to reshape research efforts of the Department toward practical solutions to regional groundwater problems. His managerial skills are exemplified by the regional, state and national acclaim now accorded the Tech Geosciences Department.

In recent years, approximately $120,000 in research grants have been awarded to the Department through his efforts. At the time of his death he was involved in natural resources, remote sensing (observation by satellites) research, funded by the National Aeronautics and Space Administration. Also near completion was his report, "Specific Ion Distribution in Ogallala Groundwater, Texas High Plains".

In his short tenure at Tech, Bill had emerged as a leader in the water resources community. He was Chairman of the West Texas Water Institute; he organized the first, and very successful, Ogallala Aquifer Symposium; and he recently established and conducted, with other members of the Geosciences Department staff, the first comprehensive short-course on geohydrology and water-well drilling techniques for water-well drillers ever undertaken by an institution of higher learning in Texas.

In spite of his extensive involvement in business, the earth sciences professions, and the full-time Chairmanship of the Tech Geosciences Department, he was never too busy to visit with students, friends, and business and professional acquaintances. His honesty, fairness, and, when called upon, subtle wit and dry humor, made each of these encounters beneficial and enjoyable. Time can be expected to fill the void left in the life of his friends, but his profession will for long show the abyss.

AREA FARMER SAVES WATER

Tommy McKinnon, Route 1, Littlefield, suffers from the same plight as other High Plains farmers, but he is putting it all together to solve the problem—by buying a playa lake to reclaim surface water.

Having been a part of a farming family since 1929, McKinnon came to the West Texas area "when there weren't even any irrigation wells". He grew up seeing the advent of irrigation wells, the decline of the water table, and the subsequent search for other methods of watering crops. So, recently, he decided to give his three small irrigation wells a rest by purchasing a nearby playa lake to catch and hold surface water. McKinnon installed a pump to direct the water held by the lake through nearly 2,500 feet of pipeline to his 160 acres of cotton, maize and grass.

The process of obtaining the lake began with buying the land containing the playa and applying for a permit from the State Highway Department in Lubbock to lay the pipeline from the lake, under the highway (Hwy. 84) and onto his farmland. A maintenance engineer from the highway department was at the site every day to supervise the installation of the steel pipeline. It was connected to the original pipeline system on the farm.

Accordng to McKinnon, the State of Texas has an easement on the land where the lake is located. The state owns the dirt that comes out of the hole and McKinnon owns the water that runs off or falls into the hole. The hole, 25 feet deep, will hold at least 31 acre feet of water, said McKinnon. "I plan to pump water from the lake until it goes dry and then pump my irrigation wells."

McKinnon has equipped the playa lake with a centrifugal pump driven by a 30-horse-power electric motor that will pump 650 to 700 gallons per minute.

Having paid more than $5,000 for the total lake project, McKinnon believes that he will soon begin to see a return on his investment. "I believe that buying the lake will increase the value of my land by turning it from partial dry-land farming to irrigation farming," said McKinnon.

The High Plains Underground Water Conservation District No. 1 commends Tommy McKinnon for taking advantage of surface water for irrigation, in an effort to conserve the groundwater under his land. He, like many of today's farmers, is trying to find a way to save the precious and limited supply of groundwater by spending his own money to search out possible avenues. McKinnon is doing a service to this water-short area, as well as to himself. *The Cross Section* speaks for the District in citing him for a job well done.

REBECCA CLINTON

EDITOR . . . continued from page 1

Rebecca worked as an intern for *The Dallas Morning News,* Editorial Assistant of Technical Publications for Recognition Equipment, Inc. in Dallas, and as a substitute teacher in the Dallas and Irving school districts.

Recently married to Eddy Clinton of Dallas, she and her husband moved to Lubbock, where he is a senior student in Telecommunications at Texas Tech and Assistant Sports Editor of the campus newspaper. He is employed at Varsity Press and the couple attends St. Paul's on the Plains Episcopal Church in Lubbock.

Upon taking over the editing chores, Rebecca expressed the desire to maintain the excellent standard displayed by *The Cross Section* under Rayner's direction. "I will do my part to uphold the reputation *The Cross Section* enjoys with its readers," she said.

Rebecca is the ninth editor of the tabloid since its inception in June of 1954.

This one 8-ounce glass of water would quench your thirst at a cost of only $0.0000677 (or one six-thousandth part of a penny.)*

However, for a farmer to quench the one-time thirst of his crop at the above rate, it would cost him $117.67 per acre.**

**Based on the City of Lubbock rates for minimum water use.*

***Figures based on consideration of one 4-inch irrigation—application costs not included. At the municipal rate one acre foot of water would cost $353.00.*

CAPPING ABANDONED WELLS

This is an open abandoned well. Note the size of the hole. It would be very easy for a fully grown person to fall into it.

This is an example of an incorrect way to cap a well. The boards and rocks are light enough in weight for a child to lift, leaving the hole open.

Tony Schertz and George Tull, Draftsman and Field Representative for the District, balance a steel plate welded to a piece of casing. This is a sample of an approved method of capping a well.

In this day of saving water, that resource most precious to the High Plains farmer, there remains also the duty to preserve another gift to this good earth—human lives. The High Plains Underground Water Conservation District No. 1 has tried many times in the past to instill in our farmers the desire to eliminate that giant in death hazards—the abandoned irrigation well.

Articles in *The Cross Section* have stressed the need to cap these holes by telling of deaths resulting from stepping into a camouflaged well improperly covered. *The Cross Section* has also told of the State laws and District rules regarding the closing of abandoned wells. In this article, we will attempt to explain a successful method the District has employed for capping a well.

As can be seen in the pictures on this page, where the concrete slab and steel casing remain intact in the well, the District plugged the well by inserting a section of casing (3 to 4 feet long) which has been welded to a piece of steel plate (¼ inch thick). Such a plug should be heavy enough and the section of casing should be long enough so that children cannot lift the plug out of the well hole. This type of plug renders the well capable of being reopened, if necessary. (Note: A well permit is required to reopen an abandoned well.)

The pictures of the well capped by the District show one of the wells included in the District's observation well program. A small, ½-inch hole is cut in the center of the plate in order for the District to measure depth to water without removing the cap. The District capped this well as a sample to farmers with closed wells.

Another point in question brought to the District's attention by farmers is that State law requires that the capping be "capable of sustaining weight of not less than four hundred (400) pounds . . . " This does not mean that the capping must weigh 400 pounds. The cover shown in the pictures bearing the Water District's name weighs approximately 120 pounds.

Improper capping methods employed by farmers include placing a piece of tin or board over the hole. This will easily rot out in time. Often a board or group of rocks can be covered by growing weeds or grass, thus rendering the cover incapable of being seen as well as being collapsible.

The cost of capping a well in the correct manner is nominal (around $15), especially when considering the life-saving factor. Please do your part in obeying the law and saving a life before it's too late.

Pictured above is a view of the plug shown in the picture at left after it has been inserted into the well. The District recommends a plug of this type. (Note tire tracks of farm vehicles that have been driven over the well cover.)

HIGH PLAINS UNDERGROUND WATER
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THE Cross SECTION

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

Volume 18—No. 7 "THERE IS NO SUBSTITUTE FOR WATER" *July, 1972*

Parmer County attorney Sam Aldridge talks about the benefits of reusing irrigation water with tailwater pits. The Farwell lawyer-landowner maintains four tailwater pits on three sections of land.

SAM ALDRIDGE

Attorney Endorses Tailwater Pits

Sam Aldridge, noted Parmer County attorney, is a firm believer in water conservation and endorses tailwater pits as a method of reusing valuable groundwater. Believing that water waste will eventually affect every land owner in the country, Aldridge said in an interview July 17, "We'll live to see the day that we will recall a mental picture of water running into the draw and wish we had some of it back."

Aldridge has had this "mental picture" for a long time now, but knows that at least he is doing his part to save the water under his land—by operating four tailwater pits on three sections.

J. T. Ford, farm manager, agreed with the attorney that "one tailwater pump, properly run and piped, will equal two 8-inch irrigation wells, and will pump twice as much water as an irrigation well." To put it another way, the two believe they can get an equivalent of two 8-inch wells of tailwater from the seven 8-inch wells contributing water to the pit. Ford says a tailwater pit, pumping up to 1,500 gallons per minute, can pump 30 to 60 rows of 2-inch tubes, as compared to 15 to 30 rows run by one of his 8-inch wells.

Aldridge believes some farmers run a well of water off their land in a day. "Because of this belief, I would be willing for the legislature to pass a law requiring all farmers to install tailwater pits, in an effort to conserve what little fresh water there remains," asserted Aldridge.

Tailwater Good For Crops

According to Ford, "We have found that tailwater is better for the crops and the land because it is putting good fertilizer back on the land along with the water."

When asked about the problem of silt build-up, Aldridge said silt is the major problem in maintaining a pit, but "the savings of irrigating with tailwater keep the cost of putting the silt back on the land from being a deficit." Aldridge said that silt in the pit probably will not dry good in a year, but, when dry, a bulldozer or carryall will move it more cheaply than a dragline. A dragline will remove watered-down silt, at a cost of $20 an hour, and moves very slowly.

"I don't know of a good way for a tailwater pit to catch a good rain shower because silt fills up the pit," says Aldridge. Ford has placed old tires all along the ditch to catch silt as the water travels to the pit. When the silt dries out, a grader is used to

—continued on page 2 . . . ATTORNEY

TINSLEY REAPPOINTED TWDB CHAIRMAN

W. E. (Buck) Tinsley, Chairman of the Texas Water Development Board, has been reappointed by Governor Preston Smith and confirmed by the Senate for a new six-year term. Also reappointed and confirmed by the Governor and the Senate is Robert B. Gilmore of Dallas. He is the engineer member of the Board.

Tinsley, an original member of the Board, has served as the finance member since its inception in 1957. He is Executive Director of the Municipal Advisory Council of Texas, an association of municipal securities firms in Texas; a member of the American Society of Association Executives, Municipal Finance Forums of Washington and New York, and the Texas Water Conservation Association. A former President of the Capitol Area of the Boy Scouts of America, Chairman Tinsley is a recipient of the Silver Beaver Award, the highest award given an adult by the Boy Scouts.

An Honorary Life Member of the Texas Chapter, Municipal Finance Officers Association of U. S. and Canada, Tinsley is a recipient of the Distinguished Service Award by the Texas Association of School Boards. He has

—continued on page 3 . . . TINSLEY

W. E. (BUCK) TINSLEY

Reports Needed from Farmers

In early July, some 22,000 Texas farmers received an acreage and production questionnaire from Charles E. Caudill, Agricultural Statistician for the Texas Crop and Livestock Reporting Service, Austin, Texas. The purpose of the questionnaire is to provide information that is to be the basis for determining harvested acreage and production of early harvested crops for the State of Texas and for each county.

According to Caudill, the information is available to the farmer in that it furnishes a basis for planning future production and marketing programs. Reports are needed from every farmer in order that each of Texas' 254 counties are well represented. Texas covers such a wide area that State totals alone do not provide adequate information on the State's most basic industry; therefore, the Texas Legislature has provided a program of estimates for each individual county.

The Cross Section joins Caudill in urging Texas farmers to fill out the questionnaire as accurately as possible and to send it to Austin in the stamped envelope provided. The farmers in this District can do much to give an accurate estimate of the counties represented in the West Texas area. The grass roots of the Texas population—the farmers themselves—must join together in this effort.

Seymour Returns For Short Visit

John Seymour, formerly employed with the District as its attorney and Editor of *The Cross Section,* recently returned to the Lubbock offices for a week to handle legal affairs for the District.

Seymour, a 1970 graduate of Texas Tech University School of Law, will be a visiting lecturer, teaching Ocean Law in the new Marine Resources Management Program at Texas A&M University in the Fall. He will also be teaching courses in Coastal Law and Environmental Law in the School of Business. Seymour received a Master of Law degree in Ocean Law at the University of Miami, Coral Gables, Florida, in June of this year.

JOHN SEYMOUR

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

REBECCA CLINTON, Editor

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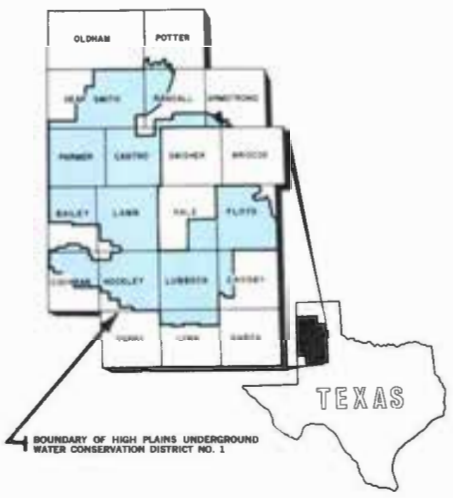

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

ATTORNEY . . . continued from page 1

pull the tires onto the land in order to clean the silt out of the ditch.

When asked about the cost of keeping a pit free of silt, Aldridge estimated an annual expenditure of $1,000. "However, it doesn't cost nearly as much to clean one out as compared to the depreciation rate of an irrigation well." Aldridge estimates that it costs about half as much to pump a pit as it does to pump a well, due to smaller equipment and smaller fuel bill.

In the pictures on this page is shown a tailwater pit on one of Aldridge's farms. The first picture shows the ditch in the bottom left corner of the picture which carries the tailwater into the silt pit (shown in the top portion of the picture). Hopefully, this is where the silt will settle before the water travels into the tailwater pit (right portion of the picture) for redistribution.

Pit Costs $5,000

Ford says a tailwater pit costs nearly $5,000 to install. He broke that figure down this way: $3,500 for digging the pit and piping the water back to the distribution point (depending on the amount of pipe required), plus approximately $1,500 for the pump and motor. The two men estimated the cost of two irrigation wells to be at least $15,000. "We feel that we can do the same thing with one tailwater pit at so much less cost, that we cannot let the silt problem keep us from maintaining as many pits as we can use," added Ford.

Aldridge said that if he were recommending to a farmer the size of pipe to install in a pit (if he were intending to pump as much as 1,500 gallons of water uphill), he definitely would use 10-inch pipe with 100-pound pressure. "You will get your money back in the long run and have a lower fuel bill, more water and less breakdowns." He said a 10-inch line will hold more pressure and would be much more effective than a smaller pipe with less pressure, when pumping larger amounts of water up a slope.

The Cross Section and the Water District point with pride to Sam Aldridge as an up-to-date water conservationist. He has found tailwater pits to be what he calls "the cheapest water you can get" and a highly regarded method of conserving good groundwater. The Texas High Plains needs for all farmers to recall that mental picture now, while there is still time to act.

U.S. FARM EXPORTS REACH HIGH IN 1972

U. S. agricultural exports in the fiscal year just ended rose to an all-time high of $8 billion, Secretary of Agriculture Earl L. Butz announced late in July.

Preliminary data show that farm exports in fiscal year 1971-1972 were about $200 million more than the all-time record of $7.8 billion of the preceding year—a gain of 3 percent.

The total included shipments of more than $1 billion worth of animals and animal products, a record for that category, and more than $2 billion in soybeans and products. This is the first time exports of any commodity have exceeded $2 billion.

Exports have gone up for three consecutive years after declining in the preceding two years. This entire rise has been in commercial dollar sales, which have gone up by almost 50 percent in three years. Non-commercial sales—those made under Government programs—have held steady at around $1 billion.

The bottom left corner of the above picture shows the ditch which carries tailwater into a silt pit (shown in the top left corner). Here the silt settles before the water flows into the tailwater pit (right portion of the picture) for redistribution.

Shown above is another view of the tailwater pit shown in the right corner of the top picture. Aldridge says the pump production from this pit, operated and equipped properly, equals two 8-inch irrigation wells. This particular pit irrigates maize.

Obbie Goolsby, left, Field Representative for the High Plains Underground Water Conservation District No. 1, stands by one of Sam Aldridge's tailwater pits with Burl Ford and J. T. Ford, farm managers, and Curtis Ford, Burl Ford's son.

Sprinkler Irrigation Under Study

The Texas High Plains, with its unique weather conditions, requires specialized equipment and ideas for its agricultural economy. Dr. Nolan Clark, Engineer for the Agricultural Research Service at the USDA Southwestern Great Plains Research Center at Bushland, is trying to develop sprinkler irrigation management practices for this area.

"Many people are under the impression that our water evaporation problems with sprinkler irrigation are caused mainly by the high temperatures and low humidity in the summer," says the agricultural engineer. But Clark believes the main factor contributing to evaporation loss is wind speed.

The air around sprinklers will soon become saturated with water and little additional evaporation will take place unless the wind is blowing to move the saturated air away. Therefore, Clark says, wind is the reason for varying degrees of evaporation with sprinkler irrigation. Evaporation losses of 40 percent have been measured during an average wind speed of 20 miles per hour. And in a region where the groundwater supply is being depleted rather quickly, this is an important problem.

"We can reduce water losses by varying the size of water droplets through control of water pressure," says Clark.

The secret is to find the best combination of sprinkler nozzle size and water pressure to reduce evaporation losses at certain wind speeds, because the effect of the wind speed is so great that it covers up the effect of temperature and relative humidity.

The researcher explains that an irrigation guide was developed several years ago for Arizona conditions where the average wind speed is 4 to 8 miles per hour. But the High Plains has a spring average of 20 to 25 miles per hour that drops to 10 to 15 miles per hour in the summer.

According to Clark, when researchers develop an applicable chart relating temperature, humidity and wind speed combinations, High Plains farmers will have more efficient use of their dwindling underground water supplies.

AGRICULTURE HAS "DOER ROLE" IN REDUCING AIR POLLUTION

Agriculture has a "doer role" in reducing air pollution. This is the opinion expressed by Dr. L. S. Pope, Associate Dean for Administrative Affairs in Texas A&M University's College of Agriculture, during a recent workshop on air pollution effects on vegetation, held at the university.

People in agriculture are often the recipient of pollution problems—and sometimes the source of other types of pollution, Pope said. "For example, 1,700 trucks a day hit the highways in the High Plains to serve the feedlot industry of Texas. The feedlots, in turn, provide top sirloin steaks for today's consumers. Yet exhaust fumes from the truck fleet add to air pollution problems already present in the area," Pope explained.

Science responds to public concern, Pope said. He emphasized that while the feedlot industry responds to consumer requests for more beef, the problem of waste disposal increases.

"Citizens face tough choices ahead in the interest of pollution abatement. We may need to re-evaluate some of our investment priorities as we consider solutions to pollution," Pope continued. "Research is the key to unlocking the riddle and finding efficient solutions to this rapidly mushrooming problem," Pope asserted.

Dr. Arden Sherf of Ithaca, New York, said that plants are especially useful as pollution indicators as society becomes more conscious of environmental problems and wonders about local pollution situations.

"Our biggest problem presently is to accurately localize important air pollution problems and attempt to trace their possible sources. Citizens want to know if their plants are being damaged by pollutants rather than by disease or insects, fertility imbalance or weather," Sherf said. Furthermore, unless one has had considerable knowledge of plants and how they grow, the diagnosis of air pollution injury may be unreliable and even hazardous, the New Yorker added.

A Texas A&M University research engineer who is using two environmental wind tunnels to determine effective measures to reduce serious air pollution at the U. S. Customs Station in Laredo described the research project.

Said Dr. M. P. Boyce, Mechanical Engineering Professor and Director of the Gas Turbine Laboratory at Texas A&M, "The wind tunnels are effective in the study of smog, and in testing and evaluating traffic exhaust pollution at the Laredo Station."

Other federal and state studies have emphasized the threat to Laredo Station employees' health with the finding of high carbon monoxide concentrations and other monitored pollutants such as hydrocarbons, ozone, sulfur

—continued on page 4 . . . AGRICULTURE

Commission Reports Population Effects On Environment

The Commission on Population Growth and the American Future was established by law on March 16, 1970, to conduct an inquiry into certain aspects of population growth in the United States and its foreseeable consequences. On May 5, 1972, the Commission made its final report to President Nixon. With respect to the impact of differential rates of population growth on several environmental factors, the Commission made the following comments on water and agricultural land and food prices, taken from *Population Bulletin,* a publication of the Population Reference Bureau, Inc.

Water. Water requirements already exceed available flow in the southwestern United States. The Commission's research shows that growing population and economic activity will cause the area of water shortage to spread eastward and northward across the country in the decades ahead. In the case of water supply, population growth will be more important than economic growth in causing problems. "Sooner or later we will have to deal with water as a scarce resource," says the Commission. "Few will like the austerity created by the need to conserve on something as fundamental as water. The rate of national population growth will largely determine how rapidly we must accomplish these changes."

Agricultural land and food prices. At a time when the federal government pays farmers to hold land out of production, it seems absurd to be looking forward to a scarcity of good agricultural land and rising food prices. But these are the prospects indicated by the Commission's analysis of what rapid United States population growth implies. "This picture emerges when we combine the requirement for feeding a rapidly growing population with a sound environmental policy, which restricts the use of pesticides and fertilizers. Fifty years from now the population resulting from the 3-child family could find itself having to pay farm food prices from 30-50 percent higher than they would be otherwise. The needs of population at the 2-child average could be met with practically no price increases."

An average car like the one shown here does not require much water for operation. But have you ever wondered how much water goes into the making of a major component of your automobile—steel?

According to THE MAKING, SHAPING AND TREATING OF STEEL, published by United States Steel Corporation in 1964, from 40,000 to 65,000 gallons of water are used in the production of a ton of finished steel. For a 4,000-pound car, approximately 80,000 gallons of water would be needed to produce the steel going into one car.

TINSLEY . . . continued from page 1

completed special courses of instruction by the U. S. Army (Advanced Fiscal, Military Government, Japanese Language) at the University of Virginia, Duke University and Harvard University.

Gilmore, a native of Tulsa, Oklahoma, is Chairman of the Board of DeGolyer and MacNaughton Petroleum Engineering Firm in Dallas. Appointed to the Board by Governor John Connally in 1965, Gilmore has served as its engineer member since that time. Tinsley's and Gilmore's terms expire December 30, 1977.

Bob Dietz is shown plotting on topographic maps the locations of land being claimed for water depletion. The information is to be used to computerize annual water decline in the District.

Price of Beef May Remain Stable

President Nixon's suspension of the beef import quotas will probably have little effect on prices received by cattlemen, according to Dr. H. O. Kunkel, Dean of Agriculture at Texas A&M University and Acting Director of the Texas Agricultural Experiment Station.

Kunkel stated that recent research in the Department of Agricultural Economics and Rural Sociology showed that imports for the last half of this year would have to increase 20 percent over the first half to reduce choice cattle prices a penny a pound. Choice steer prices were about 38 cents per pound in the first week of July.

The 20 percent increase would amount to only one pound of hamburger per person over the next six months.

The greatest effect of the imports will be on manufacturing beef—the kind used in hamburgers, hot dogs and other processed products, he said. Nations such as Australia and New Zealand export only the lower grades of beef to the United States because the U. S. normally produces enough choice and good grades to meet its own domestic demand.

Also affecting the amount of beef to be imported was the recent temporary suspension of import tariffs on beef by the European Common Market, Dr. Don Farris of the Department of Agricultural Economics and Rural Sociology said. This suspension, coupled with world demand, may limit the extra amount of beef the U. S. can import this year.

But prices on beef will probably drop anyway, Farris said, because of an expected increase in domestically fed beef later this year. Research from a study by Kenneth Graeber, under the direction of Farris, suggests that prices to cattlemen may drop as much as four cents a pound due to an expected 10 percent increase in cattle production. Reduced pork supplies or higher personal income could counteract part of the drop.

AGRICULTURE . . . continued from page 3

dioxide, hydrogen sulphide and particulates, Boyce added.

New developments in automotive engines are being made to curb pollution, yet these developments will substantially increase the costs of the product, he emphasized. "We are seeking to find different systems that can be put with existing power plants and also investigating new sources of power," Boyce concluded.

WORK CONTINUES ON COMPUTERIZATION

The High Plains Underground Water Conservation District No. 1 is continuing work on a project to computerize a system for calculating the annual water decline in the District, beginning with Parmer County. To carry out the study and to formulate the program, Frank Rayner, District Manager, recently added a temporary employee to the staff, Bob Dietz. A 1971 graduate of Texas A&M University with a degree in math, Dietz believes that, if income tax depletion can be computerized in Parmer County, it should be workable for the other counties in the District.

Dietz has been working on the Parmer County program since early May. He is completing the writing of the program and is presently contacting accountants that have claims in Parmer County in order to bring their lists of parcels up to date.

When asked why the District would finance a project of this nature, Dietz said that it should save time and money. "The District has been losing money on the selling of decline maps. Computerization would be economical, efficient and time-saving."

The District presently prepares and sells maps showing decline of the water table in each county, to be made available to farmers, land owners and accountants for the purpose of figuring income tax deductions based on water depletion. In January of each year, the District staff measures the depth to water in the 809 observation wells located within the District. Following compilation of various data, the District personnel prepares maps for each county represented in the District. The earliest the District has ever been able to get these maps to the accountant has been the middle of January, leaving the accountant little time to figure the client's tax returns by the farmer's deadline.

By computerizing the depletion information, the preparation of the maps would be eliminated. This would aid in getting the income tax information to the accounting firms by the first of January.

"Another good reason for computerizing decline is to make possible another method of stressing water conservation," adds Dietz. "We plan to send a print-out to the farmer as well as the accountant with a decline reading for the particular tract of land, cost guidelines, saturated thickness information and a water conservation message. This will give the farmer an idea of the water shortage on his land —information that he does not always receive from his accountant."

Internal Revenue Service representatives from Dallas must check out the program as soon as it is considered accurate. If it is approved, the District hopes to extend the program into the other counties in the District in hopes that it will aid farmers and their accountants.

Dietz, born in Alice, Texas, in 1949, was a member of the Army ROTC at A&M, athletic officer in the Corps of Cadets, and attended Officer's Basic Training at Fort Sill, Oklahoma, from January to March of this year.

The Time to Close Abandoned Wells is YESTERDAY

Delta Growers Up 1972 Cotton Acreage

Delta growers have apparently upped cotton acreage plantings some 23 percent from last year, according to the Crop Reporting Board's (CRB) latest estimate, published in the Friday, July 21, 1972, issue of *The Delta Farm Press.*

The CRB said the five Delta States have planted 4,730,000 acres for harvest. The Delta States include Arkansas, Louisiana, Mississippi, Missouri and Tennessee.

Nationally, planted acreage this year is estimated at 13.8 million acres, 12 percent above the 12.4 million acres planted in 1971.

Acreage in Texas is up 4 percent and in Oklahoma plantings are up 17 percent. Estimates in Texas are 5,485,000 as compared to 5,371,000 in 1971. In the Western States, growers planted 1,365,700 acres, 13 percent more than in 1971.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

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THE Cross SECTION

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

Volume 18—No. 8 "THERE IS NO SUBSTITUTE FOR WATER" *August, 1972*

FARMER CREATES "SHOWPLACE" OF FARM

Joe Schilling comes from Slaton, where farmers have been irrigating since 1945. Farming north of Farwell since 1961, his experience is proving valuable in the ways of preserving the groundwater under his Parmer County farm.

Schilling operates two tailwater pits and a playa lake in order to alleviate the necessity of pumping so frequently from his four eight-inch wells. He says he waters 200 of his 670 acres of maize, cotton, wheat, sugar beets and peanuts solely with lake water. A ten-inch lake pump produces 1,500 gallons per minute and waters 180 quarter-mile rows per 12-hour set. The farmer told Water District personnel that the lake will hold 20 acre-feet of water.

Schilling proudly claims he recovered 17 acres of farm land by building a levee to confine water to one side, the present site of the lake. On the reclaimed land, he plans to plant a crop of wheat or barley this month.

With the dirt out of the lake, Schilling built roads and filled in low spots on his farm. Whenever the lake is empty of tailwater and rainwater, he removes what soil might have been added by tailwater. "The water and soil out of the lake are better for the plants because of the fertilizer," says Schilling.

Farm Is A "Showplace"

Upon looking about the farm, one sees what Schilling's wife appropriately calls a "showplace". The farmer says he is not nearly finished with the project, but the place abounds with testimony to his hard work.

He has finished his terraced rows with concrete, a method he feels will combat erosion. From a five-acre lake, he reclaimed 4¾ acres of good farm land. He, himself, dug a tailwater pit from one-fourth acre of the old lake, terracing the spillways with concrete.

Schilling also dug a smaller pit to catch tailwater off 100 acres of farm land. With a construction similar to the larger pit, it also has a six-inch pump that produces 400 gallons per minute.

When asked the total cost of installing one of these tailwater pits, Schilling estimated a total of $1,000, excluding labor. The normal cost of digging a pit and installing the pipeline and pump is approximately $5,000.

"I realize I saved a lot of expense by digging the hole and rigging the pump by myself," noted the Parmer County farmer. Schilling purchased cross ties from the railroad company for $25, on which the pump on the smaller pit is balanced.

Came In Search Of Water

Schilling admits he came to Farwell in search of more irrigation water. He says in Slaton he saw wells dwindle from eight-inch to two-inch. "This is why I try not to over-irrigate—because we are headed in the same direction."

—continued on page 3 . . . FARMER

FRED HENSLEY

Joe Schilling, left, and Obbie Goolsby, Field Representative for the Water District, stand beside a pump which serves a playa lake located on Schilling's Parmer County farm. The farmer also operates two tailwater pits in an effort to conserve the groundwater under his property.

COTTON MUST PROVIDE PACKAGE

The cotton industry must don its Sunday best and provide a "package of goods and services" if it plans to compete successfully with man-made fibers this year.

This is the warning sounded by William E. Reid, President of Riegel Textile Corporation, at the joint annual meeting of Plains Cotton Cooperatives in Lubbock, August 16.

In a speech before more than 1,200 members and guests of four regional cooperatives, Reid, Vice President of the National Cotton Council, said, "Taken as a whole, this package must be as good as is furnished us by the man-made fiber companies."

—continued on page 2 . . . COTTON

CURRY COUNTY PUBLIC HEARING HELD ON TAILWATER WASTE

(EDITOR'S NOTE: The following was reprinted from the August 18, 1972, issue of *The Amarillo Daily News*. It is written by Karen Stanley, staff correspondent for the *Daily News*.)

CLOVIS, NEW MEXICO—Three members of the Curry County Commission indicated at the conclusion of a public hearing Thursday afternoon (August 17) that a continued growth in the number of complaints about irrigation tailwater in the county would bring legal action against suspected violators of state statutes.

Commissioner Mack Hindershot said, "If the water is a problem, there is no choice but to apply the laws."

The hearing, called at the request of Hindershot, Paul Koeltzow and James Williams of Grady, attracted a total of 60 people, including a representative of the State Engineer's Office.

Fred Henninghausen of Roswell said the state office had reacted to at least one complaint from a West Texas water user that there is an excessive amount of tailwater being wasted in Curry County.

"The three things we look at are benefits, measures and uses of irrigation water," he said.

He described waste and beneficial uses as hard to define but said the state is prepared to do what is necessary to prevent undesirable waste of water in the state, regardless of where it is.

He said his office has been instructed to investigate, photograph and discuss with water users any tailwater waste cases brought to its attention.

Fred Hensley, 9th District Attorney, said legal aspects are clearly defined and if violations continue, "something has to be done".

All violations of the state's tailwater statutes are classified misdemeanors calling for fines of $10 to $100 upon conviction.

Koeltzow, who lives west of Clovis, said he hears complaints almost daily about tailwater waste and nuisance. In one area a mail carrier has been forced to detour 14 miles to reach six mail boxes, he said.

The lack of drainage along county roads was brought up during the hearing by Mike Garrett, a Clovis attorney with farming and ranching interests.

He urged that the county employ a surveyor to provide for improved drainage.

Curry County agricultural agent Phil Crystal said many city residents are complaining because they notice waste water from irrigated fields along the roadways.

"The most important thing to consider here is that when that water goes down the road a piece it is gone," the county agent told the meeting.

Use of tailwater pits by irrigation farmers was discussed, but many objected, saying silting is too big a problem to make the practice worthwhile.

Crystal also hit at another problem when he said some over-irrigation could be creating a part of the disturbance over wasted irrigation water.

State statutes in New Mexico which are applicable to tailwater cite both waste and the nuisance or safety factor of water on the roadways.

A great deal of attention has been given the rapid drop in the water table used by Curry County irrigation farmers during the past year, including several state extension service studies.

THE Cross SECTION

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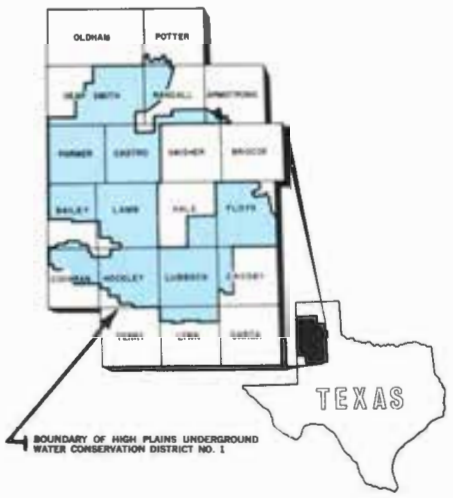

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L. B. Worthan, 1973	Rt. 3, Hereford
Frank Zinser, Jr., 1973	Rt. 5, Hereford
George Ritter, 1975	Rt. 5, Hereford
Harry Fuqua, 1975	Rt. 1, Hereford

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Malvin Jarboe, 1976	Route 4, Floydada
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Joe Moore, 1973	Box J, Lazbuddie
Guy Latta, 1975	1006 W. 5th, Friona
Edwin Lide, 1975	Rt. 1, Bovina

Potter County

Henry W. Gerber, 1973	Rt. 1, Amarillo
Fritz Menke, 1973	Rt. 1, Box 538, Amarillo
Vic Plunk, 1973	Rt. 1, Box 544, Amarillo
F. G. Collard, III, 1975	Rt. 1, Box 101, Amarillo
W. J. Hill, 1975	Bushland

Randall County

Mrs. Louise Tompkins, Secretary
Farm Bureau, 1714 Fifth Ave., Canyon

Leonard Batenhorst, 1973	Rt. 1, Canyon
Richard Friemel, 1973	Rt. 1, Canyon
Marshall Rockwell, 1973	Rt. 2, Canyon
John F. Robinson, 1975	1002 7th St., Canyon
Fred Begert, 1975	1422 Hillcrest, Canyon

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

Pictured above is an abandoned, uncovered irrigation well (see inset for exposed hole). Water District Field Representative Dan Seale discovered the uncapped well alongside the right of way of a State highway and promptly notified the State Highway Department Office in Lubbock.

Within a week the Highway Department filled the hole with ten yards of dirt and grass. J. B. Sparks, Area Foreman for the Department, said his crew will frequently check the abandoned well for possible cave-ins, and may later plug it with a concrete slab.

COTTON . . . continued from page 1

The mill executive advised the cotton industry of its need to provide an adequate supply in all the major quality categories at a number of prices. "And to be brutally frank," he went on, "your package has been woefully deficient in this respect."

Says Prices Not Stable

Reid also cited the need for a stable price at a competitive level. He charged the cotton growers with permitting prices to fluctuate too frequently, allowing competing mills to out-stock each other at cheaper prices. "These big price risks, either up or down, just drive us into the arms of your competitors as fast as we can make the moves."

In contrast to cotton prices, Reid said the prices of man-made fibers "don't change much". "When they do, we usually get several months' advance notice."

Reid talked briefly about America's position in the world market, naming her "number one" problem to be the declining rate of productivity. He noted a drop in several industrial areas where the U. S. had been a long-time leader.

He noted a drop in the U. S. share of world automobile production from 76 percent in 1950 to 33 percent in 1971. There was also a drop in steel production from 47 percent in 1950 to 20 percent in 1971.

"For decades, the U. S. was the number one builder of machine tools —the master tools of industry. By the end of this year, we likely will be in fourth place, behind Russia, Japan and West Germany," he went on.

Reid praised agriculture for doing something about the problem.

"Agriculture, our nation's biggest industry, is setting the pace we all must follow," said the speaker. He praised American farmers for increasing their productivity to an "enviable degree".

Also noted as part of the competitive package was customer service. Reid cited byssinosis, a respiratory disease of cotton associated with cotton dust, and flame retardancy as problems in this area. He mentioned by name groups that are actively doing research in these areas, in hopes of solving these problems.

Reid wrapped up the competitive package by briefly mentioning the need for research to improve the product and an innovative market development program to keep the product in the consumer's eye.

"We sincerely hope you can put together a package that will keep you in competition for our business," Reid concluded. "The textile industry wants and needs the competitive spirit you bring to the fiber market."

SCARBOROUGH WATERS PECAN TREES WITH WOLFFORTH SEWAGE WATER

As water conservation becomes a more popular practice every day, a few men are working to add a new dimension to the idea—by reclaiming waste water for irrigation.

Tom Scarborough, owner of Tom's Tree Place of Lubbock, is using the city of Wolfforth's sewage water to irrigate 60 acres of pecan trees. Scarborough pumps 144,000 gallons of chlorinated sewage water a day underground to primary and secondary oxidation ponds south of Wolfforth.

When more water is received by the ponds than is needed at the time, the water overflows into a lake area. This water is pumped onto the land before the water from the secondary oxidation pond is used. The two ponds can hold a total of 18 acre-feet of water before spilling over into the lake area. Rainwater combines with the purified sewage water and is pumped onto the land via a sprinkler system.

Scarborough says he has a five-million-gallon storage reservoir in the soil around his trees. "I can store a six-inch sheet of water in the soil on 60 acres, which is the equivalent of 30 acre-feet of storage," he said.

According to Scarborough, the idea of "storing" water underground is really better than letting it evaporate and percolate into the ground under a lake or pond. "At an evaporation rate of one-eighth inch to one-fourth inch a day, a 30-acre-foot sheet of water can provide a 25-day period between irrigations."

Sprinklers Irrigate Trees

Placing 17 trees to the acre at 50-foot spacing, Scarborough irrigates two sides of every tree, with two sides receiving no direct water storage. Sprinkler heads, spaced 50 feet apart, produce three gallons a minute, or 4,320 gallons a day, for each individual nozzle. He generally puts two inches of water on the ground each week during the growing season.

Scarborough says he uses all the water the city gives him, either in irrigation or storage. The abundance of sewage water allows him to conserve his groundwater supply. He says groundwater accounts for only one-tenth of his total irrigation resources.

"As a matter of fact, I drilled a well last year to pump 150 gallons per minute and have never turned it on," said the tree specialist. He has three other wells, pumping from 30 to 80 gallons per minute.

After eleven years of caring for the trees, Scarborough says he should really "be in business" by 1975. "It takes a tree at least 15 years to return your investment," he continued. He added that, when a tree is 20 years old, it should produce 200 pounds of pecans a year.

Pecan Trees Expensive to Grow

He says the reason it takes so long to see your return investment is because pecan trees are slow and expensive to grow. "It is also very costly to harvest pecans and to transport them to the store," he added.

Scarborough does not know how much money he has tied into the farm-turned-orchard. However, he does feel that he is investing wisely in a venture that is not draining our limited supply of groundwater.

He has developed and is practicing a method of water conservation every day, and the High Plains Underground Water Conservation District No. 1 is proud to thank him for doing his part to put our environment to beneficial use.

TOM SCARBOROUGH

As can be seen in this picture, Tom Scarborough irrigates 60 acres of pecan trees with treated sewage water via a sprinkler system. Sprinkler heads, placed 50 feet apart, produce three gallons a minute, or 4,320 gallons a day.

FARMER . . . continued from page 1

When asked if the majority of Parmer County farmers are knowledgeable of the rate of decrease in the area's groundwater supply, Schilling noted an increase in awareness due to the amount of information printed today on the subject. "One of the best examples is the decline maps prepared by the District," he added.

The Water District feels Joe Schilling is a fine example of a concerned farmer. He has worked hard to put tailwater and rainwater to good use, while conscientiously rationing his groundwater supply. *The Cross Section* commends him for his accomplishments.

Cotton Crop May Reach High

If the official August 1 estimate of High Plains cotton production proves correct, area farmers will harvest the biggest cotton crop since 1965 and could reap almost $400 million for their efforts.

The estimate, compiled jointly by Plains Cotton Growers, Inc. (PCG) and the Lubbock Cotton Exchange (LCE), sets production from about 2,602,000 standing acres in the 25 PCG counties surrounding Lubbock at 1,917,000 bales. Last year's production came to only 1,279,150 bales. The 1965 crop totaled 2.3 million. The all-time high for the Plains was 2,457,703 bales, produced in 1961.

Assuming market prices of 24 cents a pound for lint and $50 per ton for seed and including some $130 million in price support payments, the value of the crop would be $389,178,000. That figure, if realized, would just about equal the cash value of the record 1961 crop.

Last year's early-season estimates also projected a rosy picture for the fleecy crop on the Plains, but unseasonably cool, wet weather in August and September ruined those prospects. The September 1 PCG-LCE estimate indicated the area would produce a little over 2 million bales in 1971, as compared to final production of less than 1.3 million.

"It is not at all impossible that the current crop could meet a similar or even worse fate," says PCG Executive Vice President Donald Johnson, "but the odds are certainly against it."

On the other hand officials of PCG and LCE point out that ideal weather conditions for the next three months and a normal or later frost could bring on a crop considerably in excess of the present estimate.

Based on the acreage now thought to be "standing", the August 1 projection would mean a per-acre yield of only 354 pounds, as compared to a 10-year average for the Plains of 433 pounds per acre.

The PCG-LCE estimates are traditionally based on "normal" weather conditions, and are updated on the first of each month through December 1, taking into consideration the effects of weather for the past 30 days each time.

Normal rainfall at the Lubbock Weather Station for August is 1.82 inches and the average temperature for the month is 78.8 degrees.

The estimated total production for 1972 in those counties tabulated which are also included within the High Plains Water District is shown below. The estimates can be compared to the 1971 production.

County	*Estimated 1972 Total Production*	*1971 Production*
BAILEY	50,000	29,400
CASTRO	30,000	20,300
COCHRAN	60,000	33,800
CROSBY	135,000	77,600
DEAF SMITH	3,000	2,200
FLOYD	90,000	51,100
HOCKLEY	175,000	88,400
LAMB	100,000	88,300
LUBBOCK	225,000	155,900
LYNN	145,000	90,100
PARMER	21,000	22,000
TOTALS	10,340,000	6,591,000

COULD ONE OF THESE BE YOUR CHILD? Do your part to protect your child's play. Close those abandoned wells before it's too late.

Conservationists interested in bringing about the existence of outdoor classrooms listen as speakers reveal their thoughts on the feasibility of such a program.

Jon J. LaBaume, Floydada, Rhett Johnson, Jayton, and Clyde Goodman, Spur, observe tree roots above the land surface as they prepare notes for possible subject matter to be discussed in an outdoor classroom. All are of the Soil Conservation Service.

THINK

WATER CONSERVATION

Workshop Kicks Off Plans For Outdoor Classrooms

Outdoor classrooms may be a thing of the future—at least that is the goal of about 50 environmentalists, educators and conservationists in the High Plains of Texas.

On August 10, Arneal Scott, Area Conservationist with the Soil Conservation Service, conducted a workshop in Lubbock to kick off the idea of conservation education in this area.

Representatives of the High Plains Water District, Texas Forest Service, Texas Water Quality Board, Texas Department of Agriculture, Texas Parks and Wildlife Department, Texas Extension Service, U. S. Fish and Wildlife Service and Lubbock Parks Department met with Scott and other members of the Soil Conservation Service to pool their ideas concerning the effort to inject the program into the public schools' course curriculums.

The workshop began with a morning program featuring guest speakers. John Arnn, State Resource Conservationist of the Soil Conservation Service, told the group that the objective of conservation education is to "create learning experiences for elementary students in the importance of a quality environment." He suggested that a team effort be used by public schools and local, state and federal agencies of government in developing outdoor classrooms.

Arnn summed up the ideas of all the speakers when he said, "The purpose of these classrooms is to supplement other areas of instruction with the immediate environment."

Administrator Asks Questions

Dr. Cecil Green of the Lubbock Public School Administration appeared before the group with questions he felt they should be able to answer when they come to him and other administrators with their proposed program. He asked such questions as, "Who will decide what to teach?" "Who will do the teaching?" "Who will teach the teachers?" "Who are you going to teach?"

Spokesmen for the group agreed that these were good points and added that they were prepared with most of the answers.

Other speakers were Dr. Woodie Coleman, Director of Instruction Programming for Region XVII of Educational Service Center; Dr. Larry Hovey, Texas Tech University School of Education; Sam Ellis, Soil and Water Conservation District Director, and Charles Haenisch, Conservation Agronomist with the Soil Conservation Service.

Haenisch presented a talk illustrated with slides of the process in developing an outdoor classroom. He pointed out that the key to an effective natural area is utilizing present soil and plant conditions. He is using this technique throughout the South Plains area with local leaders in developing this program.

The group met that afternoon at Mackenzie Park in Lubbock to study the area for subject matter to be discussed in a typical outdoor classroom situation. After dividing into smaller groups and surveying the area, each group made a report to be compiled for the presentation to area school administrations.

According to Scott, the workshop was a success. "I think conservation education is a great idea, and outdoor classrooms are the best way to present the subject to our school children," said Scott.

Under Secretary Dies After Illness

Dr. William Thomas Pecora, 59, Under Secretary of the Interior, died July 19, 1972, at George Washington University Hospital, Washington, D.C.

The Interior official had undergone surgery for diverticulitis on June 6, but was unable to survive post-operative complications that required additional surgery.

Interior Secretary Rogers C. B. Morton said that he was deeply shocked and saddened by the death of Dr. Pecora, who as the number two man in the Department was Morton's chief assistant and the Acting Secretary in his absence.

"Our Department—and the Nation—has lost a singularly talented and energetic scientist and administrator," Morton said. "Few men possess the leadership qualities which Dr. Pecora showed in the quest for balance and harmony in resource development and conservation."

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 18—No. 9 "THERE IS NO SUBSTITUTE FOR WATER" *September, 1972*

Jack Page (right), Internal Revenue Service agent, and Albert W. Sechrist are shown discussing the District's computer programming of the water depletion tax allowance program.

Julian Believes in Modifications

Tailwater return systems and playa lake modifications are becoming more and more popular today as methods of groundwater conservation. M. M. Julian of South Plains is a man that believes in modifications and has shown it by using them on his Floyd County farm.

On three-quarters of a section, Julian operates one tailwater pit, four eight-inch irrigation wells and has three lakes modified to install lake pumps.

When asked about his yield production Julian said, "The tailwater pit increases my yield with more thorough watering by allowing water to run after it has reached the ends of the rows."

The pit, with three-acre-foot capacity, is hooked underground with the four irrigation wells. Operating on electricity, the tailwater pit initially cost Julian $5,000.

"It's a very good investment because it's cheap to operate and you don't have to get up at night to change the water," said the farmer.

In 1970, the High Plains Water District designed Julian's tailwater reuse system. The pit can give a continuous pumping cycle of 24 hours at 800 gallons per minute. Julian says he can water about 30 rows in one setting.

Pit Never Dry

Julian's son, Kenneth, said that in the three years the tailwater pit has been in operation, it has never been dry.

Concerning the question of silt, the younger Julian said most of the silt is caught in a silt pit trap. They have cleaned it out once with a back hoe and plan to do it again soon.

Julian says that the cost is so "reasonable" that the expense can be considered nominal in determining the upkeep of a tailwater pit.

The farmer says he has been lucky this year with rain. The small amount

—continued on page 2 . . . JULIAN

WATER INSTITUTE NAMES CHAIRMAN

The West Texas Water Institute (WTWI) recently appointed Anson R. Bertrand to serve as its chairman, to fill the vacancy left by the late Dr. William D. Miller.

A member of the WTWI since 1971, Bertrand is the Dean of the Texas Tech University College of Agricultural Sciences.

Born in Gatesville, Texas, Bertrand received a Bachelor of Science degree in Agricultural Education from Texas A&M University in 1947. In 1949 he earned a Masters in Agronomy from the University of Illinois and a Ph.D. in Soil Physics in 1955 from Purdue University.

Bertrand served as an instructor of agronomy at Purdue from 1949 to 1955. From 1955 to 1961 he was promoted to assistant professor and then to associate professor.

—continued on page 3 . . . WATER

At Tule Canyon

Mackenzie Dam Site Dedicated

by F. A. RAYNER

On Saturday, September 23, 1972, an estimated 400 persons gathered on the wind-swept north rim of Tule Canyon, approximately six miles northwest of Silverton, Briscoe County, to dedicate the commencement of construction of a dam to impond the runoff of Tule Canyon.

This surface water project, to be operated by the Mackenzie Municipal Water Authority, is scheduled to first supply water to the city of Silverton, then at a later date, after additional bond sales, to Tulia (Swisher County), and to Lockney and Floydada (Floyd County.) These four cities are now entirely dependent upon groundwater for their municipal water needs.

The Mackenzie project required only eight years from conception to start of dam construction. This represents a very short time interval, as compared to the decades normally required to initiate surface water development projects. The immediate need for an additional water supply for Silverton emphasized the acceleration to development of this project. To expedite water delivery to Silverton, it is anticipated that water wells will be developed by the Authority to supply Silverton's immediate need for additional water.

The lake to be created by the dam on Tule Draw is expected to impound 46,000 acre-feet of water, covering 860 surface acres, with an average depth of over 50 feet. This lake is expected to have a firm yield of 5,200 acre-feet per year. The confinement of the lake to the steep-walled canyon by a 185-foot high earthfill dam, provides for relatively efficient surface water storage by restricting the surface area exposed to the high evaporation rate common to the High Plains area.

Other Reservoirs

By way of comparison, the only other lakes near the High Plains, J. B. Thomas on the Colorado River, Lake Meredith on the Canadian River, and White River Lake on White River (tributary to the Brazos River) are capable of impounding 204,000, over 900,000, and 38,000 acre-feet of water, respectively.

Costs Rising

Also by way of comparison, the 1951 land acquisition costs for the

—continued on page 3 . . . MACKENZIE

Cloudtap Conference Scheduled for Dallas

The third in a series of conferences on weather modification in the Southern Plains Region will be held on October 16, 1972, in Dallas, Texas.

Sponsored by the Texas Water Development Board, Oklahoma State Department of Agriculture and the Texas Water Conservation Association, the objectives of the Cloudtap Conference are to have weather modification project managers to discuss weather modification activities currently being carried out in the Southern Plains Region.

Various speakers will discuss topics

—continued on page 2 . . . CLOUDTAP

Attending the Mackenzie dam site dedication were (left to right) Cap Goodwin, Ross Goodwin, Chester Mitchell and Ray Kitten. Also attending, but not shown, was Pat Frizzell, Floyd County Committeeman.

THE Cross SECTION

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Telephone 762-0181

REBECCA CLINTON, Editor

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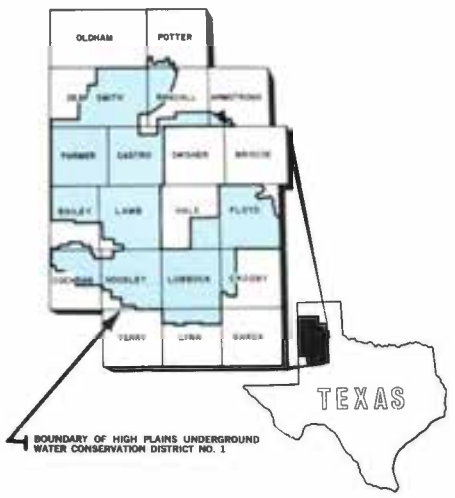

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Potter County
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Fritz Menke, 1973 ..... Rt. 1, Box 538, Amarillo
Vic Plunk, 1973 ..... Rt. 1, Box 544, Amarillo
F. G. Collard, III, 1975 ..... Rt. 1, Box 101, Amarillo
W. J. Hill, 1975 ..... Bushland

Randall County
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Farm Bureau, 1714 Fifth Ave., Canyon
Leonard Batenhorst, 1973 ..... Rt. 1, Canyon
Richard Friemel, 1973 ..... Rt. 1, Canyon
Marshall Rockwell, 1973 ..... Rt. 2, Canyon
John F. Robinson, 1975 ..... 1002 7th St., Canyon
Fred Begert, 1975 ..... 1422 Hillcrest, Canyon

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Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

Kenneth Julian and M. M. Julian stand before the tailwater pit located on their Floyd County farm. The elder Julian, a former Floyd County Committeeman for the Water District, turned the management of the farm over to his son upon his retirement.

This silt pit dug alongside Julian's tailwater pit was originally 10 feet by 20 feet by 10 feet in dimension. The silt trapped here has reduced these dimensions; however, the Julian's find that a back hoe can be used to clean the pit at a minimal cost. Julian says the pit has been cleaned once in three years.

JULIAN . . . continued from page 1

of rainfall has kept him from having to replant any of his cotton or grain sorghum.

However, it has rained enough for him to make use of one of his lakes this year, around mid-summer. "We have our lakes modified so that we can quickly install a temporary pump if we need to," said Julian.

Julian, a former committeeman for the Water District, has been around Texas farming most of his life. He has seen the changes for the better and worse, and he has his own ideas of ways to farm most efficiently.

Farming since 1944, dryland at first, Julian saw the installation of the first irrigation well in the area in 1948. "That well was 400 feet deep with a 10-inch pump," he recalls.

Julian Dug Second Well

The second irrigation well, belonging to Julian, was 320 feet to the red bed and the eight-inch pump was set at 230 feet. The pump on the same well is now set at 270 feet.

Having experienced the drop in the water table first hand, Julian considers himself a backer of modifications of all types, especially tailwater pits. "Considering how cheap it is to operate a pit and how perfectly satisfactorily mine has run, I would recommend one to all West Texas farmers," said Julian.

The High Plains Underground Water Conservation District No. 1 thanks M. M. and Kenneth Julian for their fine work toward groundwater conservation. These men should be proud of their fine accomplishments.

Corps of Engineers Bats High Average

The Corps of Engineers boasts a "batting average" of about .950 despite continuing attacks by environmentalists on water projects being built. The Chief of Engineers, Lt. Gen. F. J. Clarke, noted in a recent speech that 270 projects are under construction. He said 15 are involved in lawsuits, six have been stopped by injunctions and one by the President.

"I am astounded at the number of projects that seem to sail through fairly easily with respect to the environmental questions," he said. "And if we are stopped on five percent of our projects, which is about what it amounts to right now, I don't think we're batting too badly."

CLOUDTAP . . . continued from page 1

ranging in nature from "Stimulating Clouds to Produce Rain by Seeding From Aircraft in Oklahoma" to "Potential of Weather Modification as a Supplemental Water Source".

All sessions will be held at the Royal Coach Inn in Dallas. Those interested in attending the conference should contact Charles Taylor at P. O. Box 31368, 10111 N. Central Expressway, Dallas, Texas 75231. Registration fee is $10 and includes the noon luncheon and a copy of the conference proceedings to be mailed to all registrants after printing.

The previous two conferences were hosted by Governor David Hall of Oklahoma.

TECH LAW SCHOOL CONDUCTS SEMINAR

The Texas Tech University School of Law will conduct a seminar on October 21 entitled SUN OIL COMPANY v. WHITAKER, *The Energy Crisis v. The Water Crisis.*

Tech Professor John E. Krahmer, responsible for all continuing legal education for the Tech Law School, will prepare the program to be held in room 109 in the Law School Building.

Frank Rayner, Manager of the Water District, will present a speech concerning the impact of the case of Sun Oil Co. v. Whitaker on groundwater conservation and management.

The program will be as follows:

8:30 a.m. *Registration*—School of Law, 19th and Hartford

8:50 a.m. *Welcome*—Richard B. Amandes, Dean, Texas Tech University School of Law

9:00 a.m. *Sun Oil Co. v. Whitaker—An Overview*—Professor Richard W. Hemingway, Texas Tech University School of Law

Pre-decision oil, gas and water law; background and history of the case from inception to disposition on appeal; analysis of the majority and dissenting opinions on first appeal and on rehearing; impact of the case on legal doctrine.

10:00 a.m. *Staying Out of the Middle—The Practicing Attorney's View*—R. K. Harty, Esq., Crenshaw-Dupree & Milam, Lubbock, Texas

Protecting your client before litigation arises; development of arguments for trial and appeal; statutory "waste" and water conservation legislation; proving "reasonable alternatives"; establishing and proving distinguishable fact patterns.

11:15 a.m. *Effect on Ground Water Conservation and Management*—Frank Rayner, B.S. in Geological Engineering, Manager, High Plains Underground Water Conservation District No. 1, Lubbock, Texas

The impact of Whitaker on surface owners; extent of water shortage areas; relationship of Underground Water Conservation Districts to water users; licensing of water use; jurisdictional limitations; problems of water supply for municipalities.

12:15 p.m. *Question and Answer Period*—Panel

All those interested in attending the seminar are urged to register by mail or at the meeting. Registration fee is $15.

MACKENZIE . . . continued from page 1

lake, dam and pipeline right-of-way to Big Spring, Snyder and Odessa for Lake J. B. Thomas was less than $600,000—estimated to be less than $50.00 per land-surface acre; for only the lake and dam site for Lake Meredith it was less than $2,000,000 in 1961—less than $50.00 per land-surface acre, and for the White River Lake and dam site it was approximately $50.00 per land-surface acre in 1962, while the 2,386 acres acquired for the Mackenzie dam and reservoir cost $289,000—$121.12 per land-surface acre.

The comparative cost (for land acquisition, dam and associated construction, but not including pipelines) per acre-foot of potential water shortage was approximately $15.00 for J. B. Thomas, approximately $33.00 for Meredith, less than $9.00 for White River, and over $100.00 for Mackenzie.

All this appears to illustrate one salient point—the determination of the High Plains residents to make full utilization and conservation of *all* of their potential water supply sources, irrespective of their limited magnitude, and in spite of their high water-unit costs.

A. L. Black, Master of Ceremonies; Herb Evans, District Conservationist from Friona, and Ed Thomas, State Conservationist of the Soil Conservation Service from Temple, present the map showing the completion of the mapping and testing of Parmer County's soil in the "Final Acre" ceremony in Parmerton.

PARMER COUNTY MAPS FINAL ACRE

The completion of a four-year project to map every acre of soil in Parmer County was celebrated September 5 in Parmerton, Texas.

The Parmer County Soil and Water Conservation District, who conducted the Final Acre Celebration, presented a soil map of the entire county.

The survey was a joint project of the U. S. Soil Conservation District and Texas A&M Extension Service. Herbert Bruns, SCS Soil Scientist from Hereford, was in charge of the survey.

A. L. Black of Friona acted as Master of Ceremonies for the event. Earl Blakely, Soil Scientist from Lubbock, gave an explanation and Ed Thomas gave the principal address. Thomas is the State Conservationist from Temple.

With the completion of the project, maps will be made available to demonstrate the type of soil found on every acre in Parmer County.

The survey will enable the Soil Conservation Service to work with local farmers and land owners on a farm-by-farm basis in planning conservation programs. The information should also be helpful to real estate agents, land buyers, highway planners, school districts and many other interests.

The maps, to be kept at the Soil Conservation Office, will yield information on the soil's texture, permeability, slope, severe erosion areas, depth of soil, amounts of sand, silt and clay in each layer, water-holding capacity and other data. The survey maps cover both city land and rural acreage.

Books To Be Printed

Within three years the U. S. Government Printing Office will produce 1,500 or more copies of the Parmer County Survey book, complete with maps. When published, the book will contain 50 to 60 pages of text on the county's soil descriptions, soil percentages by types, soil use and manage-

—continued on page 4 . . . PARMER

H. Leon Slaughter of Abilene, Clois Cobb, Lubbock, Bob F. Scott, Chairman from Fort Worth, Donald V. Allison, Abilene, and Frank Rayner, Manager of the Water District, members of the West Texas Chamber of Commerce Water Conservation Task Force Committee, meet to prepare for the WTCC Mid-Year Board Meeting to be held in October. The purpose of the Conservation Task Force is "to encourage intensification of water conservation measures and to furnish facts to other task forces about conservation measures that are being taken . . ."

WATER . . . continued from page 1

He then moved to Georgia to become Director of the Southern Piedmont Soil and Water Conservation District. In 1964 he was appointed Chief of the Southern Branch, S.W.C., A.R.S., U.S.D.A.

Prior to becoming Dean of the Tech College of Agricultural Sciences in 1971, Bertrand served as professor and Head of the Agronomy Department and later as Chairman of the Agronomy Division, College of Agriculture, University of Georgia at Athens.

Other professional accomplishments include being a member of the Editorial Board of the *Journal of Soil and Water Conservation,* Associate Editor for *Soils,* an agronomy journal, and member of the Soil Science Society of the American Society of Agronomy. The Dean has also authored 42 scientific publications and co-authored a book on soil conservation.

Bertrand is a Fellow of the American Society of Agronomy and the Soil Conservation Society of America, a member of the Soil Science Society of America, the International Soil Science Society, Indiana Academy of Science, Georgia Academy of Science and the Soil Conservation Society of America.

Lubbock memberships include the Rotary Club and the United Methodist Church.

The High Plains Underground Water Conservation District No. 1 is proud to welcome Dean Bertrand to this new position and wishes him the best of luck in this very important office.

ANSON R. BERTRAND

Drilling Statistics for May, June, July and August, 1972

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Reported Dry Holes
ARMSTRONG	0	0	0	0
BAILEY	21	30	3	0
CASTRO	30	29	1	0
COCHRAN	5	11	0	0
CROSBY	3	4	0	0
DEAF SMITH	46	30	0	1
FLOYD	23	40	4	2
HALE	4	4	0	0
HOCKLEY	11	18	1	2
LAMB	22	33	3	0
LUBBOCK	19	50	7	2
LYNN	2	14	1	0
PARMER	42	52	3	1
POTTER	0	0	0	0
RANDALL	10	11	1	4
TOTAL	**238**	**326**	**24**	**12**

PARMER . . . continued from page 3

ment, engineering applications, classification of soils and the general nature of the area.

The main part of the book will consist of fold-out maps with soil "type lines" superimposed on aerial photos and soil areas classified by symbols.

The soil survey books, when released, will be made available to the Parmer County Soil and Water Conservation District through the area's congressional office.

CALIFORNIA AWARDED NATIONAL HONOR

The California State Water Project has received the nation's top engineering award for 1972 from the American Society of Civil Engineers. The project is the largest single water development in the world to be financed at one time. It is also the first water project to be built with recreation and fish and wildlife enhancement as one of the primary purposes.

SCS COMPLETES CANYON LAKES SURVEY

An inventory of the soil resources in the Canyon Lakes Project is nearing completion by the U. S. Department of Agriculture-Soil Conservation Service (SCS) and will be delivered to the City Planning Department early in October.

Commonly known as a soil survey, this inventory is being made through a cooperative agreement with the City of Lubbock, the Lubbock County Soil and Water Conservation District, Soil Conservation Service and the Texas Agricultural Experiment Station.

According to Dan Blackstock of the SCS, the soil survey will enable the planners of park facilities to consider the natural soil properties and capabilities in locating sites for the various park facilities.

A soil survey consists of a map printed on an aerial photograph showing the boundaries of each different type of soil and a handbook that contains a full description of each soil and interpretation of the properties described.

Soils in the Canyon Lakes Project range from very shallow to deep and nearly level to very steep. Each soil reacts differently from all the others to any given use.

The nearly level soil in the bottom of the canyon is deep and well suited for vegetative growth, but the frequent floods it receives limits its value as a place for any kind of permanent structure. Care must be taken when streets, houses and other structures are built on the steeply sloping sides of the canyon, as erosion can severely damage the area.

Soil Conservation Service technicians will be available to the city for consultation on any soil-related problem within the Canyon Lakes Project area.

Dedication ceremony at the north abutment of the Mackenzie dam site on Tule Draw. Otha Dent, Texas Water Rights Commissioner, was the principal speaker.

View looking upstream at the proposed Mackenzie dam site (in blue overlay).

Boy Scout Troop 262, Silverton, presents the Colors at the Mackenzie dedication.

Jim Nichols, partner of Freese, Nichols and Endress, design engineers for the Mackenzie dam and reservoir, chats with Mr. and Mrs. Marvin Shurbet. Shurbet is Vice-Chairman of the Texas Water Development Board.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 18—No. 10 "THERE IS NO SUBSTITUTE FOR WATER" *October, 1972*

TWRC CREATES GROUNDWATER DISTRICT

The Texas Water Rights Commission decided October 5 in Brownfield, Texas, to present to the voter another chance to consider a proposed South Plains Underground Water Conservation District No. 4. The new District would include portions of seven West Texas counties.

According to John Kendrick of Brownfield, one of the men chosen to serve as a temporary board member until the election, the voters will probably vote for creation of the District due to speculation of a state-wide district to pool all underground water not already a part of an organized water district.

A similar proposal was defeated in 1966 by voters in the seven counties—Andrews, Cochran, Dawson, Gaines, Lynn, Terry and Yoakum. The issue was tried through the District Court in Gaines County, the Circuit Court of Appeals at El Paso and the Texas Supreme Court. In 1968, the Supreme Court ruled the proposed District invalid due to the voters' thumbs-down decision.

Delineation Still in Effect

The delineation proposed in 1965 still being in effect, the men chosen to represent the area as temporary Directors are Gayle Craft, Yoakum County; E. L. Hendon, Dawson County; Vernon Goodwin and Marion Bowers, both serving Gaines County, and Kendrick, Terry County.

Ed Reed, a Midland hydrologist, testified before the Commission as he did in 1966 that the six basic reasons for creating the District are even more urgent now than before.

Among those reasons was that the Ogallala aquifier, the major underground water source in the South Plains area, does not affect the resources of the rest of the state.

Kendrick said the election, originally scheduled to take place in early December, will be postponed until January or February. While voting for or against forming the District, the voters will also vote for its first Board of Directors (the same names as on the temporary Board) and the ad valorem tax.

Rayner Speaks On Sun Oil v. Whitaker

Frank Rayner, Manager of the High Plains Underground Water Conservation District No. 1, participated in a seminar at the Texas Tech University School of Law October 21. The seminar concerned the case of SUN OIL COMPANY v. WHITAKER.

Speaking on its effect on groundwater conservation and management, Rayner briefly reviewed the case in respect to fresh, brackish and saline groundwater development and conservation and the involvement of the High Plains Water District in the case.

Rayner also discussed the effect of the case on groundwater ownership and water rights on both private and public lands.

Also speaking at the seminar were Professor Richard W. Hemingway of the Texas Tech School of Law and R. K. Harty, Esq., an attorney with Crenshaw-Dupree & Milam, a Lubbock firm.

Hemingway presented an overview of Sun v. Whitaker and Harty's speech was entitled, "Staying Out of the Middle—The Practicing Attorney's View".

Kerry Armstrong, Texas Tech law student; Frank Rayner, Richard W. Hemingway, Professor, Texas Tech School of Law; Gordon Treadaway, Lubbock attorney; Chester Mitchell and Albert Sechrist, discuss the case of Sun Oil Co. v. Whitaker at the Law School seminar on October 21, 1972.

NOTICE TO LAND OWNERS

Reversal of the Sun-Whitaker Decision[1]

by F. A. RAYNER

The final decision of the Supreme Court of Texas in the case of Sun Oil Company v. Whitaker has been made. The Court in a five to four decision, on June 28, 1972, set aside its previous opinion of October 27, 1971. The 1971 decision[2] was in favor of Whitaker, the owner of the land surface. The Court has now held that Sun Oil Company has the right to produce as much of the fresh groundwater beneath the Hockley County farm owned by Earnest Whitaker as is "reasonably necessary" to effectuate their oil and gas lease, including the waterflooding of their oil reservoir with water from the Ogallala aquifer.

Seven Justices, Calvert, Reavley, Pope, Daniel, Greenhill, Steakley and Denton, all agreed in the opinion dated October 27, 1971, that, under the facts and the law, Sun Oil Company was *not* entitled to the free use of fresh water from the Ogallala aquifer under Whitaker's land for their waterflooding operations. Justice McGee was the only Justice who disagreed with the 1971 opinion, and Justice Walker did not participate in that decision.

In rendering their final decision last June, Justice Calvert, who wrote the October, 1971, opinion, and Justices Reavley and Pope reversed themselves and joined with Justices McGee and Walker in holding for Sun Oil Company.

The Court found that under the "implied" right of a 1946 oil and gas lease Sun had the privilege of the free use of such water, even though Sun's projected needs would reduce by eight years the life of the irrigation water supply beneath the Whitaker farm.

Mineral Lease Dominant

The dominance of the mineral lease estate was emphatically reaffirmed by the Court in stating:

"The oil and gas lessee's estate is the *dominant estate* and the lessee has an *implied grant,* absent an express provision, for payment of free use of such part and so much of the premises as is reasonably necessary to effectuate the purposes of the lease . . . " (emphasis added).

Attorneys speaking at a recent law conference[3], noted that the effect of this decision was to place upon the lessor (the land or mineral owner) the burden to specify in writing in the lease agreement all minerals other than oil and gas, water, gravel, caliche, etc., that portion of their land surface to be reserved, and any other operations that they wish excluded; otherwise, such a right is implied even though such practices or operations are not even contemplated or known at the time such lease agreements are executed—such as was waterflooding in Hockley County at the time of the execution of the 1946 lease in question.

Legal Counsel Advised

In view of the complexity and all encompassing dominance of the oil and gas lease holder's rights to use all the groundwater necessary to produce oil, gas and *all other minerals,* attorneys have advised land and mineral owners to seek legal counsel before executing such agreements, unless the land or mineral owner is in accord with granting to the lessee all rights (particularly to the groundwater) not otherwise excluded from such leases.

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[1]From the report now in preparation, "The Case of Sun Oil Company v. Whitaker—Its Effect On Groundwater Conservation and Management".

[2]Reproduced in its entirety in *The Cross Section,* November, 1971.

[3]The conference, "Sun Oil Company v. Whitaker: The Energy Crisis v. The Water Crisis", held at Texas Tech University, October 21, 1972.

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

REBECCA CLINTON, Editor

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District Office at Lubbock

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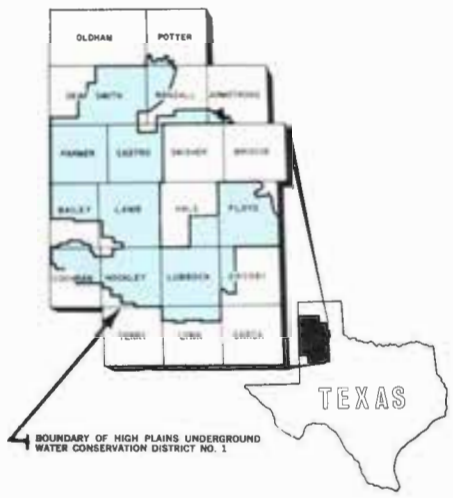
Albert W. Sechrist	Graduate Engineer
Don Smith	Geologist
Don McReynolds	Geologist
Tony Schertz	Draftsman
Obbie Goolsby	Field Representative
J. Dan Seale	Field Representative
George Tull	Field Representative
Clifford Thompson	Head, Permit Section
Mrs. Dana Wacasey	Secretary-Bookkeeper
Mrs. Norma Fite	Secretary
Mrs. Rebecca Clinton	Public Education



BOARD OF DIRECTORS

Precinct 1

(CROSBY, LUBBOCK and LYNN COUNTIES)

Ray Kitten, Secretary-Treasurer — Slaton

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)

Selmer H. Schoenrock — Levelland

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)

Ross Goodwin, President — Muleshoe

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)

Billy Wayne Sisson — Hereford

Precinct 5

(FLOYD and HALE COUNTIES)

Chester Mitchell, Vice President — Lockney

COUNTY COMITTEEMEN

Armstrong County

Carroll Rogers, 1973	Wayside
George Denny, 1973	Rt. 1, Happy
Jack McGehee, 1973	Wayside
Charles Kennedy, 1975	Rt. 1, Happy
Cordell Mahler, 1975	Wayside

Bailey County

Mrs. Darlene Henry, Secretary
Henry Ins. Agency
217 East Ave. B, Muleshoe

Jessie Ray Carter, 1973	Rt. 5, Muleshoe
Ernest Ramm, 1973	Rt. 2, Muleshoe
Adolph Wittner, 1973	Star Route, Baileyboro
Lloyd D. Throckmorton, 1975	Rt. 1, Muleshoe
W. R. "Bill" Welch, 1975	Star Rt., Maple

Castro County

E. B. Noble, Secretary
City Hall, 120 Jones St., Dimmitt

John Gilbreath, 1973	Rt. 2, Hart
Bob Anthony, 1973	Rt. 4, Dimmitt
Dale Maxwell, 1973	Box 489, Dimmitt
Joe Nelson, 1975	Box 73, Dimmitt
Anthony Acker, 1975	Rt. D., Nazareth

Cochran County

W. M. Butler, Jr., Secretary
Western Abstract Co., 108 N. Main Ave., Morton

Jessie Clayton, 1974	706 S. Main Ave., Morton
Hugh Hansen, 1974	Route 2, Morton
Dan Keith, 1976	Route 1, Morton
H. H. Rosson, 1976	Route 1, Morton
Danny Key, 1976	Star Route 2, Morton

Crosby County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

Jack Bowman, 1974	Lorenzo
Kenneth Gray, 1974,	Lorenzo
W. O. Cherry, 1976	Lorenzo
E. B. Fullingim, 1976	Lorenzo
M. T. Darden, 1976	Lorenzo

Deaf Smith County

B. F. Cain, Secretary
County Courthouse, 2nd Floor, Hereford

W. L. Davis, Jr., 1973	202 Northwest Dr., Hereford
L. B. Worthan, 1973	Rt. 3, Hereford
Frank Zinser, Jr., 1973	Rt. 5, Hereford
George Ritter, 1975	Rt. 5, Hereford
Harry Fuqua, 1975	Rt. 1, Hereford

Floyd County

Gayle Baucum, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

Fred Cardinal, 1974	Route 4, Floydada
Pat Frizzell, 1974	Box 1046, Lockney
Malvin Jarboe, 1976	Route 4, Floydada
Connie Bearden, 1976	Route 1, Floydada
M. M. Smitherman, 1976	Silverton Star Route, Floydada

Hale County

J. B. Mayo, Secretary
Mayo Ins., 1617 Main, Petersburg

Don Hegi, 1974	Box 179, Petersburg
Henry Kveton, 1974	Route 2, Petersburg
Clint Gregory, Jr., 1976	Box 98, Petersburg
Henry Scarborough ,1976	Route 2, Petersburg
Homer Roberson, 1976	Box 250, Petersburg

Hockley County

Jim Montgomery, Secretary
609 Austin Street, Levelland

E. E. Pair, 1974	Route 2, Levelland
Jimmy L. Price, 1974	Route 3, Levelland
Ewel Exum, 1976	Route 1, Ropesville
Douglas Kauffman, 1976	200 Mike, Levelland
Billy Ray Carter, 1976	Route 5, Levelland

Lamb County

Calvin Price, Secretary
620 Hall Avenue, Littlefield

Lee Roy Fisher, 1974	Box 344, Sudan
Jack Thomas, 1974	Box 13, Olton
Gene Templeton, 1976	Star Route 1, Earth
W. W. Thompson, 1976	Star Route 2, Littlefield
Donnie Clayton, 1976	Box 276, Springlake

Lubbock County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

R. F. (Bob) Cook, 1974	804 6th Street, Idalou
Dan Young, 1974	4607 W 14th Street, Lubbock
Glenn Blackmon, 1976	Route 1, Shallowater
Andrew (Buddy) Turnbow, 1976	Route 5, Box 151 B, Lubbock
Alex Bednarz, 1976	Route 1, Slaton

Lynn County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

Roger Blakney, 1974	Route 1, Wilson
Orville Maeker, 1974	Route 1, Wilson
O. R. Phifer, Jr., 1976	New Home
S. B. Rice, 1976	Route 1, Wilson
W. R. Steen, 1976	Route 2, Wilson

Parmer County

Aubrey Brock, Secretary
Wilson & Brock Insurance Co., Bovina

Webb Gober, 1973	RFD, Farwell
Jim Roy Daniel, 1973	RFD, Friona
Joe Moore, 1973	Box J, Lazbuddie
Guy Latta, 1975	1006 W. 5th, Friona
Edwin Lide, 1975	Rt. 1, Bovina

Potter County

Henry W. Gerber, 1973	Rt. 1, Amarillo
Fritz Menke, 1973	Rt. 1, Box 538, Amarillo
Vic Plunk, 1973	Rt. 1, Box 544, Amarillo
F. G. Collard, III, 1975	Rt. 1, Box 101, Amarillo
W. J. Hill, 1975	Bushland

Randall County

Mrs. Louise Tompkins, Secretary
Farm Bureau, 1714 Fifth Ave., Canyon

Leonard Batenhorst, 1973	Rt. 1, Canyon
Richard Friemel, 1973	Rt. 1, Canyon
Marshall Rockwell, 1973	Rt. 2, Canyon
John F. Robinson, 1975	1002 7th St., Canyon
Fred Begert, 1975	1422 Hillcrest, Canyon

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

Dolph Briscoe and his wife, Janey, pause for a moment during their October visit to the District offices. Briscoe is the Democratic candidate for Governor. (See story, page 4.)

Committee Hears Testimony on Solid Waste Disposal

Disposing of garbage and trash, expected to be the nation's number one problem by the year 2000, was the topic of a public hearing in the 99th District Courtroom in the Lubbock County Courthouse October 20.

Frank Rayner, Manager of the High Plains Underground Water Conservation District No. 1, presented testimony on the subject upon invitation from the Texas House Investigating Committee headed by State Representative Vernon Stewart of Wichita Falls.

Dr. Geoffrey Stanford, of the University of Texas School of Public Health, and Stewart heard testimony from approximately 20 city and county officials in an effort to receive public opinions and to develop them into specific recommendations to present to the legislature.

As an example of information already gathered from hearings in Houston and Arlington, Stewart said there seems to be a need for one central agency to regulate solid waste management. Presently, the Texas Health Department governs municipal disposal practices, but the Water Quality Board regulates industrial waste disposal.

Rayner Discusses District

Speaking for the Water District, Rayner explained the boundaries and powers of the District regarding threat of waste or damage to the aquifer system of the area within the District's boundaries.

Rayner stated that he knew of no cases within the District where a municipal sanitary landfill had caused harm to the underground water supply, but noted that if this occurred the District would take the necessary steps to alter this action.

He also recommended that the State Health Department and Water Quality Board hold public hearings before granting permits for any new solid waste disposal sites.

Floodwater Serves As Recharge Method

The Northwest Hillsborough Basin Board, located within the boundary of the Southwest Florida Water Management District, has approved the concept of diverting excess floodwater from Lake Keystone to Lakes Juanita, Rogers and Raleigh as a recharge project.

The Board also authorized retention of a private engineering firm to perform a review of the staff's diversion concept and to prepare plans and specifications for implementation of the final project design.

The project will enable excess floodwater to be moved from Lake Keystone to the smaller lake Juanita and from there to Lake Rogers where the geologic conditions indicate considerable recharge to underground water supplies will take place.

The project will also be effective in reducing flood damage during periods of excessive rainfall by giving the large lake an additional outlet. The only outlet now available to release floodwater is at the northern end where Brooker Creek exits the lake.

Ray Kitten, Selmer Schoenrock, Ross Goodwin Cap Goodwin, Alice Mitchell and Chester Mitchell prepare to attend the Southern Plains Region Cloudtap Conference in Dallas. (See story, page 3.)

HOUSTON-GALVESTON REGION

Groundwater Pumpage Causes Land-Surface Subsidence

by ALBERT SECHRIST

The Houston-Galveston region of Texas is slowly sinking due to the withdrawal of large quantities of groundwater. Groundwater is the primary source of water for both municipal and industrial use throughout the entire region. Approximately 600 million gallons of water per day are currently being pumped from the underground formations.

The subsurface of the region is a thick section of unconsolidated lenticular deposits of sand and clay. Water in the formation partially supports the weight of the overburden of the formation.

When water is withdrawn from the sands, reducing the pressure in the aquifer, the weight of the overburden forces water out of the clay layers and the clays are compacted. It is this compaction that allows the land surface to subside. The rate of subsidence and the total amount of subsidence to be anticipated are dependent on the rate and amount of groundwater pumpage in the area.

Subsidence Severe Near Monument

Robert K. Gabrysch, Hydrologist with the U.S. Geological Survey in Houston, explains that the most severe subsidence in the Houston area is in the vicinity of the San Jacinto Monument area east of downtown Houston. In this area, water levels have declined more than 200 feet since 1943 and the land-surface subsidence has been approximately seven feet. The subsidence has caused the salty water from the Galveston Bay to inundate a portion of the San Jacinto Park and battleground area. The level of some roads has had to be raised while others have been abandoned due to the encroaching waters.

The only solution to the land subsidence problem appears to be to stop pumping water from the underground supply; however, this would not stop the subsidence immediately as some water would continue to be forced out of the clay beds allowing some subsidence to continue for several months or years.

In order to partially solve the problem and reduce the rate of subsidence, the cities and industries are beginning to turn to surface water supplies to meet their needs, although the treatment and transportation of surface water is several times the cost of pumping and using the groundwater.

Upon completion of surface water storage lakes now in operation, under construction, or being proposed, the area will eventually have enough surface water to meet the present-day needs. If the change is made to the surface supply, the land subsidence can be controlled.

Directors Attend Two Conferences

Members of the Board of Directors of the High Plains Underground Water Conservation District No. 1 and their wives attended two conferences during October.

Selmer Schoenrock, Ray Kitten, Mr. and Mrs. Ross Goodwin and Mr. and Mrs. Chester Mitchell participated in the Southern Plains Region Cloudtap Conference in Dallas, October 16. The third in a series of conferences on weather modification in the Plains area, the objective of the conference was to allow laymen to hear weather modification project managers discuss activities presently being carried out in the Southern Plains Region.

Governor David Hall of Oklahoma, host of the first two conferences, gave the luncheon address and Mayor Wes Wise of Dallas welcomed the group to his city.

The Mitchell's, Goodwin's and Kitten joined Albert Sechrist, Graduate Engineer with the District, in Houston for the Thirty-second Annual State Meeting of District Directors of the Texas Soil and Water Conservation Districts, October 17, 18 and 19.

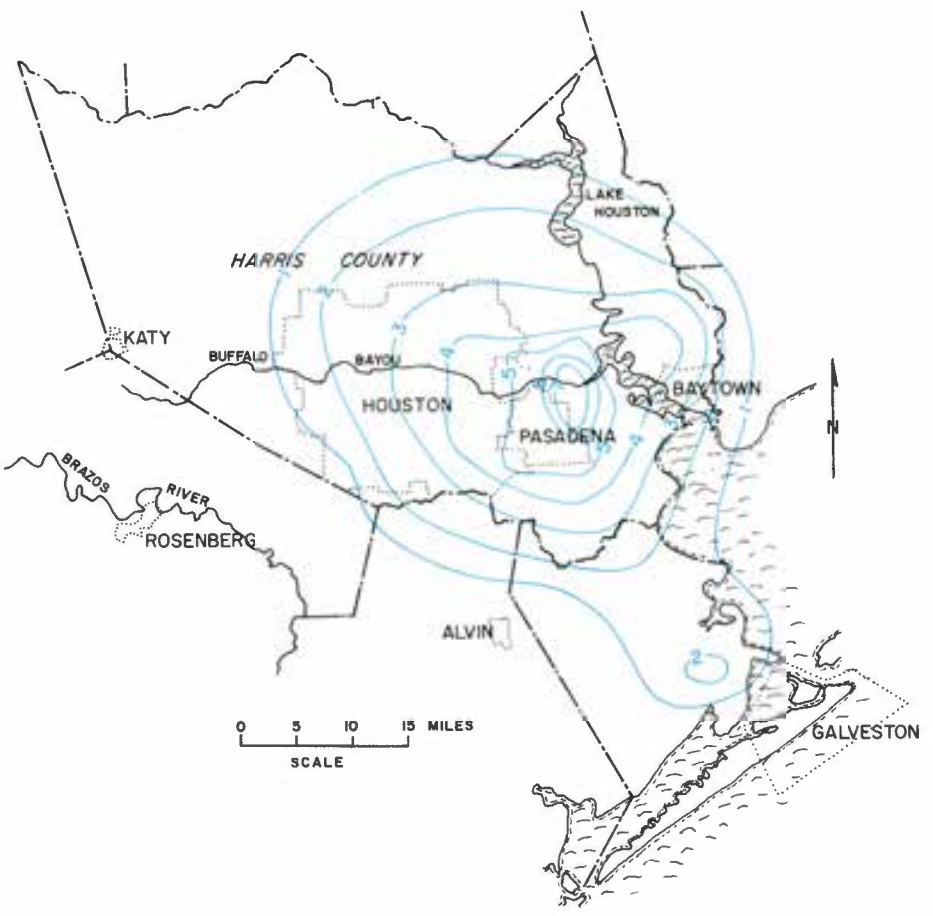
The Directors and their wives met and talked with Lieutenant Governor candidate Bill Hobby and Governor hopeful Dolph Briscoe. Hobby attended a Tuesday reception and Briscoe spoke at the Wednesday banquet.

While in Houston, Sechrist and the Directors participated in a tour of the area around the San Jacinto Monument, Baytown and the Houston Ship Channel to view the land subsidence. In some parts of Houston and Galveston, the land surface has subsided as much as seven feet since 1943 due to extensive groundwater pumpage in the area.

The San Jacinto monument, east of downtown Houston, is located near the area experiencing the greatest land subsidence—nearly seven feet. Land subsidence is taking place over a wide area and is sinking at a relatively even rate; therefore, the monument is not endangered, although water from Galveston Bay is encroaching upon some of the San Jacinto Park land.

Effects of land-surface subsidence in the Houston area are indicated by the two-story home and detached garage which have been abandoned. The land surface, where the house now stands, formerly stood several feet above the water level of Galveston Bay, which now surrounds the house.

Bob Gabrysch, right, U.S. Geological Survey Hydrologist from Houston, explains the land subsidence problem in the Houston area to Directors of the High Plains Water District. Looking over an instrumented research site are, from left, Don Jorgensen, also of the USGS Houston office; Chester Mitchell, Ray Kitten, Ross Goodwin, District Directors, and Gabrysch.



Land-surface subsidence in the Houston-Galveston area of Texas is shown by the blue contour lines. Notice that the subsidence has exceeded seven feet in a portion of the area. (Data supplied by Robert Gabrysch, U.S. Geological Survey, Houston, Texas.)

Dolph Briscoe, Democratic gubernatorial candidate, and Ray Kitten, Secretary-Treasurer of the District Board of Directors, discuss the water situation on the High Plains of Texas. Briscoe's October visit marked his second such stop by the District offices.

Briscoe and Grover Visit District

Dolph Briscoe, Democratic candidate for Governor of Texas, paid a second visit to the offices of the High Plains Underground Water Conservation District No. 1 during the month of October. The first visit being prior to the May primary, Briscoe talked with Ray Kitten, Secretary-Treasurer of the District Board of Directors, about the water situation on the Texas High Plains and the District's groundwater conservation programs.

Senator Hank Grover, Republican gubernatorial candidate, also made a special effort to stop by the District offices during his visit to Lubbock on October 24. He and several campaign workers made a tour of the office and met and talked with District employees.

The Water District is encouraged that two such well-known political figures have shown an expressed interest in learning more about the water situation in the High Plains area, and more especially in the future of our groundwater supply.

The Cross Section speaks for the District with pride in the growing public appreciation of the major importance of groundwater to the economy of Texas, and that people seeking public office are concerned enough to take time from their busy campaign schedules to seek out this information so important to our area.

Senator Hank Grover, Republican candidate for Governor, and Albert Sechrist discuss activities of the Water District during Grover's tour of the District offices on October 24.

COLORADO CURTAILS GROUNDWATER USE

Landowners who pump groundwater from the Arkansas River basin recently received notice from the Office of the State Engineer, Division of Water Resources of the State of Colorado, of curtailment of underground water pumpage from the underground water tibutary to the Arkansas River and its tributaries.

C. J. Kuiper, State Engineer, and R. Styduhar, Division Engineer for Water Division 2, published Rules and Regulations pursuant to Section 148-21-34, Colorado Revised Statutes 1963, as amended, which became effective the 15th day of May, 1972. However, no demands were received and none were anticipated until August 10, 1972, on which an anticipated call was received.

The Rules and Regulations provided for their implementation upon receipt of a written demand or upon anticipation of a demand by a senior appropriator of underground water.

Appropriators Must Comply

Pursuant to Section 148-21-35, Colorado Revised Statutes 1963, as amended, the State Engineer and Division Engineer ordered all groundwater appropriators, whose diversions are from water tributary to the Arkansas River and all its tributaries, to comply with the following requirements of the Rules and Regulations:

1. All appropriators of underground water for which an application for determination of amount and priority thereof has not been filed with the Water Clerk of Water Division 2, prior to July 1, 1972, shall immediately cease all diversion of water from such appropriations.

2. All appropriators of underground water who have made application for determination of amount and priority with the Water Clerk of Water District 2, prior to July 1, 1972, *shall immediately curtail diversion under these appropriations, three-sevenths (3/7) of the time and may divert the other four-sevenths (4/7) of the time. Such appropriators are hereby ordered to cease diversion on Friday, Saturday and Sunday of each week* unless a more efficient and acceptable plan of operation is approved in writing by the Division Engineer or his duly authorized representative; provided, other appropriators are not adversely affected.

3. Any appropriator of underground water may divert during periods of curtailment; provided, he has written approval from the Division Engineer for an exchange plan to reasonably lessen the injury to prior vested rights resulting from pumping during periods of curtailment as provided above.

Curtailments are effective in Colorado until the Division Engineer or his representative finds that periods of curtailment are no longer necessary.

DISTRICT PUBLISHES CONSERVATION BROCHURE

The High Plains Underground Water Conservation District No. 1 recently published a brochure depicting the history of irrigation on the Southern High Plains of Texas. Printed to complement the District's fair booth at the 1972 Panhandle South Plains Fair, the pamphlet is entitled, "A Look at Groundwater Conservation".

The period from the 1930's to today is traced and accompanied by a pictorial presentation. The Ogallala aquifer, once unlimited and thought to be inexhaustible, was gradually depleted with the onset of extensive irrigation development.

In 1951, landowners elected to form the High Plains Underground Water Conservation District No. 1 in an effort to conserve and manage what groundwater there remained. The review concludes with a question as to the future of the groundwater supply on the High Plains. With groundwater conservation, the High Plains Water District believes irrigation can be prolonged.

Copies of the brochure may be obtained by contacting the District offices at 1628 15th Street, Lubbock, Texas 79401.

Water Conservation Is Best Effectuated Through The Democratic Processes Of Government

VOTE ON NOVEMBER 7, 1972

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

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THE Cross SECTION

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

Volume 18—No. 11 "THERE IS NO SUBSTITUTE FOR WATER" *November, 1972*

Selmer Schoenrock, Chester Mitchell, Major General John Morris, Ray Kitten and Ross Goodwin meet in Salt Lake City, Utah, to discuss the water-shortage problem in the High Plains. Gen. Morris is Director of Civil Works for the U.S. Army Corps of Engineers. (See pictures on pages 3 and 4.)

COMMISSIONERS' COURT RESOLVES TO STOP TAILWATER SILT PROBLEM

The High Plains Underground Water Conservation District No. 1 has joined with the Deaf Smith County Commissioners' Court in resolving to stop the use of county road ditches to carry tailwater.

As a result of a resolution adopted October 9 by the Court, the Commissioners expressed the desire to secure the Water District's support and authority in solving the tailwater problem in Deaf Smith County.

Upon invitation from the Court, officials of the High Plains Water District met with the Commissioners to discuss the problem of farmers using bar ditches to transport irrigation water, as well as other conservation problems.

District members in attendance were Billy Wayne Sisson, Board Member from Hereford; Frank Rayner, Manager, and Obbie Goolsby, Field Representative.

The Court, following a discussion with Water District officials, adopted the following resolution:

"Be it resolved that the Deaf Smith County Commissioners' Court enlists the cooperation of the High Plains Underground Water Conservation District No. 1 to promote the conservation of the county's dwindling groundwater supply by abating the waste of this precious and limited resource. Be it further resolved that the Deaf Smith County Commissioners' Court is determined to reduce the expense of county road and waterway maintenance resulting from silt and weed problems that are created by such groundwater waste."

Silt A Problem

According to Commissioner Donald Hicks, the use of the bar ditches along county roads to transport tailwater is a big problem for the county. In many places the tailwater has left behind so much silt that the bar ditch is level with the road.

Consequently, the county must go into the area with a maintainer, carryall or backhoe to remove the dirt from the ditch, leaving huge mounds of dirt. As an example, a road ditch that had been filled with dirt to the height of the road was cleaned out while wet with a backhoe leaving a mound of dirt averaging 12 feet wide and five feet high for the length of the ditch cleaned.

Hicks said the cheapest method of removing the dirt is via a maintainer at a cost of $288 a day (figured at $12 an hour for a 24-hour day). A backhoe costs $15 an hour and a carryall rents for an average of $18 an hour.

Dirt Mounds Hazardous

Another problem Hicks noted is the removal of the mounds of dirt. "We'll have to go back in later and spread the dirt over the road." He added that this can result in chug holes in the road, but, unless a farmer wants to use the dirt to fill a hole on his land, that is all that can be done with it.

The Water District has increased its surveillance of landowners who have been warned previously about tailwater problems, as well as issuing warnings for first offenders.

The Water District is empowered by the State to enforce the abatement of water waste by "injunction, man-

—continued on page 2 . . . COURT

DIRECTORS ATTEND NWRA CONVENTION

The Board of Directors of the High Plains Underground Water Conservation District No. 1 attended the National Water Resources Association (NWRA) 40th Anniversary Convention in Salt Lake City, Utah, November 14-17, 1972.

Joined by their wives and Frank Rayner, Manager of the District, Ross Goodwin, Chester Mitchell, Ray Kitten and Selmer Schoenrock made the trip to Utah in an effort to participate in the planning stages of preserving water resources for future generations.

An organization of the 18 western states concerned about the future of the area's existing water supply, the NWRA proclaimed as its theme: "Pioneers of Irrigation Yesterday, Protectors of the Environment Today, Providers for the Needs of Tomorrow."

While in Utah, the Directors met with Major General John Morris, Director of Civil Works for the U.S. Army Corps of Engineers; Joseph Tofani, Policy and Analysis Chief, Civil Works Office, and Warren Fairchild, Assistant Commissioner for Resource Planning, Bureau of Reclamation. Also representing the Bureau were James Bradley and James O'Brien. (See pictures on pages 1, 3 and 4.)

Prominent speakers at various meetings throughout the conference were Ellis L. Armstrong, Commissioner, Bureau of Reclamation; Major General A. P. Rollins, Jr., Deputy Chief of Engineers, Corps of Engineers; William Erwin, Deputy Under Secretary, Department of Agriculture, and James R. Smith, Assistant Secretary of the Interior.

Representatives from the National Soil Conservation Service, Forest Service, National Wildlife Federation and state water associations also attended the annual meeting.

Convention workshops and state caucuses were highlighted by the naming of the 1972 life members. Phoenix, Arizona, was named as the convention site for 1973.

Board members all expressed the opinion that the convention was a success in that it brought closer together all those interested in the environmental and natural resource problems facing the United States as a whole.

State Crop Survey In Progress

During the last half of November and in December some 60,000 farmers and ranchers will receive a crop or livestock questionnaire from the Texas Crop and Livestock Reporting Service. Accurate estimates are of great importance to producers, providing an accurate picture of agriculture for each county and for the State of Texas.

This roundup survey of agricultural crop production and livestock numbers is made annually by the Texas Crop and Livestock Reporting Service. The Texas Department of Agriculture and the Statistical Reporting Service, U.S. Department of Agriculture, are joined together to provide a continuing program of information on Texas agriculture.

Texas has 254 counties, and producers are selected in the samples proportional to size of operation. The small producer sampled represents many others of comparable size while the very largest producers may represent only themselves.

Therefore, it is equally important for all farmers and ranchers receiving a questionnaire to return it promptly. The individual report is confidential—available to no other Government agency or anyone except the few persons processing the data. The county and State estimates published are available for everyone at the same time.

County statistics for 1971 and January, 1972, are available on Livestock, Poultry, Dairy, Field Crops, Small Grains, Cotton, Vegetables, Fruits and Pecans, and Cash Receipts from the Sale of Texas Farm Commodities. Bulletins can be obtained from the Texas Crop and Livestock Reporting Service, P. O. Box 70, Austin, Texas 78767, or by writing John C. White, Texas Commissioner of Agriculture, P. O. Box 12847, Capitol Station, Austin, Texas 78711.

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

1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

REBECCA CLINTON, Editor

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District Office at Lubbock

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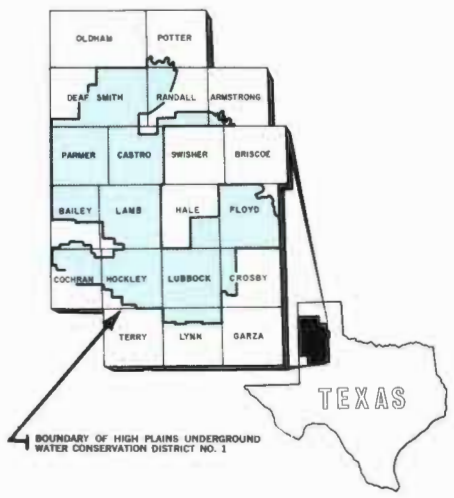
Albert W. Sechrist ..... Graduate Engineer
Don Smith ..... Geologist
Don McReynolds ..... Geologist
Tony Schertz ..... Draftsman
Obbie Goolsby ..... Field Representative
J. Dan Seale ..... Field Representative
George Tull ..... Field Representative
Clifford Thompson ..... Head, Permit Section
Mrs. Dana Wacasey ..... Secretary-Bookkeeper
Mrs. Norma Fite ..... Secretary
Mrs. Rebecca Clinton ..... Public Education



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Connie Bearden, 1976 ..... Route 1, Floydada
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Douglas Kauffman, 1976 ..... 200 Mike, Levelland
Billy Ray Carter, 1976 ..... Route 5, Levelland

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Donnie Clayton, 1976 ..... Box 276, Springlake

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Glenn Blackmon, 1976 ..... Route 1, Shallowater
Andrew (Buddy) Turnbow, 1976 ..... Route 5, Box 151 B, Lubbock
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Edwin Lide, 1975 ..... Rt. 1, Bovina

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Vic Plunk, 1973 ..... Rt. 1, Box 544, Amarillo
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W. J. Hill, 1975 ..... Bushland

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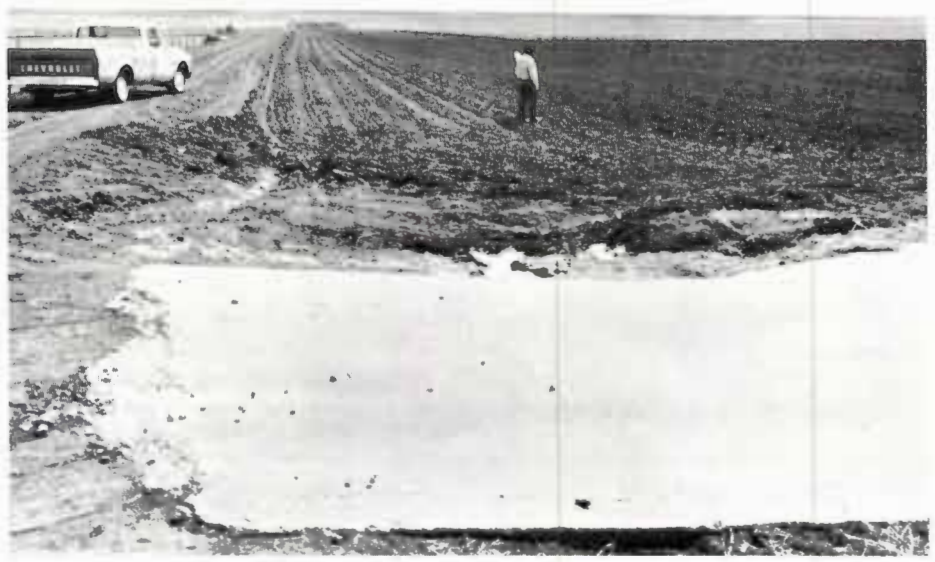
Richard Friemel, 1973 ..... Rt. 1, Canyon
Marshall Rockwell, 1973 ..... Rt. 2, Canyon
John F. Robinson, 1975 ..... 1002 7th St., Canyon
Fred Begert, 1975 ..... 1422 Hillcrest, Canyon

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.



Pictured above is the waterway to a large tailwater pit on Sisson's farm before it had been planted with grass.

GRASSED WATERWAYS BECOMING POPULAR

Grassed waterways are becoming commonplace on many irrigation farms today and Billy Wayne Sisson, Member of the Board of Directors of the High Plains Water District, thinks they are here to stay.

Going hand-in-hand with a tailwater return system, grassed waterways cut down greatly on the travel of silt to the tailwater pit. "A waterway also reduces soil erosion resulting from rain," said Sisson.

A Deaf Smith County farmer, Sisson says the grassing of waterways is common in his area of the High Plains. Having dug his own waterways in April of this year and sowed the grass in May, Sisson says the waterway will "seed itself" if it has a good, natural turf.

At the present, the farmer-director is watering the turf so as to make it as healthy as possible.

Sisson noted that the waterways on his farm lead to the larger of his two tailwater pits. Aided by the Deaf Smith County Soil Conservation Service in the planning of the grassed return system, Sisson said the total cost was minimal.

"I did most of the labor myself," said Sisson. "The major cost was the purchase of the seed at $15 to $18 an acre."

When asked if tailwater return systems and grassed waterways are beneficial, Sisson commented that the cost is minute in comparison to the conservation benefits.

He concluded by saying he expects the silt problem to be greatly reduced, if not eliminated, by the use of the grassed waterways.

The same waterway is pictured above after the establishment of grass. Sisson says the grassed waterway will serve as a method of trapping silt before it reaches the tailwater pit.

COURT . . . continued from page 1

datory injunction, or other appropriate remedy in a court of competent jurisdiction".

Water District officials have noted that Deaf Smith County is one of the leading counties in the installation of tailwater recovery systems, and that there is a backlog of construction pending. However, the use of the county roadway ditches to transport tailwater remains a problem for county road maintenance, and the Water District joins the Deaf Smith County Commissioners' Court in resolving that irrigators confine such tailwater to their lands.

Federal hydrologists say less than 1 percent of the 326 million cubic miles of water is available to man as fresh water.

ARTESIAN WELL CLOSED TO REGULATE WATER LEVEL*

The flow from an artesian well often adversely affects the groundwater levels of an entire region. Therefore, many states have laws proclaiming such flow to be illegal and, thus, authorizing it to be shut off. However, very few of these laws have been tested.

One such artesian well, the Foreman well in Southwestern Idaho, was closed upon the filing of a suit in behalf of the Idaho Department of Reclamation against D. I. Foreman. The suit was concluded with a successful repair and closing of the well.

The story is especially interesting because this well, as many of those in Southern Idaho, yields hot water from a series of basalts (trap rock), rhyolites and unconsolidated sediments. Flows from many wells are great enough for irrigation, and the higher-than-normal temperatures commonly allow an extension of the relatively short growing season.

Foreman Well Spectacular

In August, 1962, a 2980-foot well, drilled for D. I. Foreman in Middle Castle Creek Valley of Owyhee County, turned out to be one of the most spectacular of these thermal wells. Water temperature was 170 degrees F, and the well had a shut-in, well-head pressure of 105 psi. It flowed at 3,600 gpm.

A year later, massive leakage began to occur around the well casing when the well was shut down. A swamp area, several hundred feet in diameter, formed around the well. Efforts to repair the well were unsuccessful because of the high temperature and pressure involved.

Monitoring of other thermal wells in the area showed that the artesian pressure surface of the entire region was slowly being lowered. Thus, on March 2, 1967, a suit was filed under Idaho Statute 42-1602, which states in part:

"It shall be unlawful for any person owning, possessing, or occupying any land upon which is situated an artesian well, to cause, suffer or permit the water to unnecessarily flow from such well or to go to waste."

Repair Termed Success

Andrew Well Drilling Co. of Idaho Falls was hired by the owner to repair the well. The operation was successful and now, more than three years later, the seal is still holding.

The effect of the closure of the Foreman well was dramatic. The water level in an observation well almost six miles away, which had declined about 100 feet during the time the Foreman well flowed, rose more than a tenth of an inch in the first eight hours. To date, recovery has been more than 26 feet. Other wells in the area have reacted similarly.

The net result of the repair of the

—continued on page 4 . . . ARTESIAN

Ross Goodwin discusses activities of the Water District with Warren Fairchild, Assistant Commissioner for Resource Planning, Bureau of Reclamation. Looking on are Directors Ray Kitten and Chester Mitchell and James Bradley, Regional Director of the Bureau's Area Planning Office in Amarillo, and James O'Brien, Assistant Chief of the Bureau's Division of Planning.

GROUNDWATER TO BE PUMPED INTO RIVER

An omnibus bill authorizing the construction of the Closed Basin Project in the San Luis Valley in south central Colorado and four other reclamation projects was recently passed by the U.S. House and Senate and sent to the President.

The $18.2 million project is proposed to enable Colorado to meet its water obligation to Texas and New Mexico under the 1938 Rio Grande Compact and the United States' treaty obligation with Mexico for Rio Grande River water. Water would also be provided for the Mishak and Alamosa National Wildlife Refuges in the San Luis Valley.

Although the project has not been signed into law by the President and funding has not been approved, the land owner fears the on-coming truth that the Secretary of the Interior and the State of Colorado will soon have the power to drill wells on his land for the purpose of supplying water for the surface water project. In the State of Colorado groundwater is owned and controlled by the state and the land owner does not have the right to develop or control the use of groundwater beneath his land.

Groundwater to be Diverted

The project involves drilling some 135 shallow wells in the eastern lowlands of the San Luis Valley to salvage an estimated 100,800 acre-feet of groundwater annually which will be diverted to the Rio Grande River through a network of canals. Forty thousand acre-feet of water will be available for irrigation in the basin when Colorado's water deficit to Texas and New Mexico has been eliminated.

The bill as written provides that the federal Government shall pay for the project since it would help the nation meet its treaty obligations.

The bill as passed provides only for project authorization. Construction and operation money must be appropriated by subsequent legislation.

Several years ago the city of Corpus Christi pumped groundwater into the Atascosa River, which flowed downstream and was recovered from the Nueces River, near the city. It was found that 75 percent of the groundwater was lost through evapotranspiration, with only 25 percent being put to beneficial use.

History has shown that the augmenting of river flows from groundwater pumpage results in the waste of the majority of the water so pumped. The waste of groundwater in this manner does not lend itself to the effectiveness of its direct application upon the land.

AGRICULTURE PACES POPULATION GROWTH

Agricultural production has kept pace with the accelerated population growth of the last several decades, according to the Population Reference Bureau, Inc., Washington, D.C.

This does not mean that starvation has disappeared, for the increased production of food has not always occurred where the demand was located, and its distribution has been often slow and inefficient. Nevertheless, agricultural output has increased in recent years.

Crop yields in the United States and other parts of the world have increased dramatically. Production of poultry and livestock has become highly systematized. New strains of wheat and rice give promise of a short-term gain in nutrition in some areas where it is needed most—in the Far East and Latin America.

There is no way of predicting how long agricultural production can keep pace with population growth. Efforts to increase agricultural production entail both short-run improvements in the efficiency and distribution of conventional crops and foods, and long-run projects to develop new sources of food.

Green Revolution Prospers

In the short run, subtropical agriculture is on the brink of an increase in production of staples so substantial that it has been called the "Green Revolution". New strains of wheat, rice and corn, particularly applicable to tropical climates, are expected to increase yields where they are effectively utilized.

The new strains involved in the Green Revolution often require a more precise timing of planting and irrigation, as well as the application of large amounts of fertilizer, and other changes from traditional agricultural practices.

Ideas for new food sources range from the ambitious to the bizarre. Many of them revolve around the sea: fish farming; the development of a high-protein flour called Fish Pro-

—continued on page 4 . . AGRICULTURE

Remember When . . .

JULY 23, 1931—HUMBLE CITY FARM

(Courtesy of Green Machinery and Pump Co., Amarillo, Texas.)

AGRICULTURE . . continued from page 3

tein Concentrate (FPC), and the conversion of plankton, microscopic organisms of the ocean, into palatable food. Scientists are even talking about converting coal into body-building nutrients. Another proposal is to grow large fungus-type plants on a petroleum base.

Another direction that agriculture might take in the pursuit of food for the coming billions of men could be the reclamation of desert areas. Some work along this line has been undertaken in Israel and in other arid places.

Agro-Industrial Complex Proposed

The most ambitious proposal in this direction has been what scientists at the Atomic Energy Commission call an "agro-industrial complex". This concept is built around huge nuclear power plants that would be used to desalt ocean water for irrigation and produce electric power for industrial purposes.

Coastal areas, particularly in the tropics, might be converted from desert to fertile agricultural regions through the availability of ample nuclear power, according to this idea.

So far, plans to go ahead with this kind of project on an operational basis have been stalled by high costs, the possibility of environmental damage, and safety problems.

It is impossible to see beyond these highly theoretical proposals for adding to the world's food supply. Technology has changed so quickly in the past that predictions of the far future are not very fruitful. It is conceivable that future crises in world food supplies might be temporarily staved off, just as the Green Revolution seems to be staving off the present one.

These increases in food supply obviously cannot keep occurring indefinitely. There is bound to be an upper limit, and when that limit is reached, or perhaps sooner, world population growth must end.

Groundwater Contamination Studied by EPA

Environmental Protection Agency (EPA) has contracted with General Electric's TEMPO Center for Advanced Studies to make a two-year investigation of methods for monitoring groundwater contamination throughout the nation. Geraghty & Miller, Inc., consulting groundwater geologists of Port Washington, N.Y., will be a part of TEMPO's research team, with major responsibilities in the areas of problem definition, existing regulatory practices, and evaluation of the sources, movement, and eventual fate of the subsurface contamination. The end result of the overall project will provide EPA with specific recommendations on the best approaches for continuous assessment of the quality of the nation's groundwater resources.

Ross Goodwin, Selmer Schoenrock, Joseph Tofani, Ray Kitten and Chester Mitchell meet at the National Water Resources Association Annual Convention in Salt Lake City. Tofani is Chief, Policy and Analysis Division, Civil Works Office of the Army Corps of Engineers.

Large mounds of silt removed from bar ditches by Deaf Smith County road maintenance crews are piled along county roads. (See story on page 1.)

ARTESIAN . . . continued from page 3

Foreman well was to increase the availability of groundwater to farmers and ranchers in the entire valley—no small thing in such an arid region. The problem and its solution show what can happen in only a few years.

However, all over the country, artesian groundwater is being wasted, often at a rate that is hardly noticed for tens of years. The Foreman story shows that this wasted water should—and can—be protected for future beneficial use.

*EDITOR'S NOTE: This story is partially reproduced from the October, 1972, issue of *The Water Well Journal,* by permission of the author, Sherl L. Chapman, Assistant Director, Department of Water Administration, Boise, Idaho.

WATER RIGHTS CONFUSED*

Courts have opened another can of worms in Texas. This time the ruling was by the Texas Supreme Court. It relates to one of this state's most precious resources, water.

The Texas Supreme Court ruled that Nueces County Water Control District No. 3 can divert part of its quota of river water from irrigation to municipal use in Robstown. It can do this without permission of Texas Water Rights Commission (TWRC), according to this ruling in a case which has dragged on for seven years.

As its name indicates, that commission has administered rights to surface water. Many of these rights go back to 1913 or earlier, including those in the Nueces district. Many of those early rights have been relinquished entirely by the first owners. Without protest, they were given to others who needed the water. Still other holders of rights were using only part of the water; the unused portion was given to someone else, often without protest.

Now, Texas Water Rights Commission does not know where it stands on these rulings. It has no way to inventory available water as to irrigation, municipal uses or something else.

"Confused" and "frustrated" were among the words used by those in the TWRC who are most familiar with the long and complicated history of this matter. No doubt, the court will be asked for a rehearing. But who knows whether this will be granted or not?

If the members and attorneys of the commission are perplexed, you can imagine the bewilderment of the irrigation farmer. He is no lawyer, but a large investor in the production of rice, cotton, sorghums, wheat or some other commodity. Can he count on continuing to get water—or can some town come along and take it away from him?

*EDITOR'S NOTE: The above editorial was reprinted from the November 12, 1972, issue of *The Dallas Morning News.*

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 18—No. 12 "THERE IS NO SUBSTITUTE FOR WATER" *December, 1972*

THE 1972 PRESIDENT'S REPORT

At the close of 1972, the High Plains Underground Water Conservation District No. 1 will have been in existence for 21 years and three months,, since it was ratified by vote of the taxpayers in September of 1951. For nearly 16 years of this time it has been my pleasure to serve the District in an elected capacity. I was first elected to the Bailey County Committee in 1957, and after serving in that capacity for 8 years, I was then elected to my present position on the District's Board of Directors. In this service, and through my travels throughout Texas and many other of the United States, I have come to realize and appreciate the uniqueness of the High Plains Underground Water Conservation District and its critical need to this area, and to Texas.

I first became interested in groundwater management when I became active in the Bailey County Water Conservation and Users Association in 1949. I must admit that my joining and working for the Bailey County Association, and my travels to Austin in 1949, to work for the passage of a State Law that would enable the creation of local groundwater management districts (now codified as Chapter 52, Vernons Civil Statutes of Texas), I did not then realize the extent of the benefits of groundwater management by local government. Our concern in 1949 was to find an alternative to the then proposed—and periodically reproposed many times since—state control of groundwater pumpage. I now take pride in realizing that the alternative to state control—a local groundwater conservation district—has worked so well to insure the economically reasonable, fair and conservation development of this area's groundwater supply.

If the truth were known it would probably reveal that very few, if any, of the "old timers" that worked for the passage of the groundwater district enabling act of 1949 could then foresee the results their farsighted efforts would have on the effective and efficient conservation management of our limited groundwater supply. I, for one, am now proud to admit that I have been pleased with the effectiveness of the groundwater management policies that have been followed by this District.

Through the years the District residents have become so accustomed to the District's regulatory policies that they now take for granted the need for local groundwater management. However, the principle of groundwater management by local elected government still has not been accepted or adopted for most of those areas in Texas, and parts of many other states, in need of such groundwater management. That primary obstacle, which is accepting the privilege of the responsibility of imposing upon oneself groundwater regulations, has not been overcome in most areas. Most people in many states have waited until such regulations have been imposed upon them by a state water regulatory agency before they come to realize the benefits to themselves, and to their respective states, in the acceptance of the privilege of financing and adhering to the discipline that is a part of local groundwater management.

With the recent reoccurrence of interest in regulating groundwater pumpage by the state regulatory agencies, there has also been the corresponding rebirth of the interest in local groundwater management, even in those states wherein groundwater is the property of the state and subject to appropriation only through a state agency.

I have seen this cycle repeated several times since 1949, but, unfortunately, I have seen very little adoption by the local people of the responsibilities that come with self determination —a decision accepted by this District's landowners over 21 years ago. Perhaps the new interest for state regulation of groundwater pumpage will, this time, result in the acceptance of the responsibility of the privilege of self management that is still available in Texas—or perhaps the clouds of state control will again be broken up and blow away as they have many times in the past. In any event, it would be my suggestion, resulting from the privilege of the experience of being a part of this District, that the residents of those areas experiencing groundwater problems—and there are few

—continued on page 3 . . . PRESIDENT'S

Smith Appoints New TWDB Head

Governor Preston Smith recently appointed John H. McCoy of New Boston as the new Chairman of the Texas Water Development Board (TWDB) to replace W. E. (Buck) Tinsley. McCoy, Mayor of New Boston and the public member of the Board, will conclude his present term on December 30, 1975.

Appointed by Gov. Smith as Chairman in 1971, Tinsley was reappointed to the Board by the Governor in July, 1972, to serve another six-year term. He will remain on the Board until December 30, 1977.

Other members of the TWDB and their term expiration dates are Marvin Shurbet, Petersburg, December 30, 1973; Milton Potts, Livingston, December 30, 1973; Carl Illig, Houston, December 30, 1975, and Robert B. Gilmore, Dallas, December 30, 1977.

Shurbet is the farm and ranch member; Potts, the public member; Illig, the law member; Gilmore, the engineer member, and Tinsley, the finance member of the TWDB.

THE 1973 DISTRICT ELECTION

The High Plains Underground Water Conservation District No. 1 will hold its 1973 elections on January 9, 1973.

This year, elections will be held only in those counties within the Director's Precinct 3 (Bailey, Castro and Parmer) and Director's Precinct 4 (Armstrong, Deaf Smith, Potter and Randall).

A vacancy left in Precinct 3 by Ross Goodwin, President of the Board in 1972, will be filled by one of three contenders. Seeking to fill the vacancy are A. W. Gober, Farwell; Wade Mills, Nazareth, and John Gunter, Muleshoe. Billy Wayne Sisson, Director for Precinct 4, is running unopposed.

Absentee balloting was begun December 21 and will continue through January 5, 1973. Polling places will be the County Courthouse, County Clerk's Office, in each of the seven counties involved.

Qualifications to Vote

A qualified voter in the District's election is any person possessing a valid voter registration certificate and residing within the delineation of the District and within the county where a vote will be taken. The election judge at each of the polling places will have maps depicting the Commissioner's Precincts within each county included in the District's boundaries.

—continued on page 2 . . . ELECTION

WATER LEVELS TO BE MEASURED IN JANUARY

High Plains Water District personnel will begin measuring the depth to water in over 800 observation wells the first of January. On January 8, members of the Texas Water Development Board (TWDB) staff will join the District in completing the measuring of all the wells located within the boundaries of the District that are a part of the observation well program.

Members of the District staff will measure wells in Bailey, Castro, Cochran, Deaf Smith, Floyd, Parmer, Potter and Randall Counties. Wells in Armstrong, Crosby, Hale, Hockley, Lamb, Lubbock and Lynn will be measured by TWDB personnel.

1973 tags will be placed on the well-head equipment of all observation wells. A blue and white tag will be used to determine wells measured by the District and a white stick-on tag will mark all wells measured by the TWDB.

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

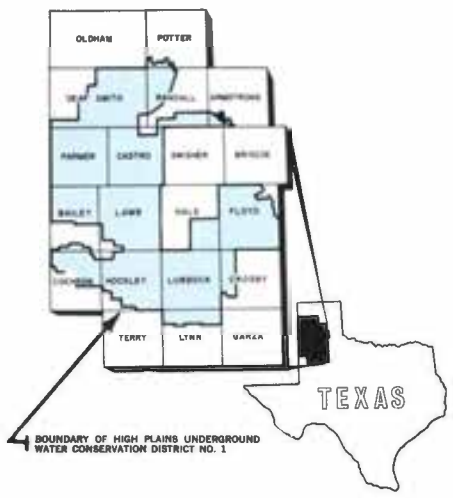
Telephone 762-0181

REBECCA CLINTON, Editor

Second Class Postage Paid at Lubbock, Texas

District Office at Lubbock

Frank Rayner, P.E.	Manager
Albert W. Sechrist	Graduate Engineer
Don Smith	Geologist
Don McReynolds	Geologist
Tony Schertz	Draftsman
Obbie Goolsby	Field Representative
J. Dan Seale	Field Representative
George Tull	Field Representative
Clifford Thompson	Head, Permit Section
Mrs. Dana Wacasey	Secretary-Bookkeeper
Mrs. Norma Fite	Secretary
Mrs. Rebecca Clinton	Public Education



BOARD OF DIRECTORS

Precinct 1

(CROSBY, LUBBOCK and LYNN COUNTIES)

Ray Kitten, Secretary-Treasurer — Slaton

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)

Selmer H. Schoenrock — Levelland

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)

Ross Goodwin, President — Muleshoe

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)

Billy Wayne Sisson — Hereford

Precinct 5

(FLOYD and HALE COUNTIES)

Chester Mitchell, Vice President — Lockney

COUNTY COMITTEEMEN

Armstrong County

Carroll Rogers, 1973	Wayside
George Denny, 1973	Rt. 1, Happy
Jack McGehee, 1973	Wayside
Charles Kennedy, 1975	Rt. 1, Happy
Cordell Mahler, 1975	Wayside

Bailey County

Mrs. Darlene Henry, Secretary
Henry Ins. Agency
217 East Ave. B, Muleshoe

Jessie Ray Carter, 1973	Rt. 5, Muleshoe
Ernest Ramm, 1973	Rt. 2, Muleshoe
Adolph Wittner, 1973	Star Route, Baileyboro
Lloyd D. Throckmorton, 1975	Rt. 1, Muleshoe
W. R. "Bill" Welch, 1975	Star Rt., Maple

Castro County

E. B. Noble, Secretary
City Hall, 120 Jones St., Dimmitt

John Gilbreath, 1973	Rt. 2, Hart
Bob Anthony, 1973	Rt. 4, Dimmitt
Dale Maxwell, 1973	Box 489, Dimmitt
Joe Nelson, 1975	Box 73, Dimmitt
Anthony Acker, 1975	Rt. D., Nazareth

Cochran County

W. M. Butler, Jr., Secretary
Western Abstract Co., 108 N. Main Ave., Morton

Jessie Clayton, 1974	706 S. Main Ave., Morton
Hugh Hansen, 1974	Route 2, Morton
Dan Keith, 1976	Route 1, Morton
H. H. Rosson, 1976	Route 1, Morton
Danny Key, 1976	Star Route 2, Morton

Crosby County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

Jack Bowman, 1974	Lorenzo
Kenneth Gray, 1974,	Lorenzo
W. O. Cherry, 1976	Lorenzo
E. B. Fullingim, 1976	Lorenzo
M. T. Darden, 1976	Lorenzo

Deaf Smith County

B. F. Cain, Secretary
County Courthouse, 2nd Floor, Hereford

W. L. Davis, Jr., 1973	202 Northwest Dr., Hereford
L. B. Worthan, 1973	Rt. 3, Hereford
Frank Zinser, Jr., 1973	Rt. 5, Hereford
George Ritter, 1975	Rt. 5, Hereford
Harry Fuqua, 1975	Rt. 1, Hereford

Floyd County

Gayle Baucum, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

Fred Cardinal, 1974	Route 4, Floydada
Pat Frizzell, 1974	Box 1046, Lockney
Malvin Jarboe, 1976	Route 4, Floydada
Connie Bearden, 1976	Route 1, Floydada
M. M. Smitherman, 1976	Silverton Star Route, Floydada

Hale County

J. B. Mayo, Secretary
Mayo Ins., 1617 Main, Petersburg

Don Hegi, 1974	Box 179, Petersburg
Henry Kveton, 1974	Route 2, Petersburg
Clint Gregory, Jr., 1976	Box 98, Petersburg
Henry Scarborough ,1976	Route 2, Petersburg
Homer Roberson, 1976	Box 250, Petersburg

Hockley County

Jim Montgomery, Secretary
609 Austin Street, Levelland

E. E. Pair, 1974	Route 2, Levelland
Jimmy L. Price, 1974	Route 3, Levelland
Ewel Exum, 1976	Route 1, Ropesville
Douglas Kauffman, 1976	200 Mike, Levelland
Billy Ray Carter, 1976	Route 5, Levelland

Lamb County

Calvin Price, Secretary
620 Hall Avenue, Littlefield

Lee Roy Fisher, 1974	Box 344, Sudan
Jack Thomas, 1974	Box 13, Olton
Gene Templeton, 1976	Star Route 1, Earth
W. W. Thompson, 1976	Star Route 2, Littlefield
Donnie Clayton, 1976	Box 276, Springlake

Lubbock County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

R. F. (Bob) Cook, 1974	804 6th Street, Idalou
Dan Young, 1974	4607 W 14th Street, Lubbock
Glenn Blackmon, 1976	Route 1, Shallowater
Andrew (Buddy) Turnbow, 1976	Route 5, Box 151 B, Lubbock
Alex Bednarz, 1976	Route 1, Slaton

Lynn County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

Roger Blakney, 1974	Route 1, Wilson
Orville Maeker, 1974	Route 1, Wilson
O. R. Phifer, Jr., 1976	New Home
S. B. Rice, 1976	Route 1, Wilson
W. R. Steen, 1976	Route 2, Wilson

Parmer County

Aubrey Brock, Secretary
Wilson & Brock Insurance Co., Bovina

Webb Gober, 1973	RFD, Farwell
Jim Roy Daniel, 1973	RFD, Friona
Joe Moore, 1973	Box J, Lazbuddie
Guy Latta, 1975	1006 W. 5th, Friona
Edwin Lide, 1975	Rt. 1, Bovina

Potter County

Henry W. Gerber, 1973	Rt. 1, Amarillo
Fritz Menke, 1973	Rt. 1, Box 538, Amarillo
Vic Plunk, 1973	Rt. 1, Box 544, Amarillo
F. G. Collard, III, 1975	Rt. 1, Box 101, Amarillo
W. J. Hill, 1975	Bushland

Randall County

Mrs. Louise Tompkins, Secretary
Farm Bureau, 1714 Fifth Ave., Canyon

Leonard Batenhorst, 1973	Rt. 1, Canyon
Richard Friemel, 1973	Rt. 1, Canyon
Marshall Rockwell, 1973	Rt. 2, Canyon
John F. Robinson, 1975	1002 7th St., Canyon
Fred Begert, 1975	1422 Hillcrest, Canyon

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

Applications for well permits can be secured at the address shown below the respective County Secretary's name, except for Armstrong and Potter Counties; in these counties contact Carroll Rogers and Vic Plunk, respectively.

ELECTION . . . continued from page 1

Ballots

The names of all candidates will be listed on a ballot for each county. Voters can place an X in the box preceding the candidate's name or place an X in the box preceding the space provided for a write-in vote, and can follow this procedure by writing in the name of the person of their choice.

In accordance with the laws of Texas, the order of names on the ballots was determined by drawing lots.

Polling Places

For the 1973 election, a total of 12 polling places have been established in the seven counties.

The names and addresses of the candidates, the location of polling places and the names and addresses of the election judges are listed below.

NOMINEES FOR DISTRICT DIRECTOR

Director's Precinct No. Three—Territory within the District which is situated in each of the following counties: Bailey, Castro, and Parmer.

A. W. Gober, Route 1, Farwell, Texas

Wade Mills, Route D, Nazareth, Texas

John Gunter, Route 2, Box 721, Muleshoe, Texas

Director's Precinct No. Four—Territory within the District which is situated in each of the following counties: Armstrong, Deaf Smith, Potter, and Randall.

Billy Wayne Sisson, 114 Liveoak, Hereford, Texas

NOMINEES FOR COUNTY COMMITTEEMEN

ARMSTRONG COUNTY

Residents vote for three Committeemen-at-large

Guy Watson, Wayside, Texas
James Bible, Wayside, Texas
C. D. Rogers, Wayside, Texas
Bill Heisler, Wayside, Texas
Clifford Stevens, Rural Route, Happy, Texas
James Stockett, Wayside, Texas

BAILEY COUNTY

Residents of Commissioner's Precinct 2 vote for one

George W. Wheeler, Route 2, Muleshoe, Texas
Eugene Shaw, Route 2, Muleshoe, Texas

Residents of Commissioner's Precinct 4 vote for one

Joe (Archie) Sowder, Star Route, Goodland, Texas
Adolph Wittner, Star Route, Baileyboro, Texas

Residents vote for one Committeeman-at-large

Jessie Ray Carter, Route 5, Muleshoe, Texas

CASTRO COUNTY

Residents of Commissioner's Precinct 1 vote for one

Jackie Clark, Route 1, Box 33, Dimmitt, Texas

Residents of Commissioner's Precinct 2 vote for one

Joe Nelson, Box 73, Dimmitt, Texas

Residents vote for one Committeeman-at-large

Bob Anthony, Route 4, Dimmitt, Texas

DEAF SMITH COUNTY

Residents of Commissioner's Precinct 1 vote for one

James E. Higgins, 200 Star Street, Hereford, Texas

Residents of Commissioner's Precinct 2 vote for one

Garland Solomon, Route 5, Hereford, Texas

Residents vote for one Committeeman-at-large

W. L. Davis, 202 Northwest Drive, Hereford, Texas

PARMER COUNTY

Residents of Commissioner's Precinct 3 vote for one

Troy Christian, Route 1, Farwell, Texas

Residents of Commissioner's Precinct 4 vote for one

Joe Moore, Box J, Lazbuddie, Texas

Residents vote for one Committeeman-at-large

Dalton Caffey, 15th Street, Friona, Texas

POTTER COUNTY

Residents vote for three Committeemen-at-large

Henry W. Gerber, Route 1, Amarillo, Texas
Jim Line, Box 87, Bushland, Texas
Albert Nichols, Route 1, Box 491, Amarillo, Texas

RANDALL COUNTY

Residents of Commissioner's Precinct 1 vote for one

Harry LeGrand, 4700 S. Bowie, Amarillo, Texas

Residents of Commissioner's Precinct 2 vote for one

Joe Albracht, P.O. Box 81, Bushland, Texas

Residents vote for one Committeeman-at-large

Leonard Batenhorst, Route 1, Canyon, Texas

POLLING PLACES AND JUDGES FOR 1973 ELECTION

ARMSTRONG COUNTY

Polling Place No. 1: Schoolhouse, Wayside, Texas
Presiding Judge: Bernice Hamblin, Wayside, Texas

BAILEY COUNTY

Polling Place No. 1: Enochs Gin Office, Enochs, Texas
Presiding Judge: W. R. Adams, Route 2, Morton, Texas
Polling Place No. 2: Bailey County Courthouse, Muleshoe, Texas
Presiding Judge: B. H. Black, Route 2, Box 77, Muleshoe, Texas

CASTRO COUNTY

Polling Place No. 1: American Legion Hall, Nazareth, Texas
Presiding Judge: Greg Hoelting, Box 103, Nazareth, Texas
Polling Place No. 2: County Courthouse, Dimmitt, Texas
Presiding Judge: Floyd Copeland, 617 NW 8th, Dimmitt, Texas
Polling Place No. 3: City Hall, Hart, Texas
Presiding Judge: Percy Hart, Route 1, Hart, Texas

DEAF SMITH COUNTY

Polling Place No. 1: County Courthouse, Hereford, Texas
Presiding Judge: Mrs. Clinton Jackson, N. 385, Hereford, Texas

PARMER COUNTY

Polling Place No. 1: County Courthouse, Farwell, Texas

—continued on page 3 . . . ELECTION

PRESIDENT'S . . . continued from page 1

areas underlain by large aquifers that are not experiencing some type of groundwater problem—take the opportunity afforded by this "new" awareness for groundwater management, to institute a local unit of government that can be adopted to solve their own unique problems, and avoid the multitude of, most often, redundant regulatory framework common to state and federal governmental agencies.

To those who are quick to accept the need to centralize groundwater controls with the state or federal governments, I would recommend caution and review before blindly accepting the good of such philosophy. I will not attempt to itemize all of the advantages of the management of groundwater basins through local government (districts), but it should suffice to note that the occurrence of groundwater is in itself a local occurrence and not a statewide condition. However, I would like to make one comparison that also borders on another of my concepts of good government, that is, economy and management of governmental units within the reasonable means for their support by the taxpayer.

In order to illustrate the economics of groundwater management as practiced by this District, it is necessary to compare it with other units of government in the water field. For this purpose I will cite the cost of maintaining the three major water agencies in Texas; first, however, I want to make it clear that this comparison is not intended as a criticism of these agencies, because, for the most part, I agree fully with the intent of the state appropriations to these agencies.

Looking back to 1951, when this District was created, there was only one state water agency, the Texas State Board of Water Engineers. The total appropriation to this agency in 1951 was approximately $240,000. There are now three major statewide water agencies—the Texas Water Rights Commission, the Texas Water Development Board, and the Texas Water Quality Board—whose total appropriation was nearly 14 million dollars in 1972; a nearly 58-times increase in 21 years (the several hundred million dollars in bond sales, and bond sales authority are not here considered a part of the money appropriated by the Legislature to these agencies).

In 1952, the first taxing year, the District's net tax income was $42,-189.31; from a $0.05 per $100.00 advalorem tax, based upon county and state evaluation as assessed and collected by the individual county tax assessor-collector in each county in the District. The District has never changed its tax rate since its creation in 1951. However, through inflation and development within the District, the same $0.05 rate returned $256,-122.77 in 1971; this represents a gain of approximately 6 times its 1952 tax-income. Therefore, the appropriations to state water agencies have increased nearly ten times faster than has the District's income, and the state water agencies do not, as of now, exercise any management over groundwater. Since 75 percent of the water used annually in Texas is groundwater, what then could be the expected necessary increase in state appropriations if a state agency(s) was given jurisdiction over groundwater? I am inclined to believe that the state's taxpayers, particularly those in areas depending solely upon surface water supplies, may be reluctant to pay the tab for the proper and equitable management of a "local" groundwater supply, by a state agency.

It also appears reasonable that since this District's taxpayer has demonstrated for some 21 years his willingness to finance the operation of the District to manage the groundwater in the public's general interest, it does not appear reasonable to now impose upon them the additional expense of overlapping state regulation.

Unlike state agencies, who can plan to spend more money and then ask for increased appropriations to finance same, the District must, and should, live within its annual income. Since it does not receive a state appropriation, it would probably require the vote of a majority of its residents to permit an increase in its taxation rate above the present $0.05 per $100.00 evaluation. Therefore, in lieu of attempting to add to the ever increasing tax load imposed by the federal, state, county, city, school, hospital district, etc., units of government, the District has revised, and is keeping a tight reign on, its spending habits. However, even with efficient management of its tax income, it has been necessary to initiate fee systems for special services performed for the relative few requiring such special services. In this regard, the District has attempted to make the water-depletion, income-tax allowance program self sustaining, by increasing the cost of the tax guideline maps; and landowners who, for many different reasons have not complied fully with the District's well drill and completion procedures, are now required to pay the costs encountered by the District in correcting such problems. To date, these are the only two fee systems employed by the District, all other services are maintained by its tax income. It should be noted that many other units of state, county and particularly, city governments also employ fee system, in addition to periodically increasing taxation or appropriations.

I hope that the District can continue to operate without additional fees being imposed in the future, but in any event, I am proud that it is operating in the black, and that it has never changed its rate of taxation in the last 21 years. This is a feat that can be claimed by very few, if any, state or federal governmental units.

I have departed from the format set by the two previous Presidential reports (1970 and 1971) in order to pre-

—continued on page 4 . . . PRESIDENT'S

TWDB STAFF MEMBERS KILLED IN AIR CRASH

Two members of the Texas Water Development Board (TWDB) staff recently perished in the crash of a light airplane near Troy, Texas.

Killed in the November 17 accident were Robert Perkins; his wife, Linda; a daughter, Cindy, six; a daughter, Kristie, six weeks, and Joe Henry, all of El Paso.

Perkins, a geologist, and Henry, an engineer-technician, were assigned to the TWDB's El Paso office.

A native of Stephenville and a graduate of Texas Tech University, Perkins joined the TWDB staff in 1966. Henry came to the El Paso office nearly a year ago. He was a native of Anniston, Alabama.

Perkins is survived by his parents and Henry is survived by his wife and five children.

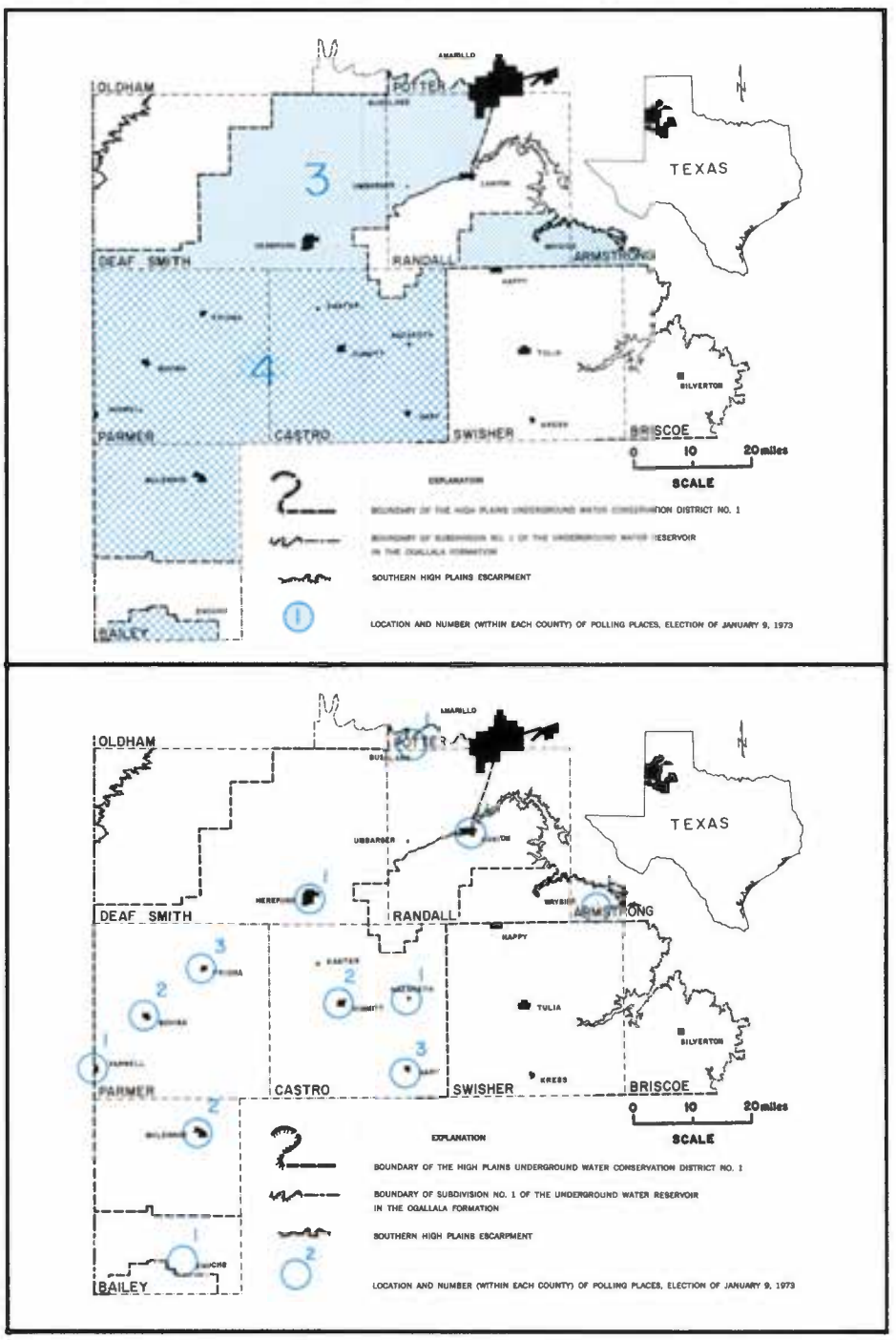
The Cross Section extends to the families of these fine men and the Texas Water Development Board the deep sympathy felt by the Water District. Their loss will be felt by all who knew them.

ELECTION . . . continued from page 2

Presiding Judge: Mrs. Albert H. Smith, Route 2, Farwell, Texas
Polling Place No. 2: Wilson & Brock Insurance, Bovina, Texas
Presiding Judge: A. B. Wilkerson, Box 296, Bovina, Texas
Polling Place No. 3: City Hall, Friona, Texas
Presiding Judge: J. L. Witten, 1602 W. 7th, Friona, Texas

POTTER COUNTY
Polling Place No. 1: Schoolhouse in Bushland, Texas
Presiding Judge: Mrs. James Walton, Box 76, Bushland, Texas

RANDALL COUNTY
Polling Place No. 1: Randall County Farm Bureau Office, 1714 - 5th Ave., Canyon, Texas
Presiding Judge: Mrs. Elizabeth M. Parker, Route 2, Box 200, Canyon, Texas



Pictured above are maps showing the area—District Director's Precincts 3 and 4—wherein the January 9, 1973, election will be held, and showing the locations of polling places for the election.

Clayton Resigns From Water Post

Bill Clayton, State Representative from Springlake and Executive Director of Water, Inc., resigned from the water post December 16. The resignation is effective December 31.

Executive Director since 1969, Clayton will be replaced by Duncan Ellison as Acting Executive Director. Ellison has been Director of Public Relations for Water, Inc., since August, 1969. In February, 1972, he was also named Assistant to the Executive Director.

Clayton told members of the Executive Committee and Board of Directors that he was resigning to allow himself more time for activities in the political realm.

PRESIDENT'S . . . continued from page 3

sent ideas of what I believe to be proper concepts for groundwater basin management through local districts. I hope that this report will be useful to those contemplating the need for initiating groundwater management in other parts of Texas, and in other states, and that it will serve as a brief summary of my policies to those who have been kind enough to support and advise me throughout my 16 years of service with the District.

Since my interest in groundwater management first started during a time of high interest in state groundwater controls, perhaps it is only fitting that with this new peak in the cycle of interest in state regulation of groundwater that I am nearing the end of service on the District's Board of Directors. In leaving this office I am finally fulfilling another of the principles that I believe to be good for local government, and that is, the necessity for the periodic change in its elected officials. For the most part, I believe the perpetuation in elected office of the members of local governments is not always in the best interest of progressive and effective service to the taxpayers. My belief in this principle was recently reaffirmed when I attended an out-of-state conference of a national water organization. I saw the same people that I had repeatedly met year after year at this particular convention. The near total absence of the young, and even middle aged, at this conference leaves me with misgivings about the future leadership in the water community—we are not perpetually young and our ideas of government are not perpetually right.

I want to take this opportunity to thank all of the District's residents for their support of the groundwater conservation programs of the High Plains Underground Water Conservation District No. 1, and to ask the residents of Bailey, Castro and Parmer Counties to support and counsel my successor, to be chosen by the election of January 9, 1973.

Respectfully submitted,

Ross Goodwin

ROSS GOODWIN, President
Board of Directors

WATER DEPLETION MAPS TO BE RELEASED IN JANUARY

The 1972 cost-in-water depletion, income-tax-allowance guideline maps for all the fifteen counties located within the District will be released early in January, 1973.

The Board of Directors voted in their December 15, 1972, meeting to retain the same price of $7.50 per copy. The guideline maps are used by landowners and their accountants to determine the water depletion allowance on their 1972 income tax.

Maps will not be available this year for landowners in Parmer County as a result of the District's automation of that county's decline information. A cost of $5 per claim will be charged by the District for the service.

If the machine processing proves successful in Parmer County, it may be expanded to other counties in the near future. Successful automation of this service is hoped for so as to cut down on man-hours put in on the program each year by the District staff.

In order for the District to implement this automation program, it will be necessary for each claimant, or his agent, to supply the District with the legal description of each parcel of land for which an allowance is claimed. This can be done by:

1) providing the District with a copy of the reverse side of IRS Form 665, noting the total acres in each parcel; or,
2) returning to the District the 1972 decline map with the parcel(s) depicted (the District will return the map to the claimant or his accountant), or,
3) providing the District with a list of the legal description of the parcels claimed. Forms for this purpose can be obtained from the District.

Accountants are urged to supply the District with all necessary information so as to keep the records and the program current. The continued cooperation of all claimants is required to continue this allowance program in effective operation.

THE FOUNDATION FOR SUCCESSFUL GROUNDWATER CONSERVATION IS PUBLIC PARTICIPATION

VOTE ON JANUARY 9, 1973

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
1628 FIFTEENTH STREET
LUBBOCK, TEXAS 79401

SECOND CLASS PERMIT