

THE Cross SECTION

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

Volume 17—No. 1

"THERE IS NO SUBSTITUTE FOR WATER"

January, 1971

VOTERS ELECT DIRECTORS AND COMMITTEEMEN

The annual election of the High Plains Underground Water Conservation District No. 1 was held on January 12, 1971. The Board of Directors of the District met January 19, 1971, to canvass the results of the election. They declared the election results to be true and binding. Declared elected were two Members of the Board of Directors and fourteen County Committeemen.

There was a total of 209 votes cast at the twelve regular polling places and seven absentee polling places. There were no absentee votes cast in the election, and the voting on election day was sparse although more votes were cast in these seven counties than in the same seven last year.

Reelected to a position on the Board of Directors was Ross Goodwin of Muleshoe who will continue as the Director from Director's Precinct Three (Bailey, Castro, and Parmer Counties). Mr. Goodwin, who was opposed by John Gunter of Muleshoe, won with a total of 88 votes to Mr. Gunter's 55 votes. Mr. Goodwin's 61.5% of the total vote is an indication of the voters confidence in the job he has been performing.

Billy Wayne Sisson of Hereford was elected to a freshman term on the Board of Directors. He will be representing Armstrong, Deaf Smith, Potter, and Randall Counties as the Director of District Director's Precinct Four. Running unopposed for the position, Mr. Sisson received 100% of the 56 votes cast for Director in that Precinct. Mr. Sisson replaces Mr. John Pitman of Hereford on the Board. Mr. Pitman had decided not to seek reelection for personal reasons.

At a luncheon meeting of the 1970 and 1971 Board Members held on January 19, 1971, Mr. Goodwin and Mr. Sisson were sworn in for two year terms on the Board of Directors of the High Plains Underground Water Conservation District No. 1. Judge William R. Shaver of the 140th Judicial District administered the oaths to the new members. Mr. Goodwin and Mr. Sisson join Mr. Chester Mitchell, Mr. Ray Kitten, and Mr. Selmer Schoenrock as Members on the 1971 Board. The Board, in its business meeting following lunch, reelected Mr. Chester Mitchell as President and Mr. Goodwin as Vice-President, then elected Mr. Ray Kitten Secretary-Treasurer of the Board.

Two County Committeemen were elected in each of the seven counties



Shown taking the oath of office to be Members of the Board of Directors of the High Plains Underground Water Conservation District No. 1 are Ross Goodwin (left) and Billy Wayne Sisson (middle). Administering the oath is Judge William R. Shaver (right).

where the election was held this year. Those Committeemen who were elected are listed below:

- ARMSTRONG:
 - Cordell Mahler
 - Charles Kennedy
- BAILEY:
 - Lloyd D. Throckmorton
 - W. R. "Bill" Welch
- CASTRO:
 - Joe Nelson
 - Anthony Acker
- DEAF SMITH:
 - George Ritter
 - Harry Fuqua
- PARMER:
 - Guy Latta
 - Edwin Lide
- POTTER:
 - F. G. Collard
 - W. J. Hill
- RANDALL:
 - John F. Robinson
 - Fred Begert

The Board of Directors have sent Certificates of Election to each of the above elected County Committeemen stating that the Committeemen will serve four year terms ending in 1975. The new four year terms for Committeemen were adopted in a rule change

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GEOLOGIST TO LEAVE



ANN BELL

Ann Bell, who has been the geologist for the High Plains Underground Water Conservation District No. 1 since August 1969, recently resigned from the District to take a much more lucrative position with the Texas

Water Development Board in Austin. This will undoubtedly be a great loss for the District while the TWDB is going to find they have an impressive new employee. Ann had worked part time for the District for nearly a year before being hired as a full time geologist. Mr. Frank Rayner, the District's Manager, has stated that it will be extremely difficult to replace Ann. He pointed out, "she has always been energetic, enthusiastic, and most capable in her attitude and efforts in behalf of the District."

Ann's husband, Dennis Bell, recently began Officer Candidate School with the Navy in Florida. Both Mr. and Mrs. Bell are graduates of Texas Tech University, and both have their degrees in geology.

The Cross Section wants to take this opportunity to publicly thank Ann for her hard work on behalf of the District and to wish her every success and blessing in the future.



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

1628 15th Street, Lubbock, Texas 79401

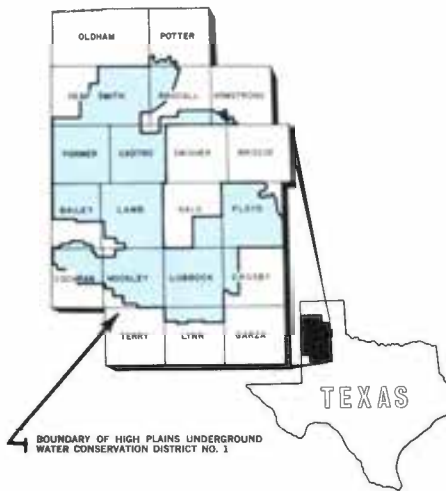
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 Kenneth Seales Field Representative
 Obble Goolsby Field Representative
 J. Dan Seale Field Representative
 Clifford Thompson Head, Permit Section
 Mrs. Dana Wacasey Secretary-Bookkeeper
 Mrs. Norma Fite Secretary



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, Vice President Muleshoe

Precinct 4

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

Precinct 5

(FLOYD and HALE COUNTIES)
 Chester Mitchell, President Lockney

COUNTY COMITEEMEN

Armstrong County

Carroll Rogers, 1973 Wayside
 George Denny, 1973 Rt. 1, Happy
 Jack McGehee, 1973 Wayside
 Charles Kennedy, 1975 Rt. 1, Happy
 Cordeil 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
 Ronald Coleman, 1972 Rt. 1, Morton
 Dan Keith, 1972 Rt. 1, Morton
 Keith Kennedy, 1972 Star Rt. 2, Morton
 Jessie Clayton, 1974 706 S. Main Ave., Morton
 Hugh Hansen, 1974 Rt. 2, Morton

Crosby County

Clifford Thompson, Secretary
 1628 15th Street, Lubbock
 W. O. Cherry, 1972 Lorenzo
 M. T. Darden, 1972 Lorenzo
 E. B. Fullingim, 1972 Lorenzo
 Jack Bowman, 1974 Lorenzo
 Kenneth Gray, 1974 Lorenzo

Deaf Smith County

B. F. Cain, Secretary
 County Court House, 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
 M. M. Julian, 1972 Box 55, South Plains
 M. J. McNeill, 1972 833 W. Tenn., Floydada
 Malvin Jarboe, 1972 Rt. 4, Floydada
 Fred Cardinal, 1974 Rt. 4, Floydada
 Pat Frizzell, 1974 Box 1046, Lockney

Hale County

J. B. Mayo, Secretary
 Mayo Ins., 1617 Main, Petersburg
 J. C. Alford, 1972 Box 28, Petersburg
 Harold D. Rhodes, 1972 Box 100, Petersburg
 W. D. Scarborough, Jr., 1972 Petersburg
 Don Hegi, 1974 Box 160-A, Petersburg
 Henry Kveton, 1974 Rt. 2, Petersburg

Hockley County

Ronnie Wallace, Secretary
 208 College, Levelland
 Ewel Exum, 1972 Rt. 1, Ropesville
 H. R. Phillips, 1972 Rt. 4, Levelland
 Douglas Kauffman, 1972 200 Mike St., Levelland
 E. E. Pair, 1974 Rt. 2, Levelland
 Jimmy Price, 1974 Rt. 3, Levelland

Lamb County

Calvin Price, Secretary
 620 Hall Avenue, Littlefield
 Ardis Barton, 1972 Hiway 70, Earth
 Gene Templeton, 1972 Star Rt. 1, Earth
 W. W. Thompson, 1972 Star Rt. 2, Littlefield
 Lee Roy Fisher, 1974 Box 344, Sudan
 Jack Thomas, 1974 Box 13, Olton

Lubbock County

Clifford Thompson, Secretary
 1628 15th Street, Lubbock
 Glenn Blackmon, 1972 Rt. 1, Shallowater
 Andrew (Buddy) Turnbow, 1972 Rt. 5, Lubbock
 Alex Bednarz, 1972 Rt. 1, Slaton
 R. F. (Bob) Cook, 1974 804 6th St., Idalou
 Dan Young, 1974 4607 W. 14th, Lubbock

Lynn County

Clifford Thompson, Secretary
 1628 15th Street, Lubbock
 O. R. Phifer, Jr., 1972 New Home
 Reuben Sander, 1972 Rt. 1, Slaton
 Dale Zant, 1972 Rt. 1, Wilson
 Roger Blakney, 1974 Rt. 1, Wilson
 Orville Maeker, 1974 Rt. 1, Wilson

Parmer County

Aubrey Brock, Secretary
 Wilson & Brock Insurance Co., Bovina
 Webb Gober, 1973 RFD, Farwell
 Jim Ray 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

Louise Knox, 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

New Editor For The Cross Section



FRANK A. RAYNER
Steps Down as Editor



JOHN L. SEYMOUR
To Be New Editor

Frank A. Rayner, Manager of the High Plains Underground Water Conservation District Number 1, has for the past year (January through December of 1970) been the editor of *The Cross Section*. Beginning with the January, 1971, issue he has given the responsibility for editing the District's monthly publication to John L. Seymour.

In making the economy moves which have resulted in the District being able to operate in the black for the first time in ten years (see "Presidents Report," *The Cross Section*, December, 1970), Mr. Rayner, in his capacity as Manager, required a doubling up of efforts by all personnel in the District's Lubbock office. He took upon himself the task of editing *The Cross Section*. This was certainly a burdensome job which he undertook on top of his already busy schedule. Looking at the previous twelve issues, there is no question that Mr. Rayner has a flair for journalism. His talents in this area have resulted in the outstanding quality that *The Cross Section* has achieved. To illustrate the reception that the more than 13,000 copies monthly receive, it can be noted that numerous other magazines and publications have asked to reproduce articles which have appeared in *The Cross Section* during the past year. Congratulations go to Mr. Rayner with regards to his fine efforts on behalf of *The Cross Section*.

Mr. Seymour, who now becomes editor, is the staff attorney for the District. He has been with the organization since mid-September following his graduation from Texas Tech University School of Law. Upon assuming the reins of *The Cross Section* he stated, "It is my hope to see the reputation *The Cross Section* has for excellence upheld."

The first issue of *The Cross Section* was in June, 1954, and it has been published monthly since that time. It was originally designed to keep the residents of the District informed on matters affecting the organization. In the first issue, the staff of *The Cross Section* stated, "We shall endeavor to present to you a cross section of the present day activities in the field of Underground Water as an instrument for keeping in touch with the plans and functions of your District." The circulation of this "monthly" has steadily increased until now it is distributed to approximately 13,000 individuals, organizations, and agencies. While its primary distribution is still within the District, *The Cross Section* is now mailed to addresses in nearly all states and approximately twenty-five foreign countries. It is one of the principle means of education concerning groundwater conservation that the District uses to further its creed, "Dedicated to the principle that water conservation is best accomplished through public education."

Mr. Seymour will be the eighth editor of *The Cross Section*. The first editor was F. B. Jeu Devine who edited the tabloid from June, 1954, until December of that year. Allan White, the gentleman who took over the editing chores in January, 1955, was editor longer than anyone else. The last issue he was responsible for was August, 1963. A young lady named Claudette McInnis was the editor for a short while from September, 1963, until May, 1964. Since that time the following have also edited the paper: Bill Waddle, June, 1964, through January, 1968; Tom Moorhead, February, 1968, through August, 1968; Jimmy Ross, September, 1968, through December, 1969; and Frank A. Rayner, January, 1970, through December, 1970.

TWDB CHAIRMANSHIP CHANGES

On January 12th, 1971, Governor Preston Smith asked Marvin Shurbet of Petersburg, Texas to step down as Chairman of the Texas Water Development Board. The Governor then appointed Searcy Bracewell of Houston to take over the chairmanship of that board. There has been a great deal of speculation as to what this change may mean with respect to the Texas Water Plan and associated hopes for importation of water to West Texas. Shurbet has been a member

of the Texas Water Development Board since its beginning, and his term as a member of the six man Board will extend through 1973. Mr. Shurbet has been a strong advocate of the Texas Water Plan as now constituted which provides for possible solutions to all of Texas' water problems. Mr. Shurbet has a great deal of experience in water matters, and he was on the Board of Directors of the High Plains Underground Water Conservation District No. 1 from 1954 through 1957.

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 Carrol Rogers and Vic Plunk, respectively.

Water Levels Measured Packing Plant Dedicated

During the first two weeks in January, personnel of the High Plains Underground Water Conservation District No. 1 and the Texas Water Development Board completed the measurement of the depth to water in 788 of the 851 current observation wells within the District.

Sixty-three wells were not measured during this year's campaign because of one or more of the following factors:

- 1) Well was pumping when visited.
- 2) Measuring tape could not be inserted in the well or would "hang" (lodge) before reaching the water.
- 3) Access roads to the wells had been plowed up.
- 4) Tape wet by water entering well above the static water level in same, or condensation on the casing and pump column wetting the measuring tape, obscuring the actual wetted part of the tape that had entered the water standing in the well.
- 5) Well had been abandoned and destroyed.

District personnel have, since completing the measurement of the 442 wells assigned for measurement during the early part of January, revisited, modified, replaced, and/or otherwise measured 29 of the wells that were not measured by District or Board personnel during the primary measuring campaign.

District personnel will revisit and make arrangements to secure the measurement of the remaining 34 wells, or replacements thereto, that were not measured by District or Board personnel during the first two weeks of January.

The 851 current observation wells within the District represent only one well for each 6,129 acres—this is exceptionally sparse observation well coverage for this (the Ogallala) type of aquifer, for the usage made of such records.

These measurements provide the data that makes possible the maintenance of the cost-in-water-depletion, income tax allowance program. Therefore, the District feels that the considerable and additional expense of this "follow up" program is most necessary and warranted.

The 1971 water-level measurements will be published in the February (1971) issue of *The Cross Section*.

January, 1971

Dear High Plains Irrigator,
Well, it looks as though you are about to start your pre-plant irrigation in a big way. It sure was a dry one last year, hope we get more moisture this year.

This is just a note to remind you to give some serious thought to your water conservation measures before you begin to irrigate this year. Remember, be conscious of your need to conserve as much water as possible, be conscientious in your use of the water, and be careful to avoid accidents which result in wasting water. The District appreciates your help in furthering its program of underground water conservation.

Sincerely,
The Cross Section

Everyone who was in attendance at the dedication of the new Missouri Beef Packers, Inc., plant north of Plainview was quite impressed. The crowd, numbering in the thousands, on hand for the ribbon cutting was permitted to tour the glittering new facilities. Utilizing extensive automation, the plant with its 190,000 square feet has been designed to process up to 10,000 head a week. The plant will have approximately 400 employees when it becomes fully operational.

This newest addition to agribusiness in the High Plains illustrates that agriculture and its related facilities are still in a dynamic growth period in this area. During the past few years, the cattle business, including both feed lots and packing facilities, has been increasing at an impressive rate. The basis for all economic growth on the High Plains is the availability and use of fresh water. This was specifically pointed out during the dedication ceremonies.

Dr. Clayton Yeutter, Administrator of the U. S. Department of Agriculture's Consumer and Marketing Service, provided the main address at the dedication ceremonies. Also in attendance were officials of Missouri Beef Packers, Inc., local governmental officials, and John White, Texas Commissioner of Agriculture. Dr. Yeutter, who is a most impressive speaker, gave a forceful speech in which he stated that the dramatic difference in the High Plains over the last fifteen to twenty years has been due primarily to water and its use in irrigation. He indicated that the area's economy will continue to depend on the availability of fresh water. In order for this area to maintain an adequate water supply, he stated that good sound conservation practices should be continued. Dr. Yeutter said that the reason businesses such as Missouri Beef Packers, Inc. will continue to come to the High Plains is to maintain a competitive position in the market. By having a packing plant near the many feedlots in this area, the transportation costs are reduced considerably. The feedlots have developed in this area due to the abundance of grain being grown on the High Plains. The grains are produced in such abundance because of the large scale irrigation practiced in the area. Consequently, it can be seen that water, irrigation, and conservation of water is the basic reason that Missouri Beef Packers, Inc. are opening this new facility on the High Plains.

Election . . .

—continued from page 1

last September. In the November issue of *The Cross Section*, the article discussing the amending of the Rule on electing County Committeemen stated that the amended rule should result in yearly election savings of approximately \$2,000 a year. The election expenses paid by the District this year totaled \$1,162.16 while the District paid out \$3,620.62 in election expenses last year. This resulted in a savings this year of \$2,458.46. Savings like this are what have permitted the District to begin operating in the black, once again.

COL. KRISTOFERSON MAKES STATEMENT TO ENVIRONMENTAL PANEL

In November, 1970, Colonel R. S. Kristoferson (District Engineer of the Fort Worth District, U. S. Army Corps of Engineers) appeared before the Environmental Advisory Panel of the Texas Water Development Board. The following text is a resume of the comments he made before that panel.

"The Corps of Engineers feels fortunate to be working with local governments like the river authorities of the State of Texas, and state agencies like the Texas Water Development Board, the Texas Water Rights Commission and the Texas Water Pollution Control Board. It is only where strong and effective local and state government exists that the federal government is able to participate significantly in local water resource planning and development. I want to express the Fort Worth District's appreciation for the competence, professionalism and cooperative attitude of all the water agencies with which we work.

"Mr. Lovett of my staff explained to you earlier that the Fort Worth District's evaluation of the Texas Water Plan will be submitted in two phases. I want to be sure that the panel understands why the report is being split into two parts.

"To begin with, the Texas Water Plan is a mammoth undertaking. To look at the Plan comprehensively and in detail is a gigantic undertaking. Much effort could be wasted in looking at some aspects in too much detail. It is the aim of the Phase I report to make an initial assessment and map out subjects and considerations which should be studied in greater detail in the Phase II report. This separation into phases has two beneficial results. It permits us to narrow the field of assessment and investigation in Phase II, eliminating the need for a shotgun approach and permitting more precise application of study efforts. It furthermore allows us to submit to the Administration and Congress a report which will act as a "trial balloon" in the field of water resources policy. This is important because, as a nation, we really have no long-range policy or set of national goals and objectives for development of our resources, whether they be water or otherwise.

"In the absence of stated goals and objectives, planners are forced to establish their own goals and objectives. This we have done. It is my hope that our Phase I report will elicit timely reactions at the local, state and national levels which will provide further guidance for the Phase II report.

"I want to point out that, as a people, we Americans have done a poor job of determining what kind of a country we want to have 50 years from now. We do a fair job of looking ahead for two, four or six years but cannot seem to get to grips with 50 years. What we badly need is for the Administration and Congress to establish an image of what they want our country to look like in 50 years, and then establish a set of national goals and objectives for all of us to accomplish so that we can direct our efforts to building our country into a semblance of that image.

"Please recognize that I am not speaking principally of water resources goals and objectives, but of social goals and objectives. Water is simply one of the supporting resources which helps us to accomplish our social goals and objectives.

"I have a tendency to try to reduce all problems to fundamentals, even at the risk of oversimplification. Even so, I view one of the elements of our national goals to be supporting human life at as high a standard of living as is consistent with the dependable yield of our resources. There is unquestionably the problem of overpopulation. My guess is that we can lick this problem in the United States and that our population will level off eventually, perhaps at the 400 million level. I do not doubt that our resources can support this number of people, but our problems don't stop there.

"Life on this planet will eventually be limited by the ability of certain fixed but renewable resources to support life. I refer

especially to arable land, fresh water and air. The latter two of these resources are indispensable in their own right for supporting life. But, in combination with arable land, they are also indispensable in growing the food and fiber necessary to support life.

"As I see it, the problem which we as a people must eventually face is not only how to feed, clothe and support just our own nation, but also to determine what responsibility we have in the same regard for other nations. I would submit that the rest of the world will not leave us in peace to enjoy our prosperity while they suffer for lack of essentials which we may have in relative abundance. This leads me to the thought that we will need to have every acre of arable land in production to provide food for ourselves and part of the rest of the world. We will probably need food to feed our friends and possibly to bribe our enemies. It seems plausible that a shipload of food may be more valuable in conducting international negotiations 50 years from now than an H-bomb is today.

"If arable land is necessary to our future survival, we must make the most of what we have. It has generally been established that irrigated lands in arid climates are more productive than most other lands. This is due to several things. First, proper application of water results in maximum production. Only in arid climates can the proper amount of water be applied; in other areas, too much water can fall on the crops. Second, abundant sunlight is usually found in arid areas, resulting in quick growth. Some arid areas can consequently produce more than one crop a year. Third, in these areas rains are less likely to have leached minerals out of the soil or to have washed valuable soil downstream to the sea.

"All these thoughts lead me back to the Texas Water Plan. The irrigated lands in the High Plains area are some of the most productive in our nation. It may turn out that we cannot spare their productive potential in the future and that we must import water to permit continued production.

"The real value of transporting water to the High Plains may not lie in preserving the status quo of an agricultural economy, or in providing jobs, or in resettling urban populations in rural areas, but in providing invaluable food and fiber for our long-term needs and national survival.

"If, in its deliberations, the Environmental Advisory Panel finds evidence or reasoning which will help us in our deliberations on the Texas Water Plan to determine its true value in the long-term interests of our nation, the Fort Worth District would appreciate your assistance. We need, and welcome, help from any source in putting the plan in true perspective."

TWCA Convention

All five members of the Board of Directors along with the Manager of the High Plains Underground Water Conservation District No. 1 plan to go to Austin for the annual convention of the Texas Water Conservation Association. The meeting will attract the water leaders from across the state. It will be an excellent opportunity for the Board to meet with, express and exchange views, and learn more about other important figures and programs concerned with the conservation of water. The meeting will be held at the Sheraton Crest in the Capitol from February 25 to February 27, 1971. Governor Preston Smith and Lieutenant Governor Ben Barnes will head the list of dignitaries who will address the meeting. With the State Legislature in session, there undoubtedly will be a great deal of discussion at the convention centering around proposed and pending legislation dealing with water matters.

DIRECTORS CHOSEN IN RECENT ELECTION



BILLY WAYNE SISSON

Billy Wayne Sisson was elected as a member of the Board of Directors of the High Plains Underground Water Conservation District No. 1 on January 12, 1971. He will represent District Director's Precinct Four (Armstrong, Deaf Smith, Potter, and Randall Counties) on the Board. This will be Mr. Sisson's first term on the Board of Directors.

Born in 1930 at Tahoka, Texas, Mr. Sisson has been associated with farming and agricultural business most of his life. While he attended McMurry College, he was on the varsity football team for four years. His degree was in physical education with a minor in history and business. After his graduation he served in the U. S.

Army from 1953 to 1954; then was involved with operating a cotton gin in Hale County for a number of years. He has been farming the same land since 1959 and now farms approximately 2700 acres. Having twenty-six wells on his farms, he is well acquainted with irrigation practices, the need for conservation of water, and the hard work necessary to prevent wasting of water.

In 1950, he married Miss DeAun LaNoe Kinkler, and they now have two daughters, Shalyn who is fifteen and Shavon who is seven. During the years he has established quite a collection of antique cars. He has six of these antiques with the earliest being a 1911 model and the most recent being of 1930 vintage.

Although this is Mr. Sisson's first term on the Board of Directors he is not a stranger to the District's operations, having been a County Committeeman for the District since 1965.

In talking to *The Cross Section* about what he hopes to accomplish while being on the Board, Mr. Sisson stated, "Initially, I want to learn as much as possible about the District's programs and policies so that I can transform this knowledge into serving the community the best I can." He also said that he hopes he will be able to play a part in educating everyone who uses water to use it without wasting any. One of his main concerns was, "to be sure that my children will have water left after I'm gone."



ROSS GOODWIN

Mr. Ross Goodwin retained his position as a Member of the Board of Directors of the High Plains Underground Water Conservation District No. 1 in the election held on January 12, 1971. Starting his fourth term as a Director of the District, Mr. Goodwin hopes to further the conservation programs of the District for another two years. Mr. Goodwin will be representing Bailey, Castro, and Parmer Counties in his position as the Board Member from District Director's Precinct Number Three.

Mr. Goodwin has been farming in Bailey County since 1939. When he bought his farmland in that year, it was in dryland. He immediately began to drill wells and has operated his

farm as an irrigated farm since that time. Speaking from a great amount of personal experience in the field, he has become known as one of the most knowledgeable water conservationists on the High Plains of Texas.

Before serving as a Member of the Board of Directors, Mr. Goodwin had served for six years as a County Committeeman for the District from Bailey County. He had been quite active in promoting water conservation matters prior to that time also. In the late 1940's there was a delegation from the High Plains of more than one hundred individuals, led by W. O. Fortenberry, who went to Austin to oppose proposed legislation which would have resulted in State ownership of groundwater. The delegation favored legislation much the same as was eventually adopted; whereby the underground water should remain under private ownership, and local water conservation districts were authorized to be formed to promote conservation of this valuable natural resource. Ross Goodwin was a member of that delegation and testified before the legislature at that time concerning water conservation matters. In 1968 Mr. Goodwin was named Conservation Farmer of the year by the Muleshoe Chamber of Commerce. At that time he was presented a plaque by the Blackwater Valley Soil Conservation Service in recognition of his work in conservation.

WEST TEXAS WATER CONFERENCE

The ninth annual West Texas Water Conference will be held at the Red Raider Inn, Lubbock, Texas on February 5, 1971. The conference is sponsored by the West Texas Water Institute, Texas Tech University. The meeting will begin at 8:00 a.m. and will run until 5:00 p.m.

The papers presented will include: Water Planning in Canada; Water Planning in the Mississippi River Basin; Water Use Option for the Texas High Plains; and Interindustry Economics of Water Use. There will also be brief discussions of research projects which are either ongoing or completed. The discussions will concern the following subjects: water harvest,

water recharge, feedlot runoff for crop production, computer models for groundwater management, subsurface asphalt barriers, water research at Texas Tech University, and irrigation methods and fertilizer techniques. Following the discussions, there will be time for questions. You do not have to be a member of the West Texas Water Institute to attend, and the public is cordially invited. The registration fee, which includes lunch and a copy of the proceedings, for the conference will be \$8.00. This is an annual meeting which should be of great interest to everyone, no matter what profession, in the High Plains since the economy in this area is dependent upon water.

DRILLING STATISTICS FOR 1970

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Reported Dry Holes
ARMSTRONG	6	4	0	0
BAILEY	65	53	3	1
CASTRO	99	60	5	0
COCHRAN	16	8	0	0
CROSBY	5	4	0	0
DEAF SMITH	102	88	4	1
FLOYD	90	65	6	2
HALE	10	4	0	0
HOCKLEY	67	43	3	1
LAMB	67	43	9	0
LUBBOCK	107	61	2	7
LYNN	29	17	1	3
PARMER	110	91	6	0
POTTER	4	1	0	0
RANDALL	48	37	1	1
TOTALS	825	579	40	16



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Volume 17—No. 2

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February, 1971

BY TWDB

District Awarded Contract

A contract between the Texas Water Development Board and the High Plains Underground Water Conservation District No. 1 for a groundwater study in the Southern High Plains of Texas has recently been approved by the Board of Directors of the two agencies. The contract calls for the High Plains Water District to prepare a detailed groundwater report for submission to the Water Development Board. The contract began February 1, 1971 and will be terminated August 31, 1971. The Water Development Board has agreed to pay the District \$30,000 for the study.

In order for the area's civic leaders and other governmental and private entities concerned with water supply, water importation, water planning and management to use the information gathered, the investigation will present in sufficient detail the determination of the current quality and quantity of the groundwater conditions of the Southern High Plains. The project description calls for, "The general scope of this investigation includes, insofar as practicable with available data, a complete evaluation of the groundwater resources of each of the aquifers in the area, a determination of the quantities of water which can be developed in each aquifer, the chemical quality of water, the areas where the chemical quality has been altered or subject to alteration, and the formation characteristics." Also included in the study will be determination of the extent and location of fresh, water bearing units, quantities of groundwater being withdrawn and effects of withdrawals, and hydraulic characteristics of the important water bearing units. Geology, hydrology, and well development including construction and operating characteristics of existing wells will be discussed in the study. Area sources and estimates of recharge, the aquifer's direction and rate of groundwater movement, and effects on water levels of rainfalls, rainfall and pumpage will also be discussed. Recommendations for alleviation of any possible groundwater problems with regard to findings concerning quality of water will be made. Illustrations including maps, cross sections, charts, and graphs along with tabulations of basic information on wells from driller's logs will be prepared.

In order to prepare the groundwater study the District will need to locate, in the fields, all existing wells, compile well location maps along with

surface and subsurface geologic maps, measure certain wells for water levels and collect water samples from "equipped", current, water-level, observation wells. It is intended that the well data reports in the District's files will be codified and card punched in order for the data to be processed by computer. An inventory will be made of present as well as past pumpage, and empirical methods will be developed to determine the hydraulic characteristics of the aquifers. Illustrations to be prepared will include geologic sections showing subsurface geology as it relates to groundwater, maps showing surface and subsurface geology with regard to groundwater supplies, well and spring location maps, and depths and thickness maps of the Ogallala and Santa Rosa Formations. Maps showing the configuration of the base of the Ogallala aquifer along with maps showing the thickness of the important water bearing formations including the percentage of the sands and gravels that they contain will also be prepared. Depths to the water level, probably recoverable quantity of water and storage, rate of water level decline, chemical quality, areas most favorable for the development of large capacity wellfields, well yields, areas of major pumpage, climatological conditions, and areas of potential or actual pollution of the aquifers will be mapped and presented as part of the study.

While this contract calls for a study to be made of Parmer County only, it is the intent of the Texas Water Development Board and the District to make similar studies for Bailey, Castro, Cochran, Deaf Smith, Floyd, Hockley, Lamb, Lubbock, and Randall Counties. The details of this study will make the results satisfy all present and anticipated needs for appraisals of the groundwater situation in this area. This comprehensive report should be of inestimable value not only to the State but to individuals, County and City Officials, industry and other types of organizations located in the Southern High Plains.

Dent Reappointed

Governor Preston Smith reappointed Judge Otha Dent as the Chairman of the Texas Water Rights Commission on February 1, 1971. He will serve a six-year term on the Commission. The other two Commissioners of the three-man Commission are Joe Carter and Leslie Neal. Their offices extend until 1973 and 1975 respectively.

ANNUAL WATER STATEMENT 1970-1971

The High Plains Underground Water Conservation District No. 1 has, in cooperation with the Texas Water Development Board, measured the depths to water in the "observation" wells within the District. Personnel of the two agencies made the measurements during January, 1971. Presented on pages 2 to 7 are the recent (1971) measurements along with other statistical data including: observation well number, depth to water in 1970, the decline in the water level from the 1970 measurement to the 1971 measurement, the average decline per year from 1962 to 1971, and the standard deviation. The location of the wells measured is shown by well numbers on the accompanying maps.

Where a 1962 and/or 1971 measurement is not available, the figure listed under the "Average Annual Decline, 1962-1971" was determined by using the earliest (after 1962) and the latest available measurement.

No attempt has been made to disregard apparently erroneous water-level measurements or to screen the data. The figures listed in the tables are from the field measurement records. It is apparent that some of the measurements do not represent the actual static water level. In ultimately accepting or rejecting a water-level record, a judgment decision has to be made. The use of the data determines whether certain data are to be accepted or rejected. The "standard deviation" has been calculated for each annual change in the water level in each well from 1962 through 1971.

A large standard deviation indicates strong evidence of erroneous water-level data since the measurements

AVERAGE DECLINE OF WATER TABLE

County	Average Decline	Average Annual
	ft.	Decline ft.
Armstrong	0.18	1.84
Bailey	2.35	1.44
Castro	4.67	3.56
Cochran	0.48	1.09
Crosby	2.78	3.98
Deaf Smith	2.63	3.12
Floyd	4.63	3.70
Hale	2.49	3.13
Hockley	0.61	1.24
Lamb	2.91	2.11
Lubbock	1.01	1.64
Lynn	0.61	0.65
Parmer	4.14	4.06
Potter	6.66	3.41
Randall	3.04	2.30

from year to year have shown a large randomness. A definite or smooth pattern of data received year after year will result in a small standard deviation and indicates more reliability.

SUMMARY OF RECORDS

The table, "Summary of Water-Level Measurements," shows the minimum and maximum depths to water as measured in 1962 and 1971. This table also lists the average depth to water in each respective county for these two years.

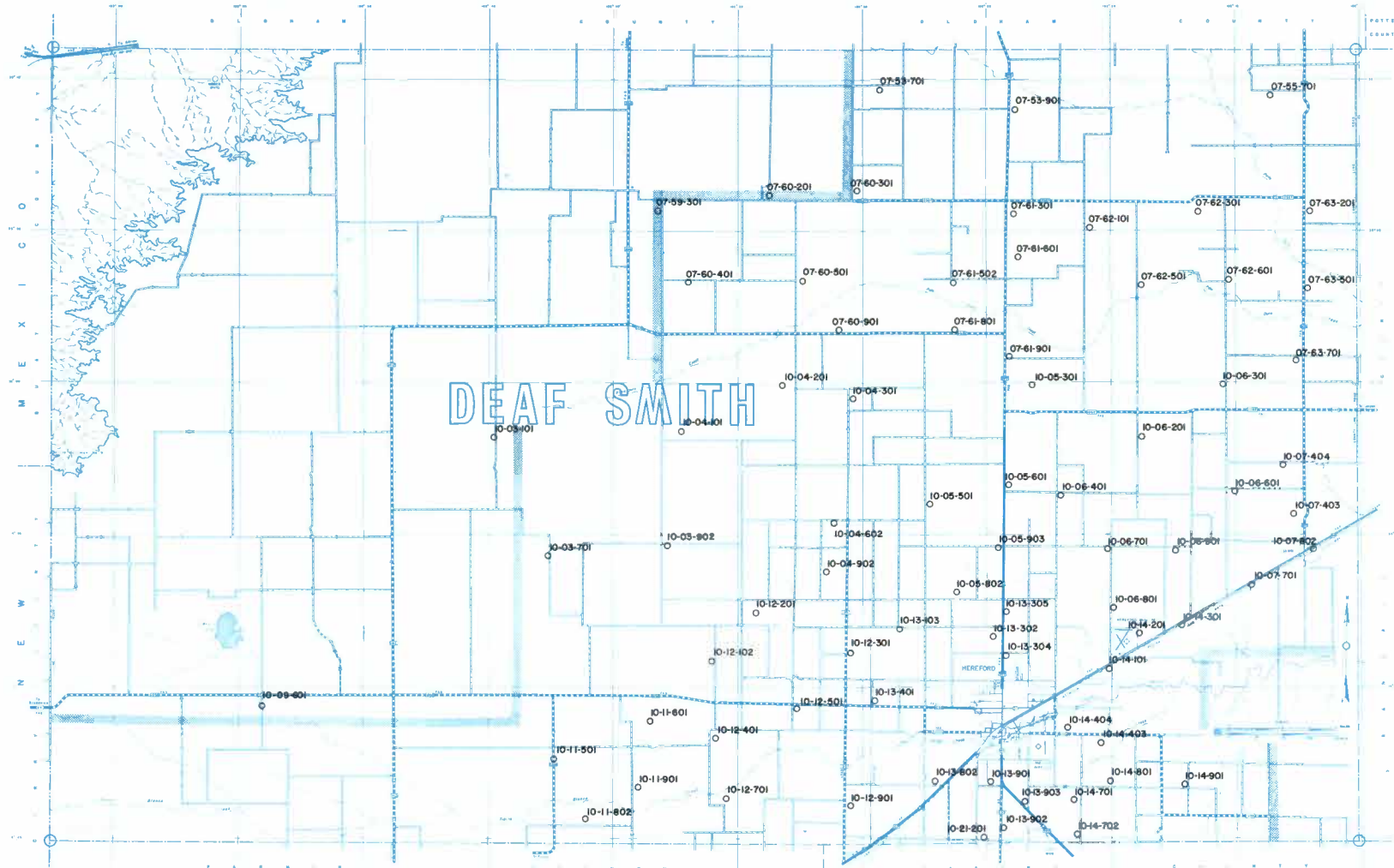
The table, "Average Decline of Water Table," shows the average annual decline in the water levels in all wells measured in the respective counties for 1962 through 1971, as compared with the average decline for 1970-1971. It should be noted that the 1970-1971 decline follows the long term trend.

While last year, six counties posted rises in their water tables, this year no county could show a net rise in the water table. Potter County had the largest average decline for the year with the wells in that county declining an average of 6.66 feet. Armstrong County's water table appears to have dropped less than any other with the average well there declining only 0.18 feet.

SUMMARY OF WATER LEVEL MEASUREMENTS

County	1962				1971			
	No. of Wells Measured	Depth to Water (Feet)			No. of Wells Measured	Depth to Water (Feet)		
		Min.	Max.	Avg.		Min.	Max.	Avg.
Armstrong	8	95.48	124.90	110.50	9	107.90	150.50	128.98
Bailey	41	25.11	142.72	67.22	60	21.95	146.87	84.12
Castro	45	52.64	224.41	143.71	60	121.64	275.87	178.48
Cochran	45	55.40	176.66	128.32	51	73.44	194.35	139.99
Crosby	10	116.48	179.34	151.60	19	127.05	209.36	186.89
Deaf Smith	61	52.25	286.40	137.66	72	58.85	313.32	173.11
Floyd	89	37.29	264.96	156.08	97	52.86	305.17	197.27
Hale	16	69.70	151.60	110.79	16	81.88	193.47	136.92
Hockley	37	34.64	178.60	109.96	74	44.15	197.87	126.40
Lamb	36	28.13	147.10	97.76	69	33.38	193.50	118.12
Lubbock	100	12.82	194.70	111.86	115	6.84	217.91	125.57
Lynn	29	25.89	133.73	81.97	30	28.41	148.18	89.29
Parmer	48	123.35	306.14	202.89	59	153.39	328.29	237.23
Potter	0				3	219.23	225.19	221.22
Randall	12	123.30	187.97	156.53	31	100.10	225.10	168.45

Water Level Measurements In Observation Wells In High Plains Water District



Well No.	Depth To Water 70	Depth To Water 71	Decline 1970-1971	Average Annual Decline 62-71	Standard Deviation
10-04-101	0.0	311.30	0.0	3.653	1.34
10-04-201	268.60	274.50	5.90	5.930	0.03
10-04-301	265.74	271.80	6.06	5.063	1.75
10-04-602	233.80	233.35	+0.45	+0.450	0.0
10-04-902	174.40	180.62	6.22	3.288	4.00
10-05-301	155.44	156.22	0.78	2.369	5.68
10-05-501	180.98	0.0	0.0	5.714	4.93
10-05-601	146.73	141.53	+5.20	3.061	3.46
10-05-802	143.74	148.86	5.12	3.381	2.49
10-05-903	157.10	159.71	2.61	3.884	2.09
10-06-201	149.90	148.05	+1.85	3.084	6.66
10-06-301	163.44	170.15	6.71	3.742	1.60
10-06-401	159.28	0.0	0.0	4.040	2.81
10-06-601	0.0	156.26	0.0	5.377	4.84
10-06-701	73.84	81.55	7.71	3.587	3.29
10-06-801	79.63	78.06	+1.57	+0.640	3.40
10-06-901	132.05	138.70	6.65	3.850	1.74
10-07-403	129.52	137.13	7.61	4.492	2.25
10-07-404	141.20	147.89	6.69	3.170	2.53
10-07-701	124.49	121.50	+3.99	0.433	4.16
10-07-802	138.12	145.90	7.78	2.673	18.23
10-09-601	58.50	58.85	0.35	+0.681	4.32
10-11-501	185.25	187.02	1.77	1.670	3.35
10-11-601	0.0	167.89	0.0	2.504	5.25
10-11-802	196.59	200.95	4.36	4.294	1.36
10-11-901	165.17	168.84	3.67	2.733	0.67
10-12-102	157.22	160.37	3.15	1.577	6.03
10-12-201	73.34	70.23	+3.11	0.286	3.13
10-12-301	159.60	161.90	2.30	3.632	5.86
10-12-401	192.45	198.01	5.56	5.754	3.79
10-12-501	193.88	196.73	2.85	1.106	5.26
10-12-701	154.55	159.38	4.83	4.590	2.62
10-12-901	143.40	147.72	4.32	4.129	3.57
10-13-103	172.63	179.19	6.56	6.560	0.0
10-13-302	146.80	141.58	+5.22	4.711	8.11
10-13-304	146.70	150.72	4.02	4.716	5.45
10-13-305	139.27	134.20	+5.07	2.815	6.07
10-13-401	149.70	148.19	+1.51	3.113	2.36
10-13-802	0.0	144.13	0.0	8.670	0.0
10-13-901	143.75	147.99	4.24	2.880	1.62
10-13-902	153.16	159.48	6.32	3.517	1.49
10-13-903	158.95	162.46	3.51	3.982	2.57
10-14-101	74.90	71.60	+3.30	0.077	2.91
10-14-201	107.70	113.47	5.77	2.515	6.48
10-14-301	78.82	79.10	0.28	0.706	5.47
10-14-403	120.00	122.18	2.18	3.166	1.20
10-14-404	122.80	128.89	6.09	4.780	2.66
10-14-701	167.15	172.62	5.47	3.674	4.30
10-14-702	162.82	173.78	10.96	3.859	9.24
10-14-801	142.36	143.10	0.74	2.316	1.22
10-14-901	107.25	111.88	4.63	1.513	2.06
10-21-201	186.72	188.53	1.81	2.642	3.27

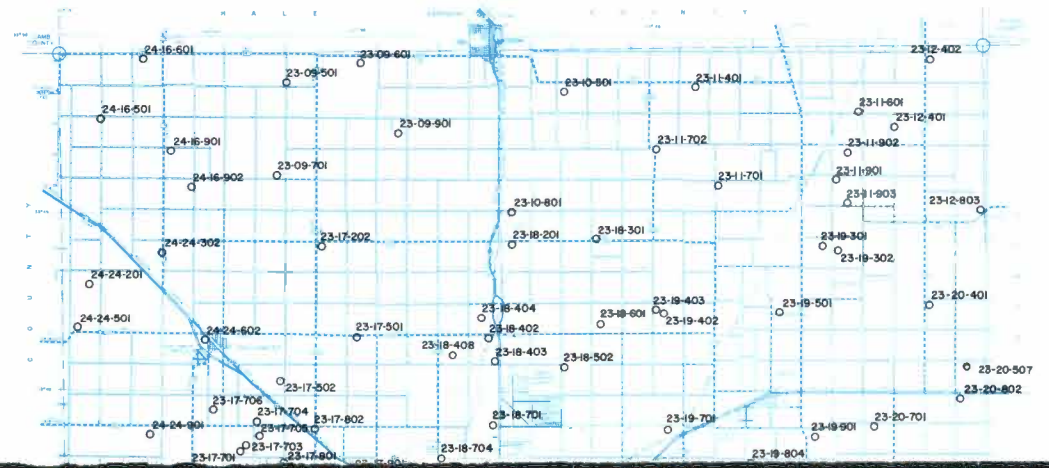
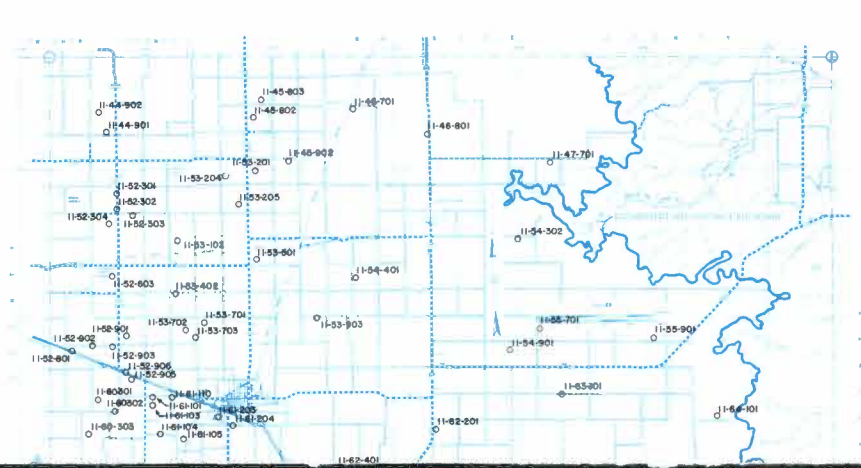
DEAF SMITH COUNTY

Well No.	Depth To Water 70	Depth To Water 71	Decline 1970-1971	Average Annual Decline 62-71	Standard Deviation
07-701	226.30	225.03	+1.27	0.393	1.31
07-53-901	221.50	231.87	10.37	4.858	5.53
07-55-701	215.44	211.33	+4.11	3.584	4.60
07-59-301	310.99	313.32	2.33	2.669	5.46
07-60-201	279.67	267.23	+12.44	0.813	5.30
07-60-301	259.11	259.49	0.38	3.677	2.15
07-60-401	283.70	288.25	4.55	0.190	12.82
07-60-501	243.20	249.41	6.21	4.893	2.52

Well No.	Depth To Water 70	Depth To Water 71	Decline 1970-1971	Average Annual Decline 62-71	Standard Deviation
07-60-901	205.82	208.54	2.72	1.740	1.59
07-61-301	212.43	0.0	0.0	4.128	3.45
07-61-502	185.02	189.15	4.13	4.130	0.0
07-61-601	182.55	187.22	4.67	3.362	1.04
07-61-801	183.05	186.38	3.33	2.800	1.67
07-61-901	162.78	163.14	0.36	2.762	1.45
07-62-101	200.10	203.67	3.57	3.571	3.98
07-62-301	176.30	176.07	+0.23	1.578	4.03

Well No.	Depth To Water 70	Depth To Water 71	Decline 1970-1971	Average Annual Decline 62-71	Standard Deviation
07-62-501	154.40	159.38	4.98	3.164	2.99
07-62-601	178.35	181.45	3.10	4.326	2.64
07-63-201	0.0	186.56	0.0	5.080	3.05
07-63-501	119.20	121.29	2.09	0.702	4.19
07-63-701	147.68	154.28	6.60	3.118	4.98
10-03-101	305.47	299.94	+5.53	1.350	3.23
10-03-701	222.02	0.0	0.0	+0.601	2.59
10-03-902	241.40	246.69	5.29	3.854	0.92

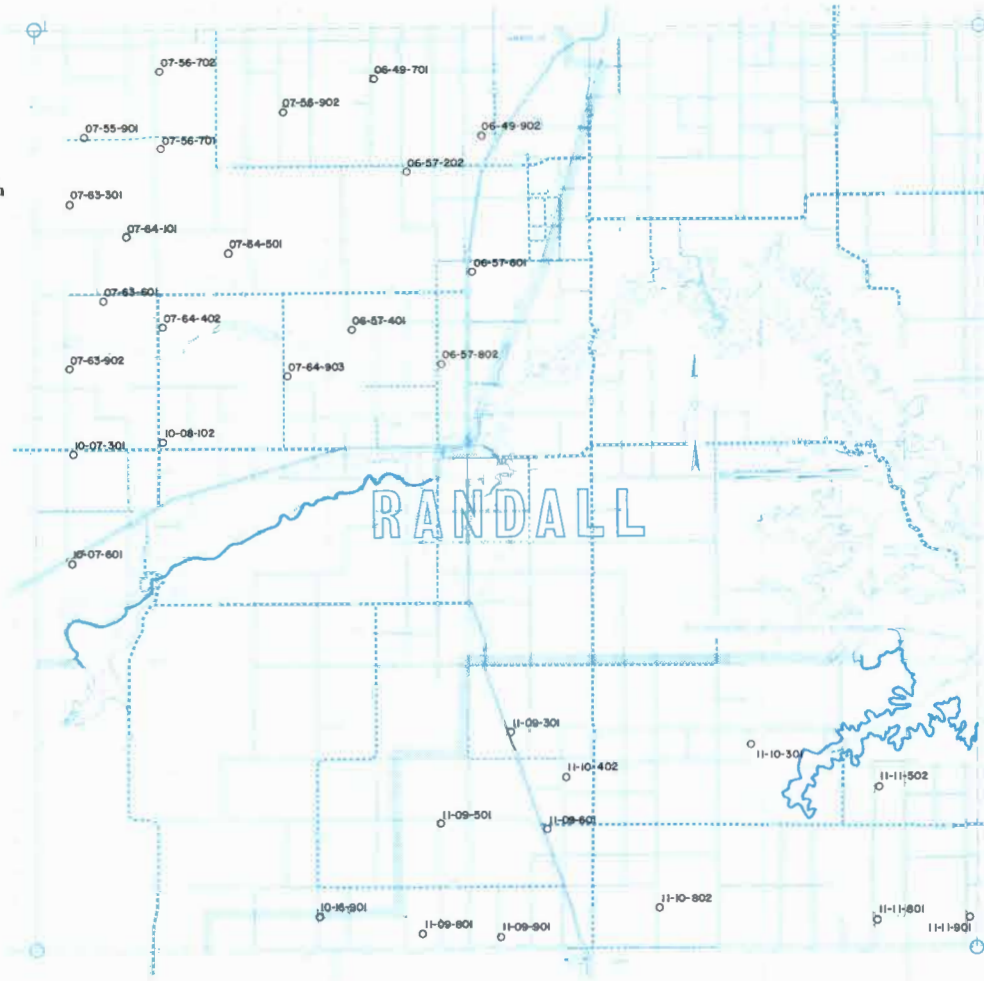
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RANDALL COUNTY

Well No.	Depth To Water 70	Depth To Water 71	Decline 1970-1971	Average Annual Decline 62-71	Standard Deviation
06-49-701	223.10	222.84	+0.27	4.235	2.64
06-49-902	202.52	203.99	1.47	0.418	1.45
06-57-202	189.26	190.20	0.94	2.085	1.67
06-57-401	168.48	173.97	5.49	4.152	4.28
06-57-601	167.72	0.0	0.0	2.335	1.99
06-57-802	144.13	150.58	6.45	2.980	4.62
07-55-901	188.26	193.84	5.58	4.895	4.60
07-56-701	202.27	204.84	2.57	4.328	1.86
07-56-702	220.73	225.10	4.37	2.252	3.56
07-56-902	190.73	196.65	5.92	3.730	2.62
07-63-301	202.06	213.52	11.46	9.052	7.72
07-63-601	147.30	153.63	6.33	3.370	1.87
07-63-902	129.80	137.60	7.80	4.222	2.09
07-64-101	204.68	204.14	+0.54	5.577	6.51
07-64-402	103.04	105.70	2.66	0.703	2.50
07-64-501	0.0	137.69	0.0	0.506	1.23
07-64-903	148.12	144.76	+3.36	2.336	6.81
10-07-301	124.70	134.82	10.12	2.469	4.33
10-07-601	96.96	100.10	3.14	1.216	5.43
10-08-102	138.00	139.56	1.56	1.017	1.05
10-16-901	190.19	174.72	+15.47	+0.332	7.97
11-09-301	159.76	167.90	8.14	1.935	3.74
11-09-501	179.52	180.10	0.58	0.861	4.16
11-09-601	194.02	199.14	5.12	1.337	2.63
11-09-801	188.06	190.64	2.58	2.409	2.08
11-09-901	191.26	197.90	6.64	3.760	1.69
11-10-301	124.33	125.84	1.51	1.510	0.0
11-10-402	181.47	175.10	+6.37	0.624	4.92
11-10-802	172.57	181.25	8.68	2.565	4.08
11-11-502	160.63	162.16	1.53	+1.363	4.04
11-11-801	110.62	112.60	1.98	1.888	0.87
11-11-901	116.83	121.20	4.37	2.401	3.00

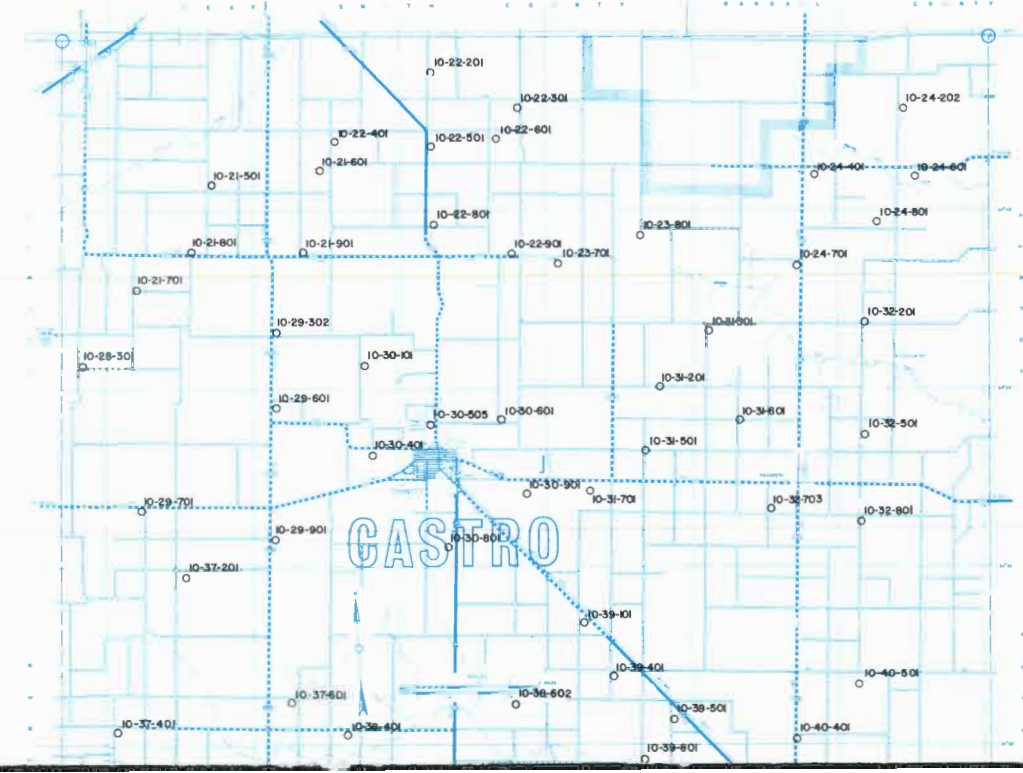
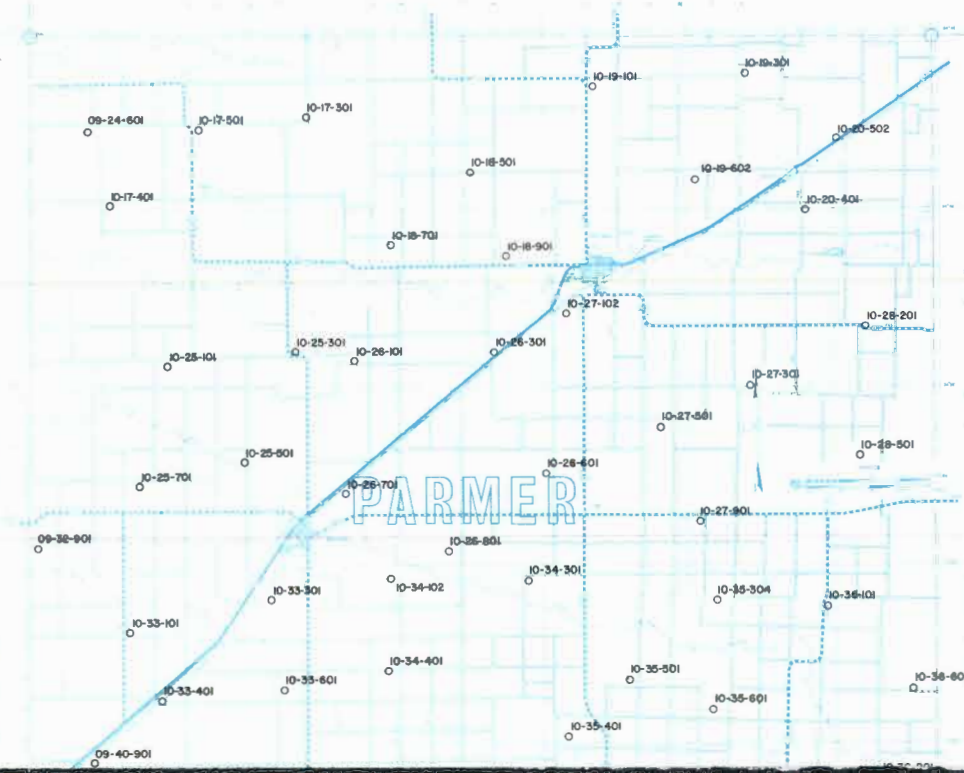
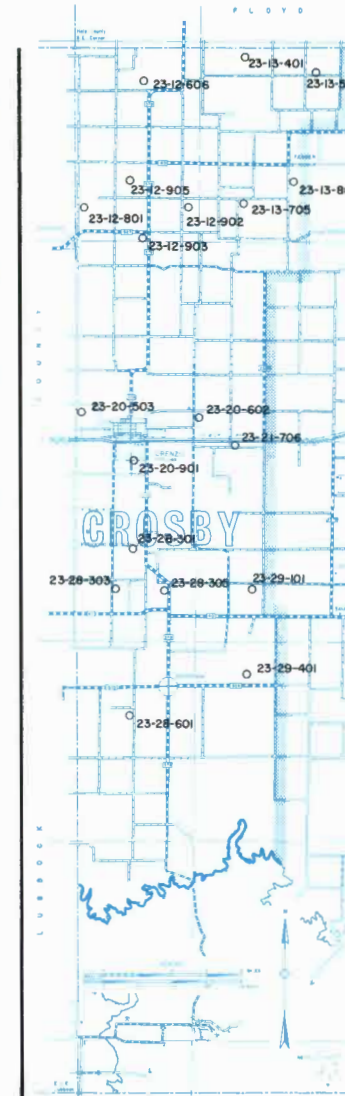
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CROSBY COUNTY

Well No.	Depth To Water 70	Depth To Water 71	Decline 1970-1971	Average Annual Decline 62-71	Standard Deviation
23-12-606	170.06	169.67	+0.39	1.385	1.78
23-12-801	186.40	192.25	5.85	4.996	3.87
23-12-902	203.44	208.58	5.14	2.955	2.87
23-12-903	207.00	207.00	0.00	3.919	6.48
23-12-905	195.20	198.25	3.05	0.790	2.26
23-13-401	176.28	181.60	5.32	5.320	0.0
23-13-502	197.88	200.63	2.75	1.255	1.50
23-13-705	202.90	209.36	6.46	6.350	6.45
23-13-803	193.94	197.98	4.04	4.040	0.0
23-20-503	187.46	191.30	3.84	4.249	2.85
23-20-602	189.88	203.42	13.54	4.224	9.17
23-20-901	192.24	194.00	1.76	4.161	4.07
23-21-706	199.07	198.40	+0.67	4.270	3.82
23-28-301	156.18	160.20	4.02	7.966	12.31
23-28-303	128.05	127.05	+1.00	0.732	7.38
23-28-305	158.82	150.80	+8.02	0.587	7.12
23-28-601	152.26	150.15	+2.11	7.092	7.33
23-29-101	192.62	203.50	10.88	3.477	9.73
23-29-401	208.46	206.80	+1.66	4.610	5.49

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

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1970-71

Soil Moisture Survey

The lack of precipitation in the High Plains for the past year or so has created a significant amount of anxiety among the farmers in the area. This has resulted in increased activity on their part to supplement their water requirements by placing additional burdens on the underground water. This can be seen in the fact that the number of permits applied for to the District during January and February are more than double for those two months in 1970. Also, existing wells are being deepened. It would also appear that pre-plant irrigation is being conducted to a much larger extent than normal. A report which recently came to the attention of *The Cross Section* may be both heartening and enlightening to irrigators in the High Plains area.

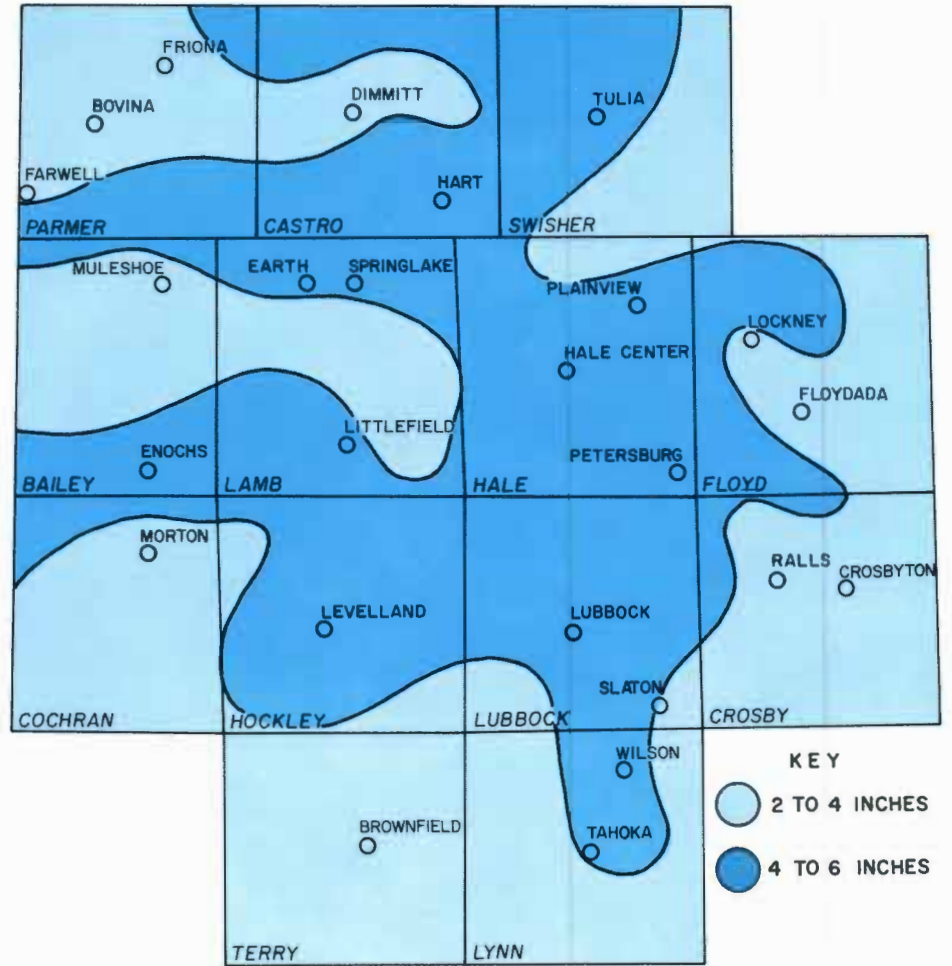
The report entitled "Soil Moisture Survey" for the 1970-71 fall and winter season has been compiled and distributed by the National Weather Service Office for Agriculture and the Texas A&M University Agricultural Research and Extension Center at Lubbock with partial support by the Plains Cotton Growers, Inc. It is hoped that the report will help eliminate wasteful over-watering during the pre-plant irrigation season. The authors of this survey are O. H. Newton, Advisory Agricultural Meteorologist, National Weather Service for Agriculture, and O. C. Wilke, Assistant Professor of Agriculture Engineering,

Texas A&M University Agriculture Research and Extension Center at Lubbock. While the lack of rainfall recently is a significant indication that soil moisture levels are low, this is not necessarily an indication that the actual amounts of moisture needed to rewet the soil need to be great. There is a maximum moisture holding capacity for the soils and when the soils reach this capacity, additional water is not effectively used. The average amount of moisture held in the top five feet of soil provides a basis for determining the amount of pre-plant irrigation which will provide the farmer the best possibility for normal crop production. The moisture level in the top 18 inches of soil does not necessarily give a true picture of the need for additional soil moisture since this layer is subject to rapid changes during dry and wet periods. The deeper layers of soil are extremely important in that this is where the more stable moisture is in reserve.

The soil moisture deficit can be reasonably established by comparing the amount of moisture in the soil to a depth of five feet with the maximum moisture holding capacity of the soils.

The map on this page shows the amount of moisture (in inches) needed to saturate the soil to the five-foot level. More moisture than this can not be effectively stored by the soils. In part of the area shown, a pre-plant irrigation of from two to four inches will completely rewet the soil to its maximum stable water holding capacity, while in the other portion of the map, it is required that four to six inches of water will be needed as pre-plant irrigation to rewet the soil. The soils in the High Plains can store between seven to nine inches of available water in the top five-foot layer.

Another factor which is important in determining the amount of pre-plant irrigation needed is the previous season's irrigation schedule. Where fields were irrigated three or more times and late in the season the soil remained relatively moist below the 18 inch depth and in such cases water requirements to rewet the entire five-foot layer are little more than what is needed to saturate the top 18 inches;



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

this amount would range from two to four inches.

One more factor which should be taken into consideration when determining how much water should be used for pre-plant irrigation is the probability of spring rains.

In order to take advantage of probable rainfall farmers have to leave room in the soils to store the water. This means that the soil can not be brought to full saturation by pre-plant irrigation or the spring rains will be of little value to the farmer. The chart shown below is a percentage probability for rainfall between the middle of March and the end of May. The

chart is for rainfall recorded at Lubbock for a 55 year period. If we select a farmer who has pre-plant irrigated lightly and who needs one and one half inches of rain to bring the soil to its full moisture capacity it can be seen that by April 30 there is a 40 percent chance of rainfall while by the 20th of May the probability of receiving this amount of moisture is 81 percent.

This survey was carried out over a fourteen county area of the South Plains and this is the fourth year that this survey has been made. There are 114 survey points which have been spaced over these fourteen counties.

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

Rainfall (inches)	Time Intervals				
	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

THE Cross SECTION

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

Volume 17—No. 3

"THERE IS NO SUBSTITUTE FOR WATER"

March, 1971



Pictured above from left to right are Don Smith, Joni Deyo, and Don McReynolds. All three are new employees of the District. Smith and McReynolds are geologists while Mrs. Deyo will be the District's keypunch operator.

District Adds Three To Staff

Donald D. Smith has joined the staff of the High Plains Underground Water Conservation District No. 1 as a geologist. Mr. Smith graduated from Texas Tech University in 1961 with a B.A. in geology. Following his graduation Mr. Smith owned the Smith Publishing Company until recently. The Company published the county farm plat books which have been used so widely on the High Plains.

Born in 1933, Mr. Smith called Texhoma, Oklahoma, his home until he went to the U.S. Navy in 1951. He served in the Navy until 1956, spending the majority of his time in the far east with a communication intelligence group. Don and his wife, Kathy Sue, have a daughter, Kelley, who is three.

Don will be working on the contract recently negotiated between the District and the Texas Water Development Board which calls for a detailed groundwater study in the Southern High Plains of Texas beginning with Parmer County.

MRS. JONI DEYO

The High Plains Underground Water Conservation District No. 1 has recently employed Mrs. Joni Deyo as a member of its staff in Lubbock. Mrs. Deyo will be a clerk-keypunch operator on a grant the District has from the Office of Water Resources

Research, Department of the Interior. The grant is entitled "Mathematical Management Model Unconfined Aquifer—Phase II" and is being conducted in cooperation with Texas Tech University.

Originally from Newport Beach, California, Mrs. Deyo and her husband, Robert, have lived in Lubbock for about a year and a half. He is employed with Connecticut Mutual. The Deyos have three children, Jimmy, Michael, and Shawn.

DON McREYNOLDS

The third new staff member to join the High Plains Underground Water Conservation District No. 1 is Don McReynolds. He is a graduate of Texas Tech University where he received a B.S. in Geology. He graduated in December 1970.

Don was born in 1942 in Weatherford, Texas. He attended Tarleton State College before going to Texas Tech. From 1967 to 1969 Don served in the United States Army, and most of his service was spent with a missile unit in Germany. Mr. McReynolds will be working on the District's detailed groundwater study in Parmer County which is being financed by the Texas Water Development Board.

The Cross Section welcomes Mrs. Deyo, Mr. Smith, and Mr. McReynolds to the District.

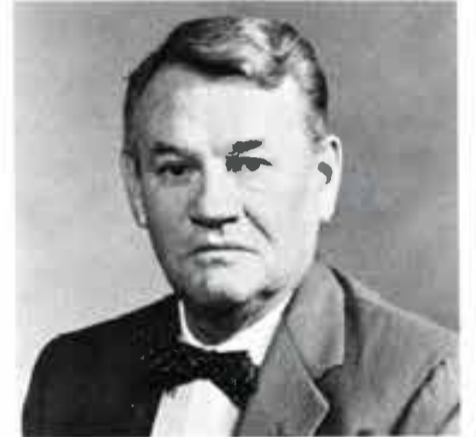
CLEAN WATER AMENDMENT PROPOSED

On February 5, 1971, Governor Preston Smith signed a bill which had been passed by the Texas Legislature. That bill authorizes a statewide election to be held on May 18, 1971 to decide on the proposed constitutional amendment. The constitutional amendment would call for the issuance of an additional one hundred million dollars in bonds by the Texas Water Development Board providing for grants and loans to various political subdivisions. The constitutional amendment will also provide for raising the interest on such bonds from 4% to 6% per annum and remove the cutoff date of December 31, 1982 as the time when such financial assistance shall terminate.

The bonds providing for grants and loans to municipal corporations, river authorities, conservation and reclamation districts, and interstate agencies and compact commissions to which the State of Texas is a party are to be for water quality enhancement including collection, transportation, storage treatment, disposal and reuse of waste waters.

On Tuesday, May 18, 1971, the voters will vote for or against this proposition; "The constitutional amendment to authorize the issuance of one hundred million dollars Texas Water Development bonds to provide financial assistance to cities and other public agencies for water quality enhancement purposes, providing for the improvement and continuance of the water development assistance program, and establishing the interest rates on the bonds at not more than 6% per annum." This constitutional amendment will enable the State of Texas to apply for certain Federal funds which would not be available without such a constitutional amendment.

Representative Bill Clayton of Springlake, carried the legislation in the House while Senator Tom Creighton of Mineral Wells, carried the legislation in the Senate.



HARRY BURLEIGH

BURLEIGH NAMED DIRECTOR FOR T.W.D.B.

Mr. Harry Burleigh has become the new Executive Director of the Texas Water Development Board. That Board set March 15, 1971, as the date that Mr. Burleigh would undertake his duties. Mr. Jack Fickessen, the Acting Executive Director, resigned effective March 15, 1971, but will stay with the Water Development Board as a consultant through August of this year.

Mr. Burleigh graduated as an engineer from the University of Nebraska in 1932 and came to the High Plains of Texas with the Department of Interior. During the war he spent five years in the service and held the rank of major when he left the service. Immediately following the war Mr. Burleigh joined the Bureau of Reclamation and was assigned as the area engineer with his office being in Austin, Texas. He has served in that capacity until he took his present position with the Texas Water Development Board.

Mr. Burleigh is well acquainted with the water problems throughout the state, and he has an extensive knowledge of the High Plains. He was involved in some of the original work done with regards to mapping and studying the underground water in this area. While with the Bureau of Reclamation he made extensive studies into the feasibility of water importation to needy areas in Texas including the High Plains. He is recognized as one of the leading authorities on the subject of importing water. This should be a great asset to him in his new position. The Texas Water Development Board is fortunate to have a gentleman with his experience and knowledge as its Executive Director.

TUESDAY, MAY 18th

VOTE

FOR

AMENDMENT 4



A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
1628 15th Street, Lubbock, Texas 79401
Telephone 762-0181

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J. Dan Seale Field Representative
Clifford Thompson Head, Permit Section
Mrs. Dana Wacasey Secretary-Bookkeeper
Mrs. Norma Fite Secretary
Mrs. Joni Deyo Clerk-Keypunch Operator

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(COCHRAN, HOCKLEY and LAMB COUNTIES)
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W. R. "Bill" Welch, 1975 Star Rt., Maple

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Dan Keith, 1972 Rt. 1, Morton
Keith Kennedy, 1972 Star Rt. 2, Morton
Jessie Clayton, 1974 706 S. Main Ave., Morton
Hugh Hansen, 1974 Rt. 2, Morton

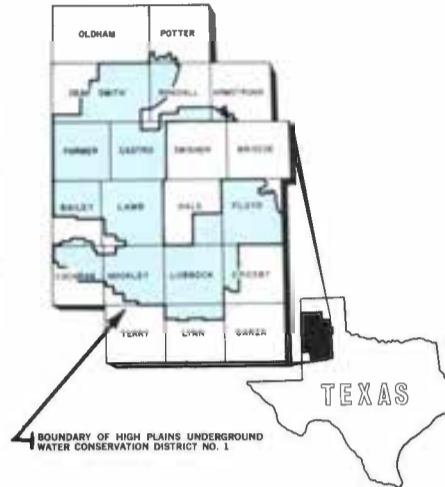
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M. T. Darden, 1972 Lorenzo
E. B. Fullingim, 1972 Lorenzo
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Kenneth Gray, 1974 Lorenzo

Deaf Smith County
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L. B. Worthan, 1973 Rt. 3, Hereford
Frank Zinsler, Jr., 1973 Rt. 5, Hereford
George Ritter, 1975 Westway, Hereford
Harry Fuqua, 1975 Rt. 1, Hereford

Floyd County
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Farm Bureau, 101 S. Wall Street, Floydada
M. M. Julian, 1972 Box 55, South Plains
M. J. McNeill, 1972 833 W. Tenn., Floydada
Malvin Jarboe, 1972 Rt. 4, Floydada
Fred Cardinal, 1974 Rt. 4, Floydada
Pat Frizzell, 1974 Box 1046, Lockney

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 Carrol Rogers and Vic Plunk, respectively.



The Great Plains Conservation Program and the Rural Environmental Assistance Program may help farmers with the installation of tailwater pits. A typical pit is pictured above.

FEDERAL PROGRAMS TO AID IRRIGATION FARMERS

There are two recently expanded Federal Programs which could be of considerable value to farmers in the High Plains area with regard to the construction of irrigation tailwater return installations. The Soil Conservation Service and the Agricultural Stabilization and Conservation Service have adopted programs as of March 1, 1971, which may provide financial assistance along with technical assistance in building return systems for the conservation of irrigation water which might otherwise be lost in the form of tailwater.

The Soil Conservation Service of the U.S. Department of Agriculture administers the Great Plains Conservation Program which has enabled thousands of farmers and ranchers in the Great Plains to strengthen their operations by developing and applying conservation plans on their farms and ranches. Since 1957 this program has protected and improved crop land, reduced wind and water erosion, saved scarce irrigation water, developed dependable water for livestock, stabilized income, and strengthened community economy. The program basically allows the landowner or operator to develop a conservation plan suited to his land and to the kind of operations he desires. In this program he works out a schedule of applying his plan and then enters into a contract with the Secretary of Agriculture to apply all needed conservation work on the entire unit within three to ten years. The farmer is able to receive help from the Soil Conservation Service when he needs it, and in this program he receives the Federal share of the cost of the program as he completes each conservation step. The Federal share of the cost ranges from 50 to 80 percent.

The Great Plains Program has been in effect since 1957 and has recently been expanded to make additional provisions for: disposal of animal wastes; developing recreation and fish and wildlife resources; conservation work on non-farmland adversely

effecting a farming area; and promoting the economic use of land.

Of particular interest to farmers within the District is that the expansion of the Great Plains Program will now permit irrigation tailwater recovery systems to be included under the program. Farmers, who do have a tailwater problem and who have been reluctant to install one of these systems because of the cost, might now give consideration to putting in a tailwater return system by having the Great Plains Conservation Program pay from 50 to 80 percent of the cost. Arneal Scott, who is the Area Director of the Soil Conservation Service located in Lubbock, has told *The Cross Section* that the Great Plains Program has been expanded and improved to meet the additional local needs and requirements that have arisen since the program was initiated in 1957. Mr. Scott urges farmers to act quickly in applying for this assistance for this year, since there are limited funds in each county which can be spent on the program.

The Agricultural Stabilization and Conservation Service has a program known as the Rural Environmental Assistance Program (REAP) which also started March 1, 1971. Under this program it will be possible for farmers to receive assistance in the installation of tailwater recovery systems. Under the REAP program the decision whether or not to include tailwater return systems is to be a matter decided in each county by that county's committee. The ASCS would finance 50 percent of the tailwater pit installation costs. The tailwater return systems would be allowed under the section providing for sediment or chemical run off control measures to be included in the REAP program. Since this program will include tailwater recovery pits in some counties and not in other counties, it is suggested that farmers, interested in the possibility of this program financing a return pit for them, contact the county committee of the ASCS in their particular county.

- Hale County**
J. B. Mayo, Secretary
Mayo Ins., 1617 Main, Petersburg
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Don Hehl, 1974 Box 160-A, Petersburg
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Jack Thomas, 1974 Box 13, Olton
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Dan Young, 1974 4607 W. 14th, Lubbock
- Lynn County**
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Joe Moore, 1973 Box J, Lazbuddie
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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**
Louise Knox, 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



DR. ANSON BERTRAND

NEW DEAN OF AGRICULTURE FOR TEXAS TECH

Dr. Anson Rabb Bertrand has recently assumed the deanship of the College of Agricultural Sciences at Texas Tech University. Dr. Bertrand follows Dr. Gerald Thomas as Dean of the Agricultural School. Dr. Thomas is now President of New Mexico State University.

Dr. Bertrand has stated that he is quite pleased with what he has found at Texas Tech and that the school has an excellent faculty and programs. He said that there would be continued interest in range management, brush control, soil management, and crop production, and that there would be

new agricultural programs which would be directed towards environmental control and quality and rural development. He also stated that he would like to see an increase in food science and food technology programs at Tech. Dr. Bertrand indicated that he would favor establishment and growth in interdisciplinary research teams. When *The Cross Section* ask him what his thoughts on possible water conservation programs were, he stated that the School of Agriculture would be involved in programs to determine the appropriate amount of water to apply to crops. This would help in enabling farmers to avoid using too much water on their crops when the excess could not be used beneficially.

Dr. Bertrand is a native Texan, and he received a degree in agricultural education from Texas A&M University. He also received a Masters in agronomy from the University of Illinois, and he holds a Ph.D. in soil physics from Purdue University. While at Purdue his primary interest was in the field of water movement in the root zone. He was on the staff of Purdue University from 1949 to 1961. He has also been with the United States Department of Agriculture and on the staff of the University of Georgia. Before coming to Texas Tech he was in East Pakistan as an agricultural advisor for the Southern Consortium of Colleges. He has authored numerous publications in the field of agriculture. Dr. Bertrand should prove to be quite an asset to Texas Tech University.

District's Board Attends Texas Water Conservation Association's Convention

Chester Mitchell, Ross Goodwin, Ray Kitten, and Selmer Schoenrock, Members of the Board of Directors of the High Plains Underground Water Conservation District No. 1 attended the annual convention of the Texas Water Conservation Association held in Austin from February 23, through February 25. Among many distinguished speakers at the convention were Governor Preston Smith, Lieutenant Governor Ben Barnes, House Speaker Gus Mutscher and Commissioner Bob Armstrong of the Land Office. Beeman Fisher was elected President of the Texas Water Conservation Association for the coming

year to replace outgoing President Josiah Wheat. Gordon Fulcher chairman of the Texas Water Quality Board, was named man of the year by the Texas Water Conservation Association at the convention.

While in Austin the District's Directors attended a meeting of the Texas Water Development Board and also met with Commissioners Otha Dent and Joe Carter of the Texas Water Rights Commission. The District's Board was given extended and detailed tours of both state agencies by the staffs of the two agencies. The District's Board of Directors appreciated the opportunity to view the operations of these two state agencies. They state that they now have a better understanding of the interrelationships between those agencies and local districts such as their own.

ATTORNEY ADDRESSES WATER LAW CLASS

John Seymour of the High Plains Underground Water Conservation District No. 1 recently spoke to the class enrolled in the Water Law course at Texas Tech University School of Law. The Water Law course is designed to provide the law students with a knowledge of the problems and legal remedies associated with water, its uses, conservation, quality, and development. Since West Texas is so dependent upon water, it is most appropriate that the school should teach a course in water law. The course is being taught this year by Professor John Paulus, and there are presently 44 students enrolled in the course.

Mr. Seymour, who is himself a graduate of the Tech Law School, presented an overview of the administrative law procedures in the State of Texas. He then explained to the law students the operations and programs of the High Plains Underground Water Conservation District No. 1. He discussed the rules and regulations of the District as well as the legal and administrative remedies of the District and the residents of the District to conserve groundwater in the High Plains.



Warren Fairchild, shown above, gave the keynote address at the annual meeting of Water, Inc.

WATER, INC. HOLDS ANNUAL MEETING

The fourth annual meeting of Water, Inc. was held in Hereford, Texas on February 19, 1971. The keynote address was given by Warren Fairchild, Assistant Commissioner, Resource Planning Bureau of Reclamation. The other primary addresses were given by Brig. Gen. Harold R. Parfitt of the U.S. Army Corps of Engineers and Calvin Watts, Executive Director of the Red River Valley Association. The luncheon address was given by Dr. Tinco van Hylckama, Research Hydrologist, U.S.G.S., Professor of Hydrology, Texas Tech University. In the panel discussion on "Action Programs for the Coming Biennium" held in the afternoon, Representative Bill Clayton; Judge Otha Dent of the Texas Water Rights Com-



NORMA FITE

Secretary Introduced

It was recently brought to the attention of *The Cross Section* that one of our employees, Mrs. Norma Fite, has never been introduced to our Cross Section readers. We would like to correct this previous oversight especially in view of the fact that Norma is one of the most essential staff members of the High Plains Underground Water Conservation District No. 1.

Norma came to work with the District in February 1970 as one of the District's secretaries. She has become involved in all facets of the District's operations. She is extremely capable and always manages to have a smile for everyone.

Norma is married to Harold Fite, and they have two children, Jerry and Christie. Mr. Fite is the minister of the 62nd St. and Indiana Ave. Church of Christ in Lubbock. Originally, Norma was from the Dallas area. She and her husband lived in Fort Worth prior to moving to Lubbock.

mission; Jack Fickessen of the Texas Water Development Board; Hugh Yantis, of the Texas Water Quality Board; and David Hale, Chief Engineer of the New Mexico Interstate Stream Commission were participants.

Fairchild Addresses Meeting

In his keynote address Mr. Fairchild discussed "Western State's Planning and Development". He was quick to point out that if water is to be imported to the High Plains area that every effort must be made to show that the water resources already available are being conserved to the greatest degree possible. He stated that the wasting of water in the High Plains area would dramatically hinder the area's efforts and arguments for importation of water. He said that the local authorities need to insure that a *maximum conservation effort* is being made with regards to our present supplies of groundwater.

Elect Officers

During the business session, Gaston Wells was elected to replace K. Bert "Tex" Watson as the President of Water, Inc. Other officers elected include A. L. Black of Friona, First Vice-President; A. C. Verner of Lubbock, Second Vice-President; Ed Weber of Amarillo; and Jim Ed Waller of Lubbock, Treasurer.

LET'S

MAKE ONE

THING CLEAR

... WATER



Shown above discussing the first phase of the research study are Dan Wells (left) and Frank Rayner (right).

FINAL REPORT FOR FIRST PHASE OF STUDY PUBLISHED

The final report for the first phase of the study entitled "Mathematical Management Model Unconfined Aquifer" which was prepared October 31, 1970, has recently been published and put into manual form. This research project, as funded by the Office of Water Resources Research, was a joint effort by the Texas Tech University Water Resources Center and the High Plains Underground Water Conservation District No. 1. This report covers the work accomplished during the first two-year phase of the research project as funded by OWRR. The objective of this research was to investigate the application of existing techniques to the development of a mathematical model to describe the movement of water in the Ogallala aquifer, to develop new or improved methods of mathematical modeling, and to initiate a limited amount of model testing. Further development, refinement, and clarification of the model will be accomplished in later phases of the research effort. Presently, Texas Tech and the District are involved in the second two-year phase of the research.

Dr. Dan M. Wells, Director of the Water Resources Center at Texas Tech University, served as the chief investigator and coordinator of the project for Texas Tech while Frank A. Rayner, Manager of the High Plains Underground Water District No. 1, served as chief investigator and coordinator of the project for the Dis-

trict. Bill Claborn, Associate Professor of Civil Engineering; Dr. George Ennis, Professor of Mathematics; and Tom Atcheson and Wayne Ford, Associate Professors of Mathematics; were the other University personnel primarily engaged on the project. Albert W. Sechrist, Graduate Engineer, is the other primary individual engaged in the project for the District.

This final report on the first phase of the study that began in 1968 provides quantitative data on groundwater withdrawals. Knowledge of groundwater pumpage or withdrawal from the groundwater basin is needed for systematized planning and conservation.

It has been the objective of the study to develop a mathematical model (adaptable to digital computer programming) capable of predicting aquifer response that can determine:

- 1) Response of the aquifer to natural stimuli—such as years with large amounts of rainfall.
- 2) Response of the aquifer to several alternate schemes of management, involving well spacing and/or pumpage control.
- 3) Response of the aquifer to artificial recharge schemes.
- 4) Response of the aquifer to several subsurface storage schemes.
- 5) Response of the aquifer to several schemes of well-field development and management.
- 6) Ultimate depletion of the aquifer in "digestible" terms of time and area.

The research accomplished and presented in this final report of phase I demonstrates the feasibility of groundwater management for aquifers which possess few vertical inhomogeneities provided model verification can be accomplished. The District has a very limited number of additional copies of the report which it could make available to those interested in this type of research.

LEGISLATIVE COMMITTEES DEAL WITH CONSERVATION MATTERS

The Sixty-second Legislature of the State of Texas has been in session for two and a half months, and the committee appointments have been made. Several of the committees will be dealing with matters which are of vital interest to the conservation of ground water in the High Plains.

In the Texas Senate the standing committees which will be dealing with matters most significant to the High Plains Underground Water Conservation District No. 1 are the Environmental Matters Committee and the Water and Conservation Committee. Senator Murray Watson, Jr. of Mart, Texas, is the chairman of the Environmental Matters Committee, while Senator H. J. (Doc) Blanchard of Lubbock is the vice-chairman. Other members of that committee include Senator A. M. Aiken, Jr. of Paris, Senator Joe Christie of El Paso, Senator Tom Creighton of Mineral Wells, Senator Ralph Hall of Rockwell, Senator Barbara Jordan of Houston, Senator Don Kennard of Fort Worth, Senator Glenn Kothmann of San Antonio, Senator Oscar Mauzy of Dallas, Senator William Moore of Bryan, Senator A. R. Schwartz of Galveston, Senator Max Sherman of Amarillo, Senator W. E. Snelson of Midland, and Senator J. P. Word of Meridian.

Senator Tom Creighton is the chairman and Senator William N. Patman of Ganado is the vice-chairman of the Water and Conservation Committee for the Senate. Other members of the committee include Senator James Bates of Edinburg, Senator Lindley Beckworth of Longview, Senator Wayne Connally of Floresville, Senator Henry Grover of Houston, Senator Hall, Senator Jack Hightower of Vernon, Senator Mike McKool of Dallas, Senator Moore, Senator David Ratliff of Stamford, Senator Sherman,

Senator Snelson, Senator James Wallace of Houston, Senator Watson, Senator Charles Wilson of Lufkin, and Senator Word.

The standing committees in the House which will be involved with legislation which could have an effect on the conservation of groundwater include the Conservation and Reclamation Committee and the Agricultural Committee. State Representative Raul Longoria of Edinburg is the chairman and Representative Gerhard Schulle, Jr. of San Marcos is the vice-chairman of the Agricultural Committee. Along with Representative Delwin Jones of Lubbock, the other members of that committee are Representatives Adams, Bass, Burgess, Carrillo, Craddick, Daniel, Dramberger, Finnell, Head, Hendricks, Hubenak, Ingram, Jones of Harris, Kubiak, Moore, Newton, Presnal, and Von Dohlen.

The Conservation and Reclamation Committee has Representative John Allen of Longview as the chairman and Representative Joe Allen of Baytown as vice-chairman. Representatives on the committee who live within the District include Representative Bill Clayton of Springlake and Representative R. B. (Mac) McAlister of Lubbock. Other committee members include Representatives Baker, Beckham, Cates, Daniel, Finck, Finney, Foreman, Haynes, Kaster, Murray, Nabers, Nelms, Poerner, Rosson, Silber, Solomon, and Williams.

RAYNER APPOINTED TO WATER COMMITTEE

Frank A. Rayner, Manager of the High Plains Underground Water Conservation District No. 1 has been appointed as a member on the Water Committee of the Texas Society of Professional Engineers. The Texas Society of Professional Engineers is affiliated with the National Society of Professional Engineers. The Committee is composed of Registered Professional Engineers within the State who not only have a significant amount of expertise but also a sincere interest in the water matters of Texas. Victor Yaeggli, from Austin, is the Chairman of the Water Committee. There are 27 members of the Committee from across the State.

THE Cross SECTION

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

Volume 17—No. 4

"THERE IS NO SUBSTITUTE FOR WATER"

April, 1971

LIFE CYCLE OF AQUIFER SHOWN BY RATE OF WELL DEVELOPMENT

by F. A. RAYNER

An interpretation of the stages in the life cycle of an aquifer can be ascertained by an analysis of the rate and magnitude of the water well development.

Although antecedent weather conditions, primarily the amount of rainfall received, has a major influence on the rate of well development in the Ogallala aquifer; the rates of well completions, as recorded by the District during the past 18 years, suggests that there are some other major influences that also control well development.

For the purposes of this analysis, only the development of new wells was considered as the indices of the identifiable stages of the development of this aquifer. The rate of the development of replacement wells would also be influenced by many of the same factors that control the development of new wells, however, the primary controlling influence would be the natural aging or malfunctioning (caving, collapse of casing, etc.) of existing wells.

New Wells

Table 1 lists the number of new wells completed in that part of each county within the District from 1953 through 1970. It should be noted that this table lists only those irrigation, municipal, and industrial wells (hereafter referred to as large capacity wells) that were completed under permit issued by the District.

The District commenced requiring a permit to be issued for any well capable of supplying more than 100,000 gallons per day (69.4 gpm) on February 1, 1953. Under the District's rules, most wells supplying water only for domestic or stock purposes do not require a permit.

There are no accurate records of the total number of large capacity wells within the District. Prior to the creation of the District there were probably less than 10,000 large capacity wells within those counties, or parts of counties (13 in number), that originally constituted the District. A field survey revealed that there were 1,417 large capacity wells in Precinct 2, Hale County, and 774 large capacity wells in Precinct 3, Crosby County, when these areas joined the Dis-

trict in May 1967, and April 1969, respectively.

There are probably more than 40,000 large capacity, operational wells within the District as of January 1, 1971. However, since the District does not have an abandoned well rule, accurate records are not available as to the total number of large-capacity wells, capable of pumping groundwater, that now exist within the District. Approximately 98 percent of the large capacity wells within the District are irrigation wells.

The maximum amount of new wells developed within the District in a single year was the 3,998 new wells drilled in 1955. During this same year the maximum number of wells drilled in a single county was the 606 new wells completed in Lubbock County. Lubbock County also contains the largest number (5,093) of permitted wells.

Precipitation Records

Figure 1 is a histogram showing the number of new, large capacity wells completed within the District from 1953 through 1970. Also shown is the average of the total annual precipitation recorded at the Lubbock and Amarillo weather stations by the U. S. Weather Bureau. These stations are located at the north and near south extremes of the District. Although an average of these stations' precipitation records may be an indication of the average precipitation received throughout the whole of the District during any given year; such records are probably not representative for any single county for any given year.

On the average, nearly 70 percent of the area's total annual precipitation occurs as rainfall during May, June, July, August and September of each year. Since the "well drilling season" is primarily confined to the months of January, February and March, the amount and times that precipitation fell during any calendar year probably has very little effect on the wells

—continued on page 2



Shown above are (left to right) Don McReynolds, Albert Sechrist, Dick Peckham, Gunnar Brune, and Don Smith. Mr. Peckham and Mr. Brune are with the Texas Water Development Board and were reviewing the progress of the Parmer County Groundwater Study.

Groundwater Study Underway

Dick Peckham and Gunnar Brune of the Texas Water Development Board, were in Lubbock on April 7, 1971, to review the progress of the Parmer County Groundwater Study. The study, which is being funded by the Texas Water Development Board, is being conducted by the High Plains Underground Water Conservation District No. 1 and is designed to provide an extensive, comprehensive, and detailed study of the groundwater conditions in Parmer County.

Mr. Peckham, who is the chief of the groundwater division of the Texas Water Development Board, and Mr. Brune also visited the District's field office which has been set up in Friona, Texas for the duration of the study in Parmer County.

The initial field work for the study is now completed. Obbie Goolsby and

Kenneth Seales, who are both Field Representatives for the District, were the individuals primarily responsible for the collection of data from the field. Their on-site work is being correlated and analyzed by Don Smith, Don McReynolds and Frank Rayner, Manager of the District. The study is scheduled to be completed at the end of August, 1971.

KENNETH SEALES LEAVES

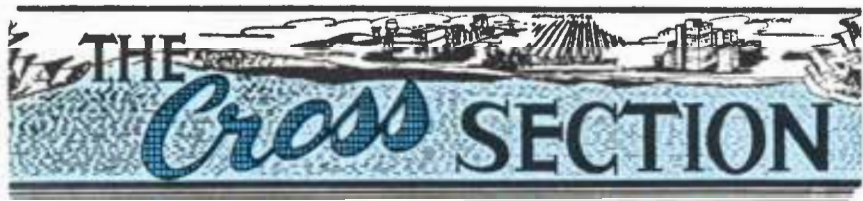
Kenneth Seales, who has been a Field Representative for the High Plains Underground Water Conservation District No. 1 since 1964, has recently resigned from the District. He has taken a position with a Lubbock bearing company.

While he was with the District, Kenneth became acquainted with a great many of the District's residents and was quite well liked throughout the District. Many knew Kenneth to be extremely helpful in aiding with individual water conservation problems.

Always a strong advocate of water conservation, Kenneth truly believes in the purposes of the District. The District will no doubt miss Mr. Seales a great deal, and *The Cross Section* wishes him the very best in future endeavors.

TABLE 1—NEW WELLS COMPLETED IN THE DISTRICT, FEB. 1, 1953 TO DEC. 31, 1970

County	1953	1954	1955	1956	1957	1958	1959	1960	1961	1962	1963	1964	1965	1966	1967	1968	1969	1970	Total
Armstrong	1	10	12	1	4	4	6	3	9	0	4	20	21	7	0	14	0	4	120
Bailey	43	151	254	198	234	59	91	68	48	65	107	112	112	59	55	32	57	53	1,798
Castro	142	264	371	138	196	86	106	72	100	117	134	232	238	126	148	111	95	60	2,736
Cochran	36	109	196	89	86	33	64	38	33	53	78	76	56	34	28	17	8	8	1,042
Crosby	Precinct 3, Crosby County entered the District in 1969																		
Deaf Smith	61	236	285	185	165	106	128	97	72	109	206	303	260	192	175	173	110	88	2,951
Floyd	152	241	358	174	185	70	144	94	54	113	131	275	228	124	120	69	56	65	2,653
Hale	Precinct 2, Hale County entered the District in 1967																		
Hockley	194	325	547	310	358	139	263	182	131	252	246	218	249	114	93	52	45	43	3,761
Lamb	178	320	456	194	241	81	176	123	102	115	215	200	228	95	89	39	41	43	2,936
Lubbock	344	518	606	452	473	121	252	249	178	266	314	289	429	200	135	136	70	61	5,093
Lynn	97	194	268	212	148	29	101	87	82	104	46	86	115	59	18	28	10	17	1,701
Parmer	190	484	494	161	171	109	143	88	83	142	183	239	213	164	217	122	99	91	3,393
Potter	4	1	4	0	2	2	2	0	2	1	7	2	2	2	0	9	8	1	54
Randall	52	80	147	56	56	30	42	32	15	51	75	101	92	74	68	31	33	37	1,072
TOTAL	1494	2933	3998	2170	2319	869	1518	1133	909	1388	1746	2153	2243	1255	1148	861	650	579	29,366



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1628 15th Street, Lubbock, Texas 79401
Telephone 762-0181

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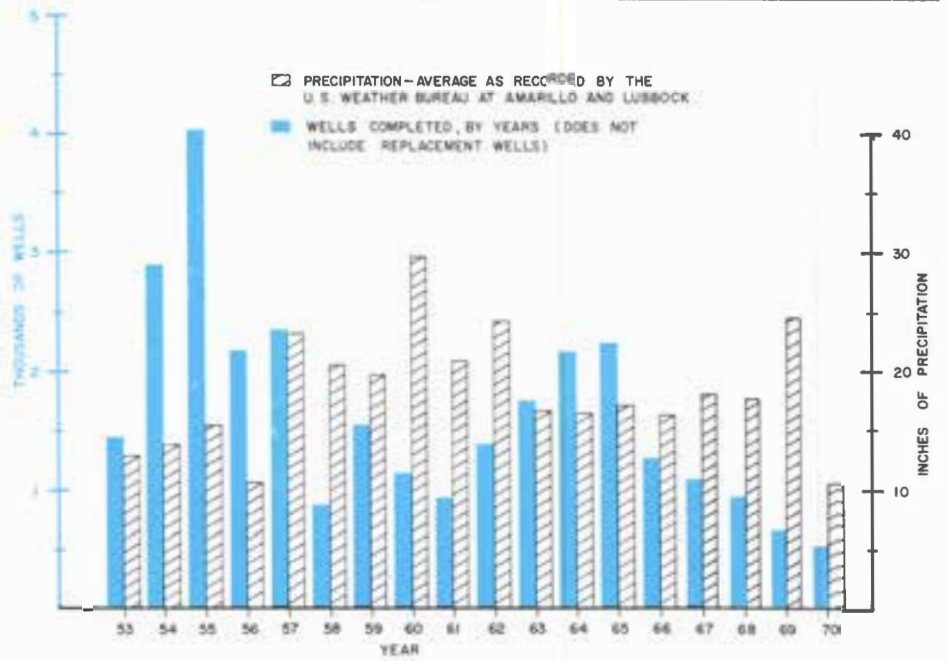


FIGURE 1

Life Cycle . . .

—continued from page 1

drilled during that same year. This is to say that the wells drilled in any given year were mostly completed before that year's precipitation was received. Therefore, the previous year's precipitation controls, for the most part, the development of wells in the ensuing year. This condition should be considered when interpreting Figure 1—consider the precipitation received in the previous year as correlatable to the number of wells developed in any selected year.

The average annual precipitation recorded at the Amarillo and Lubbock stations was 18.4 inches from 1953 through 1970.

Controlling Factors

It is easy to conclude that climatic and even short term weather conditions are the major factor controlling well development. The first indication of this control is the magnitude of the well development during the severe drought of the early 1950's — shown on Figure 1 as 1952 through 1956. However, it should be noted that the rate of well development had already begun to decline from the record year of 1955 even before the drought breaking rains of 1957. Perhaps the mammoth drain on the landowners funds for capital improvements (well development) in 1955 is, in part, re-

flected by the decline in well drilling in the next ensuing drought year, 1956.

Another primary controlling factor was probably the inception of the "infant stage" of this aquifer's development. This is to say, that the large scale development of this aquifer began its accelerating trend after World War II, and more specifically about 1950. Therefore, had rainfall been of an average magnitude during the early 1950's, the rate of well development would have probably continued to accelerate—new land was being put into cultivation and dryland farmers were converting to irrigation farming.

Therefore, Stage A (Figure 2) — 1953 through 1957 — would be that stage of aquifer aging represented by the discovery of the benefits of irrigation well development. This was a stage in the aquifer's youth.

Stage B — 1958 through 1961 — probably represents that part of aquifer development wherein the primary factor controlling well development is precipitation. During this stage, as would be expected, new well development is inversely proportioned to the appropriate annual precipitation.

During Stage C — 1962 through 1965 — the gradual increase in new well development may reflect the irrigators desire to maintain the irrigation capability that he had been able to pre-

—continued on page 4

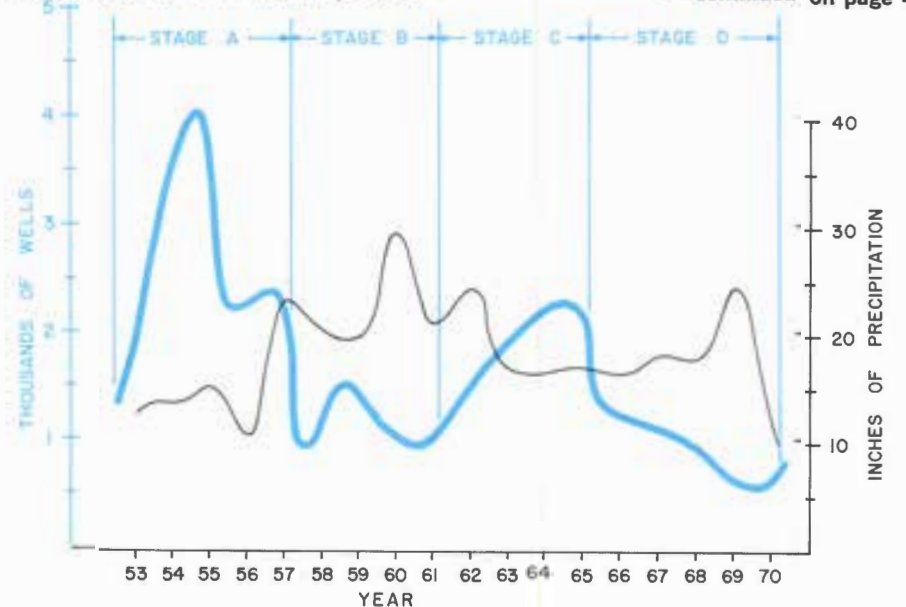


FIGURE 2



PRECINCT 3—ROSS GOODWIN



PRECINCT 4—BILLY WAYNE SISSON



PRECINCT 2—SELMER SCHOENROCK

Annual Meetings With County Committeemen

The High Plains Underground Water Conservation District No. 1 recently held its annual dinner meetings. The meetings are held so that members of the Board of Directors, the County Committeemen, the County Secretaries and the District's Staff are able to get better acquainted and are able to discuss general matters pertaining to the District.

This year the meetings were held on a District Director's Precinct level. In other words, each Director from the Board hosted those County Committeemen and County Secretaries from the counties within his precinct. The meetings were held in Muleshoe, Levelland, Floydada, Hereford and Lubbock. The members of the Board of Directors (Chester Mitchell, Ross Goodwin, Ray Kitten, Selmer Schoenrock and Billy Wayne Sisson) presided at their respective dinners as masters of ceremony.

Frank Rayner, Manager of the District, presented a Status Report of the

District for the year 1970 at the meetings. The report was designed to bring the County Committeemen and County Secretaries up-to-date on all of the District's activities. It included a brief survey of the District's purposes, powers, and duties. Other main topics of the report included Management Structure, District Income and District Activities.

Albert Sechrist also spoke at the meetings and he presented a short overview of the aquifer modeling project.

Current legislation which could affect the District was presented at the meetings by John Seymour.

Cliff Thompson, head of the permit section, also gave a brief survey of requirements for permit applications.

The meetings were quite helpful in allowing many of the 80 elected officials, 10 county secretaries, and 13 staff members to become acquainted or reacquainted.



PRECINCT 1—RAY KITTEN



PRECINCT 5—CHESTER MITCHELL

Life Cycle . . .

—continued from page 2

viously afford with fewer, but larger capacity wells. In other words, the irrigator found it necessary to develop more wells because of the gradual decline in pumping capacity of his existing wells — a reflection of the effects of the gradual depletion of the aquifer.

The complexities of aquifer development represented by Stage D are the least related to hydrologic condition than are any previous stages. During this stage, the economies of the agribusiness probably controlled well development.

During the latter part of the 1960's the Federal farm programs assumed a gradual trend to the forced retirement of cultivated lands. Nearly every year, until 1971, there has been a reduction in the allotted acreage, coupled with other production controls. During this same time there has been a phenomenal increase in the cost of farm equipment, agricultural chemicals and other farm supplies — the unit costs of production have increased while unit incomes have remained near constant. This condition reduced the general accumulation of capital for new well development. However, the primary deterrent to new well development during Stage D has been the scarcity of borrowing capital, and the very high interest rates associated with this shortage of money.

Rainfall of average or above average magnitude also characterized this stage; except for the year of 1970, when the total average rainfall was about 11.1 inches, 7.3 inches less than the long term average. Disregarding the possibility that economic conditions were solely responsible for the

decline in well drilling, and since climate was not a major factor, the well development characterized by Stage D would suggest the institution of the terminal (old age) stage of this aquifer system. However, the nearly 100 percent increase in the permits issued for wells during the 1971 well drilling season indicates that this interpretation for the present age of this aquifer is improper and premature.

The Immediate Future

Table 2 shows a comparison of the number of well permits issued by the District during January, February and March of 1970, as compared to the same three months of 1971.

TABLE 2—WELL PERMITS ISSUED DURING JANUARY, FEBRUARY AND MARCH OF 1970 AND 1971

County	Permits Issued		Percentage Increase 1971 over 1970
	1970	1971	
Armstrong	2	6	200
Bailey	27	34	26
Castro	17	46	170
Cachran	4	0	—
Crosby	0	10	—
Deaf Smith	35	68	94
Floyd	30	48	60
Hale	2	20	900
Hockley	30	59	96
Lamb	18	75	316
Lubbock	44	77	75
Lynn	17	17	0
Parmer	43	57	32
Potter	0	1	—
Randall	9	24	166
Total	278	542	Average 95

The primary reason for the increased well drilling activity during the latter part of 1970, and the first part of 1971, has been the ensuing drought

conditions. However, within the last year there has been an easing of the tight money situation, and a slight decrease in the interest rate on borrowed money. These changes in financial conditions have probably prompted the irrigators to initiate their past-due need for capital investment in new wells.

If the new, 1971, Federal farm program is to continue for several years, a new stage of aquifer development will be initiated. The new Federal program has caused a considerable increase in the cropped acreage, with the necessary irrigation thereof. If usable precipitation is not forthcoming this crop season, the water-table decline in the Ogallala aquifer will probably exceed that of any previous year of record.

Well Spacing

The District's well spacing rules are based upon the anticipated capacity of the well to be drilled. An application for a well capable of producing 69.4 gpm to 265 gpm (4-inch well) must be spaced at least 200 yards from any existing well, while a well capable of producing more than 1,000 gpm (10-inch well) must be located at least 440 yards from all existing wells. Other well spacing requirements, in direct proportion to the capacity of the well, have been established for 5, 6, and 8-inch wells.

In consideration of only these well spacing rules, it would first appear that the District's regulations pose another limiting influence on the number of new wells that can be developed. This would be the case if it were not for the notable decrease in well capacity with the continual decrease in the thickness of the aquifer (depletion of

the aquifer). With the decline of the water-table, throughout most of the District, the maximum possible well capacity has kept pace with the available space for the completion of new wells. This means that when an irrigator wants to develop a new well, and the maximum distance he can space from any existing well is 300 yards, the aquifer in that area will probably only be able to sustain a well of such capacity (390 to 560 gpm). In any event, even if a larger capacity well could be developed, the increased lowering of water level in the existing and the new wells, as the result of the excessive interference between the existing and new wells, would probably not justify the operation of the wells in excess of the recommended capacity for such well spacing.

If, as the water table continues to decline and the well capacities decline correspondingly, this aquifer was to be completely drilled in conformance with the District's minimum well spacing (200 yards on centers) rule, more than 600,000 four-inch wells could ultimately be developed within the District. Although the District's well spacing rules may now prevent some irrigators from drilling and equipping large capacity wells at very closely spaced intervals at the sites of their choosing — bunched along property lines — there is more than ample space for the development of many more thousands of 6, 8 and 10-inch wells. In any event, it is obvious that the ultimate permissible well density possible within the District's present rules is no deterrent to the complete economic development of this aquifer, and that such well spacing rules are not a controlling factor in the past stages of aquifer aging.

VOTE 4 AMENDMENT 4 MAY 18TH



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

Volume 17—No. 5

"THERE IS NO SUBSTITUTE FOR WATER"

May, 1971

VOTERS APPROVE AMENDMENT 4

Texas voters approved a Constitutional Amendment on May 18, 1971 which has been applauded by water leaders across the state. Amendment 4, which had been labeled the "Clean Water Amendment," was the only proposed Constitutional Amendment which was approved in the recent election. The other three were handily defeated. Statewide, Amendment 4 was able to gather about 53 percent of the voters in favor of passage (preliminary figures were 403,532 for and 356,473 against).

Passage of Amendment 4 enabled the Texas Legislature to send enabling legislation to the governor for his signature. With the favorable vote on Amendment 4, there will be an additional \$100,000,000 worth of Texas Water Development Fund bonds authorized. The ceiling on the interest rate for bonds of the Texas Water Development Fund will be 6% rather than 4%. Also, Amendment 4's passage will eliminate a 1982 termination date for the Texas Water Development Fund which had previously existed. The \$100,000,000 in additionally authorized bonds are earmarked exclusively for water quality enhancement purposes. The State needed the additional bonds to make itself available for matching funds to come from the federal government. This should help Texas and many of the State's municipalities in upgrading the quality of its rivers, streams, and estuaries. The Texas Water Development Board, which is the state agency with the responsibility for overseeing the Texas Water Development Fund, has found it quite difficult recently to sell its bonds when the financially unrealistic ceiling on the interest rate was 4%. Increasing the authorized ceiling on the interest to 6% should put the bonds back into the market by making them competitive.

Amendment 4 was an attempt to begin harnessing water quality with water development. Obviously, the two will have to go hand in hand in the future if they are to be expanded and enhanced properly. Prior to the election, however, there were some critics of the amendment who claimed that the proposal was strictly limited to furthering the Texas Water Plan. It would appear that, actually, the entire state should benefit by the passage of this Constitutional change. Both East Texas and West Texas along with North and South Texas are going to



Shown above is the giant sign (40 feet by 8 feet) the District placed on the outside wall of its Lubbock office prior to the

May 18th vote on Amendment 4. The sign was designed to encourage as many voters as possible to vote on Amendment 4.

have to be in harmony on water matters if the entire state is to have progress in both developing and enhancing the quality of our water resources.

The Cross Section feels that it was a good sign that the people in West Texas should vote in favor of Amendment 4 when its primary and most immediate effects will be to give some aid to Texas municipalities, most of which are located in the eastern portion of the State. Many could see that there were also some benefits in the Amendment down the road. It is disappointing, however, that more West Texans didn't take the time to vote (as can be seen by the light turnout), and that the voting percentage in favor of passing Amendment 4 was not larger than it was (see Table 1—Local Voter Response for Amendment 4 (1971) and Amendment 2 (1969).) In Table 1 only counties within the District are tabulated; however, these counties are quite representative of all West Texas voting in the May 18 election.

Apparently, the narrow defeat of another important proposed Constitutional Amendment (Amendment 2 in 1969), which would have authorized

three and a half billion dollars in water bonds, did not awaken West Texans sufficiently to work harder than ever. When there are matters to be decided which will affect water and its eventual importation to West Texas (even when the effect is oblique such as in Amendment 4) the people in West Texas should take a more positive attitude. Amendment 2 in 1969 could have been passed if just a few more West Texans had taken the time to vote.

Even though West Texans did favor Amendment 4 this time, the voting was much lighter and the percentage "for" much smaller than the West Texas vote in 1969 for Amendment 2. Amendment 4 would not have carried if the metropolitan vote in favor had not been larger percentage-wise than in the 1969 vote. Once again, it will take favorable votes from East and West Texas to continue progress in Texas' water future.

	1971 AMENDMENT 4			1969 AMENDMENT 2		
	FOR	AGAINST	% FOR	FOR	AGAINST	% FOR
Armstrong	84	79	52	155	155	50
Bailey	246	216	53	642	85	88
Castro	307	119	72	980	85	92
Cochran	169	89	66	433	69	86
Crosby	295	159	65	895	118	88
Deaf Smith	1466	648	69	1203	87	93
Floyd	519	344	60	1362	161	89
Hale	1277	437	75	2623	339	89
Hockley	498	349	59	1441	188	88
Lamb	624	610	50	1895	224	89
Lubbock	3988	2285	64	10495	1635	87
Lynn	383	247	61	980	187	84
Parmer	279	127	69	1005	75	93
Potter	2839	3060	48	2944	1508	66
Randall	1207	959	56	2600	834	76

TABLE 1—Local Voter Response for Amendment 4 (1971) and Amendment 2 (1969). (Counties or parts of Counties in High Plains Underground Water Conservation District No. 1.)



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Ewel Exum, 1972 _____ Rt. 1, Ropesville
H. R. Phillips, 1972 _____ Rt. 4, Levelland
Douglas Kauffman, 1972 _____ 200 Mike St., Levelland
E. E. Pair, 1974 _____ Rt. 2, Levelland
Jimmy Price, 1974 _____ Rt. 3, Levelland

Lamb County

Calvin Price, Secretary
620 Hall Avenue, Littlefield
Ardis Barton, 1972 _____ Hiway 70, Earth
Gene Templeton, 1972 _____ Star Rt. 1, Earth
W. W. Thompson, 1972 _____ Star Rt. 2, Littlefield
Lee Roy Fisher, 1974 _____ Box 344, Sudan
Jack Thomas, 1974 _____ Box 13, Oilton

Lubbock County

Clifford Thompson, Secretary
1628 15th Street, Lubbock
Glenn Blackmon, 1972 _____ Rt. 1, Shallowater
Andrew (Buddy) Turnbow, 1972 _____ Rt. 5, Lubbock
Alex Bednarz, 1972 _____ Rt. 1, Slaton
R. F. (Bob) Cook, 1974 _____ 804 6th St., Idalou
Dan Young, 1974 _____ 4607 W. 14th, Lubbock

Lynn County

Clifford Thompson, Secretary
1628 15th Street, Lubbock
O. R. Phifer, Jr., 1972 _____ New Home
Reuben Sander, 1972 _____ Rt. 1, Slaton
Dale Zant, 1972 _____ Rt. 1, Wilson
Roger Blakney, 1974 _____ Rt. 1, Wilson
Orville Maeker, 1974 _____ Rt. 1, 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

Louise Knox, 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

Water Code For Texas

Texas has a "new" Water Code. Governor Preston Smith recently signed into law House Bill 343 (carried by Rep. Bill Clayton of Springlake) which had been passed by the Texas Legislature. The new code is to take effect on August 31, 1971. The Water Code is a non-substantive revision of the general and permanent water laws of the State of Texas.

The Legislature in 1963 directed the Texas Legislative Council to plan and execute "a permanent statutory revision program for the systematic and continual study of the statutes of this State and for formal revisions on a topical or code basis to clarify, simplify and make generally more accessible, understandable and usable the statutory laws of Texas. In carrying out the revision program, the sense, meaning or effect of any legislative act shall not be altered."

The Business and Commerce Code in 1967 was the first of the codes to be enacted. The Water Code is the second of these codes to be enacted. The new Water Code consists of four titles (General Provisions, State Water Administration, River Compacts, and General Law Districts), and it contains a total of 26 chapters. Underground water conservation districts are provided for in Chapter 52 under Title IV, General Law Districts.

Before being introduced to the Legislature, the Water Code was approved by the Water Code Advisory Committee. That committee was composed of Corwin W. Johnson, Professor of Law, The University of Texas, Chairman; Neal King, Attorney, Mission, Vice Chairman; Victor W. Bouldin, Attorney, Houston; Dean Carlton, Attorney, Dallas; Joe D. Carter, Member and Past Chairman, Texas Water Rights Commission; William S. Rose, Acting General Counsel, Texas Water Development Board; and Frank T. Youngblood, Hearings Examiner, Texas Railroad Commission. The Texas Legislative Council was the organization which was responsible for the actual preparation of the code to be presented to the Legislature. Miss Sarah Haynie of the Texas Legislative Council was designated as the Chief Revisor of the Water Code.

The new Water Code makes the

understanding and administration of Texas' water laws much easier and more systematic. Some of the language was changed in order to make the statutes more intelligible, however, the meaning was not changed and the code does not present any substantive changes. Currently before the Legislature are numerous substantive changes which have been recommended in the hope of improving the present water laws. These substantive changes will have to be approved separately from the new Water Code.

REERIO FORMED

On May 10, 1971, the Regional Environmental Education, Research, and Improvement Organization (REERIO) was organized and became a reality. The purpose of REERIO is to develop, promote and strengthen educational and research programs leading to environmental improvement in the Southwest.

REERIO's educational program they hope to improve communications among business, industry, agriculture, various conservation groups, and the general public on all matters relating to the environment. They plan to sponsor an annual environmental conference as well as other periodic seminars and short courses. Also, they intend to issue publications in the field of environmental improvement. REERIO's organizers hope to have a research program in which they might aid existing research programs, determine the need for new research efforts and help to finance needed research.

At the organizational meeting in Las Cruces, the first fifteen Directors were chosen from approximately 400 people attending. Among those chosen as Directors are Dr. Gerald W. Thomas, President of New Mexico State University; and John Clark, Director of the New Mexico Water Resources Institute at New Mexico State University.

Speakers at the first meeting included: David L. Norvell, Attorney General of New Mexico; Dr. Gerald W. Thomas, President of New Mexico State University; Thadis W. Box, Dean of the College of Natural Resources at Utah State University; B. C. Hernandez, Albuquerque Attorney; B. B. Smith, General Manager, Kennecott Copper Corp.'s Chino Mines; and Jack C. Springer, Executive Vice-President of the West Texas Chamber of Commerce.

Drilling Statistics for Jan., Feb., Mar., & Apr., 1971

County	Permits Issued	New Wells Drilled	Replacement Wells Drilled	Reported Dry Holes
ARMSTRONG	6	6	0	0
BAILEY	34	17	0	0
CASTRO	60	39	6	0
COCHRAN	5	4	0	0
CROSBY	10	9	0	0
DEAF SMITH	90	37	4	2
FLOYD	57	39	0	1
HALE	26	8	2	0
HOCKLEY	78	40	2	0
LAMB	90	46	9	1
LUBBOCK	98	54	2	3
LYNN	19	10	0	1
PARMER	83	38	3	1
POTTER	1	2	0	0
RANDALL	32	12	2	1
TOTALS	689	361	30	10

BOARD OF DIRECTORS HOLD PUBLIC HEARING

Two Public Hearings were called on May 19, 1971, by the Board of Directors of the High Plains Underground Water Conservation District No. 1. The Hearings were called as a means of administratively enforcing the District's Rules and Regulations. One situation, in which the District has alleged a violation of its rules, resulted in the Hearing being held in the Al Allison Court Room of the new Law School at Texas Tech University. The second Hearing, which had been scheduled for that day, was not held since an arrangement was reached between the party, whom the District had alleged had caused a violation, and the District just prior to the Hearing.

In the case in which the Hearing was actually held the District had alleged that Mr. J. E. Franklin of Lubbock County, was operating two wells on a farm he owns and operates, the two wells being allegedly drilled and operated in violation of the District's Rules and Regulations. In that case the Board of Directors ordered Mr. Franklin to either close or reequip the two wells.

After listening to the evidence and testimony presented at the Hearing and listening to Mr. Franklin's statement that he did drill the two wells in question on the land he is farming, without obtaining permits as is required by the District's Rules, the Board issued a finding of their Hearing and then issued an ORDER upon that finding.

The finding stated that the two wells were drilled after the date the District began to require a permit to drill a well, one capable of producing in excess of 100,000 gallons per day (69.4 gpm), and that the two wells are presently equipped in such a manner that they are capable of producing in excess of 100,000 gallons per day. The finding also stated that the wells were drilled without benefit of a permit from the District.

The Board in its ORDER to Mr. Franklin, requires him to cease operating the two existing wells in violation of the District's Rules, and that the two wells must either be closed or re-

equipped by July 3, 1971. If they are reequipped, they must be reequipped in such a manner that they would not be capable of producing in excess of 100,000 gallons per day (69.4 gpm).

Mr. Franklin has fifteen days from the date of the Hearing in which to request a rehearing on this matter by the Board of Directors.

On the same property, but not in connection with the illegally drilled wells, the Board also directed Mr. J. E. Franklin to close or cap two large open holes which are apparently abandoned irrigation wells. They are to be closed or capped in accordance with the District's Rule concerning capping of open wells. They also directed Mr. Franklin to re-complete or plug two additional wells on the northwest part of the same farm, in such a manner that pollution or contamination of the underground water reservoir in the Ogallala Formation will not be permitted.

In other administrative action the same day, the Board of Directors unanimously accepted an agreement signed by Mr. Joe Greenlee of Lubbock, Texas. Mr. Greenlee is the Trustee of a farm in Lubbock County where the District had alleged that waste of groundwater was being committed.

In lieu of the Hearing which had been scheduled on a tailwater waste complaint, the Board of Directors accepted a consent agreement which had been worked out between Mr. Greenlee and employees of the District prior to the Hearing. Mr. Greenlee agreed to require his leasees to abide by all rules and regulations of the District. In the agreement was an acknowledgement of the District's jurisdiction with regard to tailwater waste as it is outlined in both the District's Rules and the Statutes of Texas.

After accepting the agreement, the Board instructed the District's Manager to take the appropriate steps to abate waste in accordance with the District's Rules and Regulations and the Statutes of Texas in the event tailwater is permitted to escape from that particular land in the future.

BUREAU OF RECLAMATION APPOINTS AREA PLANNING OFFICER

Appointment of Norman G. Flaigg, 52, to be Area Planning Officer in charge of the Bureau of Reclamation's Austin Development Office, Austin, Texas, was announced April 14 by the Department of the Interior.

Commissioner of Reclamation Ellis L. Armstrong said Flaigg is being promoted to this key position in Texas water development because of the high quality of his performance during many years of experience in planning activities in the Bureau. The Austin Office is in the Bureau's Region 5, which has headquarters in Amarillo, Texas.

"Mr. Flaigg's experience includes more than six years in his present Area Engineer position in the Bureau's Oklahoma City Development Office," Mr. Armstrong said. "He is familiar with the West Texas - Eastern New Mexico Import Project, a major study being conducted largely by the Austin Development Office."

Flaigg was born in Deadwood, S.D. He holds B.S. Degrees in Civil Engineering from the South Dakota School of Mines and in Sanitary Engineering from the University of Illinois and a Master's Degree from the University of Oklahoma.



Frank Rayner (left) addresses the Board of Directors at their recent Public Hearing held in the Al Allison Court Room at the School of Law on the Texas Tech University Campus. Members of the Board of Directors are (left to right) Billy Wayne Sisson, Ray Kitten, Selmer Schoenrock, Ross Goodwin, and Chester Mitchell.



Mr. J. E. Franklin (standing left), who had allegedly drilled two wells in violation of the District's Rules, is shown presenting his testimony to the Board. The District's attorney, John Seymour (standing right), is shown listening to the testimony of Mr. Franklin. Seymour presented information concerning the two wells which the staff had collected.



Mr. Harley Franklin (standing), a neighbor of Mr. J. E. Franklin, is pictured as he was making a statement to the Board of Directors. Under the District's Rules, anyone who might have an interest in a case being heard is permitted to present any statements, testimony, or evidence which is relevant to the issue before the Board.

District Directors Visit Congressmen



Three members of the Board of Directors of the District are shown in the Washington, D.C. office of Senator Lloyd Bentsen (second from left). From left to right are Billy Wayne Sisson, Senator Lloyd Bentsen, District Manager Frank Rayner, Chester Mitchell, and Selmer Schoenrock.



Senator John Tower is shown hosting members of the District's Board in his Senate office. The Board members were in Washington to attend a national water conference, visit federal water agencies, and meet with their Congressmen. From left to right are Senator John Tower, Billy Wayne Sisson, Frank Rayner, Chester Mitchell and Selmer Schoenrock.



United States Representative George Mahon talks with three Board members of the High Plains Underground Water Conservation District No. 1 while they were in Washington. Pictured left to right are Selmer Schoenrock, Frank Rayner, Billy Wayne Sisson, Chairman George Mahon and Chester Mitchell.



In his Washington office Representative Bob Price talks with officials of the High Plains Water District. Shown standing are (left to right) Selmer Schoenrock, Chester Mitchell and Frank Rayner. Sitting are Billy Wayne Sisson and Representative Bob Price.

THE Cross SECTION

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

Volume 17—No. 6

"THERE IS NO SUBSTITUTE FOR WATER"

June, 1971



ALBERT W. SECHRIST

Sechrist Appointed To Groundwater Committee

The American Society of Agricultural Engineers has recently sent congratulations to Albert Sechrist on his appointment to the Groundwater Committee of the ASAE. Mr. Sechrist, who is a graduate engineer for the High Plains Underground Water Conservation District No. 1, has been a member of ASAE for the past seven years. He has been appointed to a three-year term beginning July 1, 1971. Currently there are eleven members from across the United States on this Groundwater Committee. C. E. Nuzman is the present chairman and D. C. Signor is the vice-chairman.

Besides promoting technical sessions on groundwater studies and artificial recharge, the Committee objectives include providing a source for publications, along with serving as a clearing house for the exchange of ideas, standardization of terminology, listings of active groundwater projects, and the preparation and maintenance of bibliographies of materials which have been prepared in the field of groundwater.

AVOID SPRINKLING PUBLIC ROADS

In numerous areas of the High Plains the most efficient, and in some cases the only, way to irrigate is with the use of sprinklers and sprinkler systems. There are numerous types of sprinklers to fit individual requirements and needs. Among others there are: handmove, tow lines, giant sprinklers (boom), side or wheel roll, side-move with and without trailer line, center pivot self-propelled, straight

—continued on page 2 . . . SPRINKLERS

AN OPEN LETTER TO THE RESIDENTS OF HIGH PLAINS:

As a Field Representative for the High Plains Water District, one of my duties is to see that wells are properly covered. During the past month or so it seems to me that I have noticed more open wells than I have in the past. Having two small children of my own, open wells are a problem which I take quite seriously.

Open holes (usually abandoned wells) are potential killers which many landowners or lessees are not even aware of. Others who are aware of open holes on their property appear to disregard the situation as a possible hazard. Many of the open and uncovered wells that I have seen lately were close to well traveled roads or were fairly close to places where people were living. There have been several recent occasions when I have noticed that there were children playing in close proximity to an open or uncovered well. With summer here, the children have more time to explore around such wells.

Most of these open holes are ten, eighteen, or thirty-six inches in diameter. Many have had weeds grow up around them and are hidden from view until a person is right upon one (hopefully not in one). Quite a few of these wells are improperly covered and this also creates the possibility of an accident. I have seen thin sheets of tin merely laid over a hole, and the tin would not be able to support the weight of a child, let alone a man. I have also seen old tires thrown over wells, rusted out buckets placed over them, and rotten pieces of wood merely placed over a well.

I am sure that no one would want to be responsible for the tragedy of a child, or adult for that matter, falling into an abandoned well. Even if the individual could be recovered safely from one of these wells, it would have invited many hours of agony on the family's part. It is extremely important to close any abandoned well that may exist on your property. What I am trying to say is that before we all read in the headlines about a child falling into an open abandoned well we should get them closed, and now. In other words, lock the barn door before the horse gets out and not after. REMEMBER! The time to close abandoned wells is yesterday.

*Sincerely,
Dan Seale
Field Representative,
High Plains Water District*

EDITOR'S NOTE:

In addition to the possibility of a tragedy occurring, which Mr. Seale pointed out, it should be also illustrated that open and improperly covered wells are an extremely good conduit for potential pollution of the underground aquifer. Everyone appears to be quite ecology minded these days and very concerned with water quality. The quality of water in the Ogallala Formation would generally be considered excellent. To maintain this condition of excellent quality don't permit it to be damaged by leaving a well uncovered which might then lead to a degradation of the underground water. There are both state laws and district rules which specifically provide for the elimination of open wells. The state law states that it "shall be unlawful for the owner or operator of any well or system, as much as ten feet deep, and not less than ten inches or more than six feet in diameter to fail to keep it entirely covered at all times except when said well or cistern is in actual use by the owner or operator thereof." State law also provides that "any person violating the provisions of this act (Article 1721 V.C.S.) shall upon conviction be guilty of a misdemeanor and be fined not less than one hundred dollars nor more than five hundred dollars." Rule 6 of the Rules and Regulations of the High Plains Underground Water Conservation District No. 1 provides that every owner or operator of land upon which there is an open or uncovered well is required to close it or cap it permanently with a covering capable of sustaining weight of not less than four hundred pounds, except when it is in actual use. When the District discovers an open or uncovered well or an improperly covered well it can serve written notice upon the owner or operator that the well is in violation of the District's rules and request that the owner or operator close or cap the well in accordance with the rules. Where this is not done within ten days after the written notice the District may go upon the land or have someone close or cap the well in accordance with the rules and all expenditures of such closing shall constitute a lien upon the land where the well is located (the lien shall not exceed the sum of one hundred dollars for any single closing).

Editorial By Rayner Appears In "Ground Water"

"Holes in our environment" was the title for the guest editorial which Frank A. Rayner, manager of the High Plains Underground Water Conservation District No. 1, recently had published in *Ground Water*. The May-June, 1971 issue is the issue of *Ground Water* in which the editorial appeared.

Ground Water is the journal of the technical division of the National Water Well Association. Jay Lehr is the editor of *Ground Water*, and he invites a guest editorial from a recognized authority in the field of ground water each issue. Mr. Rayner points out that America is a nation of "causes" and that one of the most recent and widely accepted "causes" is that of the environmental cause.

He then goes on to point out the relationship of water well drillers and the National Water Well Association to this new cause and the fact that they must take this new cause seriously. He finalizes his editorial by stating "the material and fluids encountered in a bore hole, the quality of well construction and pollution control adequacy of the well completion, are all the 'business' of the well driller, however, wells penetrate the earth's crust, forming conduits through a part of our environment, and the environment is now considered to be held by the individual only in public trust."

California Consultants Visit Lubbock District

Participants in the Tech-District aquifer-modeling research project held a planning and review meeting June 2-3, 1971 in the District's Lubbock office. The meeting was held to discuss the present status of the research and to discuss plans for conducting the research in the coming months.

The Tech-District aquifer-model research project is sponsored by a joint research grant from the Office of Water Resources Research (OWRR), U. S. Department of Interior. It is anticipated that the model when completed will be a useful tool to both research and management of the groundwater of the Ogallala aquifer.

Mr. Ernest M. Weber and Mr. J. Russell Mount were invited to attend the planning meeting as consultants.

--continued on page 2 . . . CONSULTANTS



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

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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
Mrs. Joni Deyo	Clerk-Keypunch Operator

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 FARMER COUNTIES)

Ross Goodwin, Vice President _____ Muleshoe

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)

Billy Wayne Sisson _____ Hereford

Precinct 5

(FLOYD and HALE COUNTIES)

Chester Mitchell, President _____ Lockney

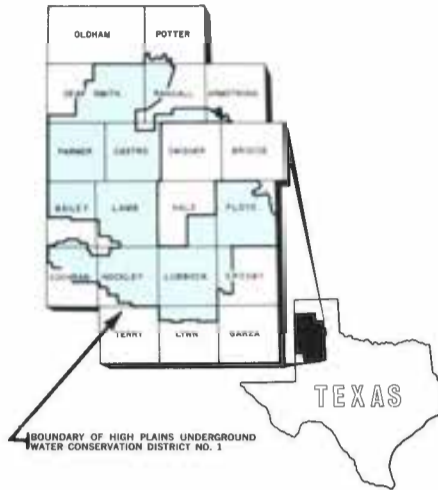
SPRINKLERS . . . continued from page 1
lateral self-propelled, traveler or big gun, and solid set systems.

Sprinkler systems are an extremely good method to conserve water when they are used properly. This also means that they can be an aid in saving money for irrigators.

While the District generally applauds the use of sprinkler systems in order to help conserve our groundwater supply, there are occasional problems which develop from the use of such sprinklers. The District has recently received numerous complaints that, where sprinkler systems were in use, the end sprinkler closest to a public road was sprinkling not only the field in which it was being used but also the road next to it. Obviously, this can cause a real hazard to motorists on the road, school bus drivers, and mail carriers. Motorists driving down what would normally be a dry road may have difficulty in negotiating a stretch of road which is wet or muddy due to its being sprinkled. Certainly, no one would intentionally want to cause a school bus loaded with children to have an unfortunate accident as a result of "irrigating" a public road.

It should be noted that irrigation water leaving the farm and getting on a public road or in the road ditch is a violation of the statutes of Texas as well as the rules and regulations of the High Plains Underground Water Conservation District No. 1.

There are several simple methods to avoid sprinkling a road. Among others is the use of a sprinkler head which only turns 180°, rather than a full circle, on their system in the outlet closest to the road. Another easy way to avoid the problem is to use a shield, generally a piece of metal, which will prevent the water from being sprayed in the direction of the road.



CONSULTANTS . . . continued from page 1

Both Messrs. Weber and Mount have had considerable experience in developing groundwater models. Mr. Weber, of Los Angeles, California, was instrumental in the development of the California Department of Water Resources model that has been modified for use by the Tech-District personnel. Mr. Mount of Dames & Moore of Los Angeles, serving as the other consultant, has been involved in the development and use of groundwater models in several parts of the country.

Personnel from the District participating in the meeting were Frank Rayner, Manager; Albert W. Sechrist, Graduate Engineer; and Randall Conner, student assistant. Personnel from Tech attending the meeting were Dr. Dan M. Wells, Director of the Water Resources Center; Dr. Bill Claborn, Assistant Professor; and Tommy Knowles, Graduate Student.

During the two-day meeting the Tech-District personnel explained the work accomplishments to date. Briefly these accomplishments included the first two years work on the model which led to a partially validated model covering the four counties of Bailey, Castro, Lamb, and Parmer. Also discussed was the current effort to expand the model capabilities to reflect the irregularities of the base of the aquifer and to be able to simulate the aquifer as it approaches depletion. In order to accomplish these objectives, a small portion of Lubbock and Lynn Counties will be modeled. The District personnel produced data showing extreme variation in the elevation of the base of the aquifer.

A considerable amount of the discussion during the meeting involved methods of validating the model. Some of the procedures discussed were to make changes in the size and shape of the polygons, to make changes in some of the input data and study the model response, and to study aerial photographs to aid in determining the location of cropped acreage in each county.

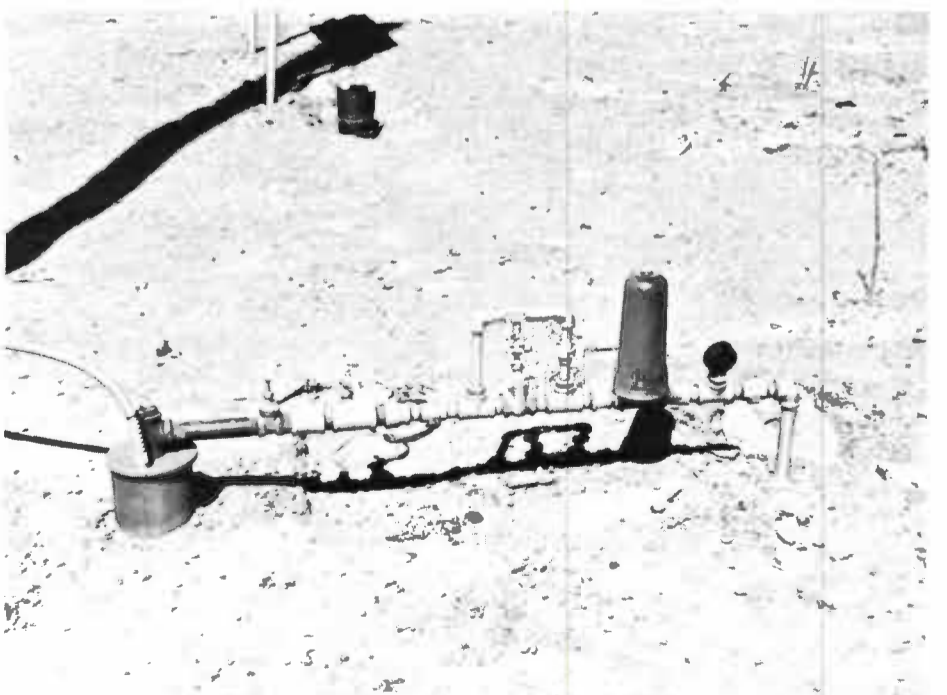
Reports of the meeting have been received from the consultants participating in the meeting and these reports have been forwarded to OWRR officials.



Shown above coupling the flexible plastic pipe before it is laid underground is Blez Gutierrez. Watching are Dale Brown and Luis Arguello, both of Lubbock. This system was being installed on a farm close to Lubbock.



The smaller plastic pipe on the right is the one supplying water to the system's orifices, which are placed at the required intervals. The larger pipe on the left, to which the smaller pipes are attached, are the header pipes.



Shown above is a filtering system for a subirrigation system which is in use close to Lubbock. At this point, fertilizer can also be introduced to the system.

SUBIRRIGATION-- A COMING INNOVATION?

Residents of the High Plains of Texas have for many years been aware that the withdrawal of water from the Ogallala Formation is in actuality a mining operation. As the water table goes down the interest in conservation of the underground water goes up. The District's primary function is to promote conservation of water in all possible ways. There are many programs and practices being utilized by agriculturalists, presently, which are designed to conserve water to the fullest. There are many more programs which will be used in the future to bring about even greater conservation of groundwater in this area. One farming practice, which is still in its beginning stages, that may result in greater savings of water, sometime in the future, is the use of subirrigation. Certainly, it is little beyond an experimental or developmental stage, yet it does hold a great deal of promise as a possible water saving practice in the future.

There has been a large amount of experimentation in respect to subsurface irrigation, and there has been movement into the developing stage whereby several companies have begun to manufacture and distribute these systems throughout the United States. There is a commercial manufacturer, distributor, and local outlet of such subsurface irrigation systems located in Lubbock, and these systems have been put into operation on numerous local farms (primarily on small acreages), and there has been a large number of systems put into use on lawns. There are many advantages to subsurface irrigation and at the same time there are still numerous disadvantages although the disadvantages are being eliminated as more research and experimentation is done, along with practical utilization of such systems on existing farms. It has been the objective of the proponents of subsurface irrigation to apply less water, more beneficially, and more evenly, and to reduce water losses which occur with present irrigation systems. Also, it is hoped that subsurface irrigation will be beneficial because of the reduction in labor required and the fact that it is almost completely automated. Theoretically, the subsurface irrigation should result in using the right amount of water for the right crop, reducing losses from evaporation and infiltration. Obviously, the runoff problem would also be negligible. Other advantages would include a reduction in weed problems and better methods of fertilization. The fact that there is not water on the surface of the ground aids in faster maturing of crops as well as the reduction of weeds.

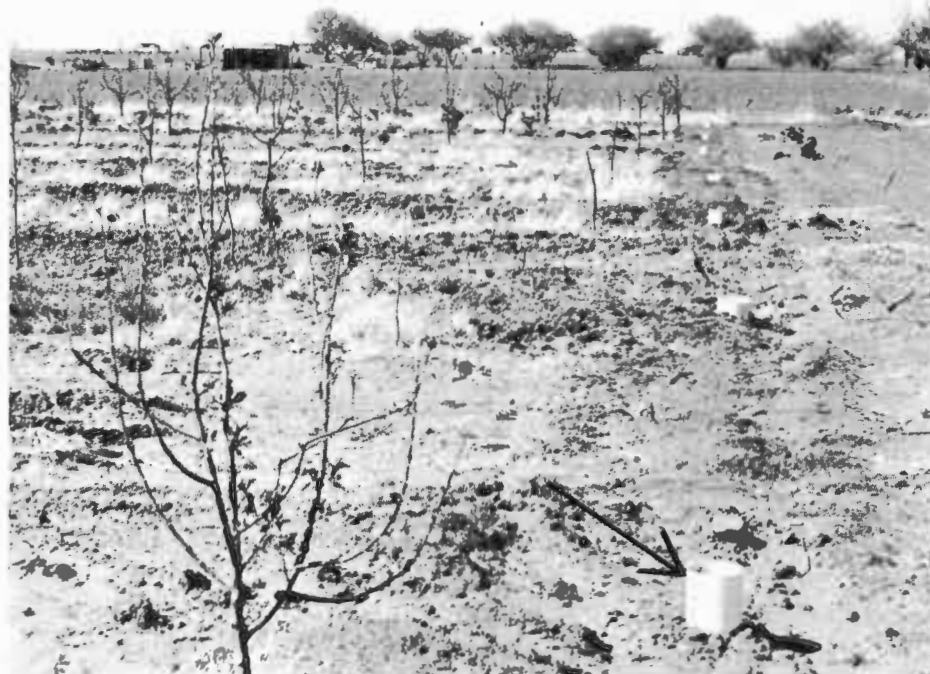
Some of the disadvantages include cost, possible maintenance difficulties, and possibility of difficulties with alkalinity and salinity. Certainly these difficulties are not as great as they were a number of years ago, and many have been overcome, to a certain extent, as more and more experimentation has been conducted. As there is more development in this field the

other problems should also be reduced with increased knowledge.

With regards to relatively high costs of the initial outlay for a subirrigation system, it should be noted that there have been several advances made which have reduced the costs somewhat. Obviously, the introduction of plastic pipe has helped to reduce costs considerably, yet the problem of price for such a system is still great enough that the systems are being used, primarily, on acreages which have a high cost value, such as homesites, orchards, football fields, and parks. It should be noted that some of the initial cost can be recaptured fairly quickly through the fact that there is less labor involved in the maintenance and operation of the systems. As with most other new products, the cost should reduce as there is a greater demand for the product. There are several farmers in the area who have already realized that they can pay the costs of installing a system and are expecting the system to repay them in a relatively short time. Another thought with respect to the cost is that where the water table is nearly depleted and only low capacity water wells are producing, these low capacity wells may be sufficient to supply the water for a subirrigation system over an extended period of time where it would be completely infeasible to irrigate with surface methods. The lower cost of a farm with a fairly depleted water supply may be made profitable if it is once again turned into an irrigated farm with the use of a subirrigation system. In other words, if a farm is bought at essentially dry land prices, because it has a low water table, but can produce with the same capabilities as fully irrigated farm land, then the cost of the system might certainly be justified.

Certain technical difficulties have presented themselves in the past towards developing a maintenance free subirrigation system. The primary difficulties have arisen from clogging of underground pipe in the orifices or outlets in the underground pipe through which the water enters the soil. Considerable thought has been given to these problems, and it would appear that progress has been made in the area although research will undoubtedly continue to modify and improve the present state of the art.

Numerous designs were formulated for the outlets from the plastic pipe which would be able to provide a continuity of flow, ease of replacement, durability, as well as not being susceptible to the penetration of roots into the orifice. Some of the earliest types were merely holes drilled into the plastic pipe. This and several other methods have been determined not to be completely feasible, and newer methods become more and more acceptable. Some of the orifice types which have been tried include water outlets covered by plastic flaps, smaller tubes attached to the primary underground plastic tubes with orifices in the smaller tubes being fed by water from the larger tubes (Sterling Davis,



A small orchard, which has a subirrigation system, is pictured above. The arrow points to one of the control valves for the system.



The tractor above is pictured as it lays the underground pipe for a subirrigation system. The pipe rests above the ground in front of the tractor and is fed into the narrow trench being dug by a vibrating plow. (Photos by Tony Schertz)

"Subsurface Irrigation How Soon a Reality?" *Agricultural Engineering*, November, 1967, page 654). One of the newer type orifice is a simple plastic insert and is the type being used in the subirrigation which is being installed in the High Plains area. The small orifice inserts are molded plastic with a labyrinth protection on the outside. The small plastic orifices are actually punched into the walls of the plastic tubing. A design for such an orifice which has proven fairly successful is illustrated in an article by L. F. Whitney and K. M. Lo entitled "Plastic Orifice Inserts for Subsurface Irrigation" (*ASAE Transaction*, 1969, page 602). A filter is required with subirrigation systems if the orifices are to remain open and not become clogged by material in the irrigation water.

Systems can be installed quickly and are readily adaptable to the particular purpose for irrigating. Where an orchard is being irrigated, it takes

fewer lines and fewer orifices than where turf is to be irrigated. The number of lines and the spacing would also vary if row crops were intended to be irrigated. It appears that good lateral movement of the water from the orifices is obtained especially where attention is given to the speed of application. Obviously, capillarity and porosity of the particular soil type will have a large effect on the amount of lateral movement.

In conclusion, subsurface irrigation may be one of the answers to many farmers' irrigating problems (even such problems as excess slope where tailwater runoff is a difficulty). Its advantages of lower water requirements and reduction of labor required must still be balanced with respect to its reasonably high initial cost and the fact that it is just now beginning to move out of the research, experimental and developmental stages into actual practical use.

IRRIGATION INVENTORY

By ALBERT W. SECHRIST

A basic need of many people in agriculture is an accurate accounting of irrigation and irrigated crops. In partial answer to this need various records are maintained and estimates are made by several organizations.

The Texas Water Development Board recently issued their Report 127 "Inventory of Irrigation in Texas—1958, 1964, and 1969." The report, dated May, 1971, is based on cooperative inventories made by the Soil Conservation Service, U.S. Department of Agriculture; the Texas State Soil and Water Conservation Board; and the Texas Water Development Board. Some of the results from the inventory are shown in Table 1 for the 15 counties, all or parts of which, make up the High Plains Underground Water Conservation District. These 15 counties account for a large proportion of the irrigation in the state. Statewide, the number of acres irrigated shows an increase each year from 6.7 million acres in 1958 to 7.7 million in 1964 and 8.2 million in 1969, while the acreage for the counties of the District has declined slightly from 3.3 million in 1958 to 3.1 million in 1969. In 1958, the 15 counties contained 50 per cent of all irrigated acres in the state, while in 1969, the same counties contained only 38 per cent of the state total. The entire High Plains accounts for about 5.5 million acres irrigated, or about two-thirds of all irrigation in Texas.

The estimates indicate that the 15 county area pumped 3.8 million acre feet of water in 1958, 5.3 million acre feet in 1964, and 3.9 million acre feet in 1969. Rainfall variation may be part of the reason for the large amount of water used during 1964. The average rainfall for the Lubbock and Amarillo measuring stations averaged 20.4, 13.0, and 28.9 inches for the years 1958, 1964, and 1969, respectively. This would indicate that more irrigation was necessary in the low rainfall year of 1964. It is significant to note that both the quantity of water per acre irrigated and the quantity of water pumped per irrigation well were considerably larger in 1964 than in 1958 or 1969. This coincides with the larger quantity of

Table 1—IRRIGATION INVENTORY

County	Area Irrigated (acres)			Quantity of Water Used (acre-feet)			Number of Irrigation Wells			Quantity of Water Per Acre Irrigated (acre-feet/acre)			Quantity of Water Pumped per Well (acre-feet/well)		
	1958	1964	1969	1958	1964	1969	1958	1964	1969	1958	1964	1969	1958	1964	1969
Armstrong	24,845	27,825	25,518	21,509	43,782	33,968	162	195	212	.86	1.57	1.33	132	224	160
Bailey	147,000	149,210	157,170	256,887	354,508	184,883	1,600	1,820	1,900	1.74	2.37	1.17	160	194	97
Castro	401,670	406,500	411,500	354,475	634,300	548,634	2,600	3,150	3,350	.88	1.56	1.33	136	201	163
Cochran	65,600	88,600	84,600	108,784	125,266	65,312	1,200	1,375	1,543	1.65	1.48	.77	90	91	42
Crosby	200,000	168,400	165,990	139,148	188,448	212,106	1,551	2,050	2,082	.69	1.11	1.27	89	91	101
Deaf Smith	282,660	304,400	275,100	407,293	469,145	481,525	2,300	2,300	2,800	1.44	1.54	1.75	181	203	171
Floyd	300,250	321,910	315,000	188,592	256,026	317,646	2,500	3,500	3,950	.62	.79	1.00	75	73	80
Hale	533,455	461,800	352,520	757,752	1,105,616	680,167	4,500	4,378	4,400	1.07	2.39	1.92	127	252	154
Hockley	160,000	194,400	194,225	165,014	397,983	214,696	4,700	5,088	5,835	1.03	2.04	1.10	35	78	36
Lamb	292,460	331,180	317,847	935,982	683,252	388,875	5,000	5,350	6,000	1.35	2.06	1.22	79	127	64
Lubbock	350,000	350,014	325,000	291,264	213,298	189,850	5,055	5,410	6,200	.83	.60	.58	57	39	30
Lynn	65,000	79,200	91,640	79,501	79,067	23,294	1,500	2,175	2,466	1.22	.99	.25	53	36	9
Parmer	404,222	377,000	318,357	773,936	574,020	492,817	2,410	2,650	3,402	1.91	1.52	1.54	321	216	144
Potter	11,000	14,300	17,757	10,000	22,548	20,844	55	40	75	.90	1.57	1.17	181	563	277
Randall	95,000	91,000	83,659	86,986	147,717	86,512	700	821	1,150	.91	1.62	1.03	124	179	75
Total	3,333,162	3,365,739	3,135,883	3,855,123	5,294,976	3,941,129	35,833	40,302	45,365	1.14	1.54	1.10	116	165	107

water pumped in 1964.

Although the number of acres irrigated in the District has remained fairly constant, the number of irrigation wells has continued to increase for each time increment. The estimated number of wells increased from 35,833 in 1958 to 45,365 in 1969. This represents an average increase of 866 wells or 2.5 per cent per year.

Data from the report show that although surface irrigation is the method used on by far the major portion of the District area, the amount of land irrigated by sprinklers is beginning to increase. In 1958, there were only 86,000 acres of land irrigated by sprinklers whereas in 1964 sprinklers were used on 318,000 acres or approximately 10 per cent of the total area irrigated.

TAES SURVEY

The Texas Agricultural Extension Service also publishes an irrigation survey annually for the High Plains area.

Table 2

County	IRRIGATION SURVEY	
	Acres Irrigated	Number of Irrigation Wells
Armstrong	20,249	215
Bailey	130,000	2,090
Castro	294,535	3,350
Cochran	121,845	1,543
Crosby	167,395	2,082
Deaf Smith	255,891	2,907
Floyd	222,500	3,950
Hale	406,000	4,375
Hockley	242,132	5,895
Lamb	285,320	5,654
Lubbock	322,770	6,580
Lynn	92,000	2,466
Parmer	310,647	2,937
Potter	17,334	85
Randall	75,500	1,095
Total	2,964,118	45,224

Table 2 shows the number of irrigation wells and number of acres irrigated by county for the 15 counties of the District. These data as taken from the "1969 High Plains Irrigation Survey," were compiled by Leon New, area irrigation specialist. The data contained in this report are obtained primarily from the County Agricultural Agent of each county.

The survey indicates that there were 2,964,118 acres irrigated by 45,224 irrigation wells in 1969. These numbers vary somewhat from those in Table 1, but by only a small percentage factor. Both sets of data are based on estimates of values rather than on actual measured or calculated data.

DISTRICT SURVEY

For comparison to the data presented in Tables 1 and 2, Table 3 presents net aquifer depletion data as taken from *The Cross Section* of March, 1970. These values were determined by analysis of data collected as a part of the District's observation well measuring program. The average annual decline of the water table was shown on contour maps, then the area within each decline interval was determined. This area was multiplied by the annual decline to calculate the total portion of the aquifer that is dewatered annually. Assuming a 20 per cent storage factor for the aquifer, the net amount of water removed from the aquifer was calculated.

Table 3, therefore, shows the average net amount of water pumped from the aquifer for that portion of the 15 counties that are included in the boundaries of the High Plains Underground Water Conservation District No. 1.

These values should probably be less than the total quantity of water pumped from the aquifer for irrigation due to the deep percolation of the irrigation applied to the land. In most of the area there is some percentage of the water applied to the land surface, from irrigation and from rainfall, that eventually reaches the water table and is again available to be pumped.

Table 3

AVERAGE ANNUAL NET DEPLETION OF THE OGALLALA AQUIFER

County	Acres		Net Depletion
	in District	Net	
Armstrong	41,600	8,415	
Bailey	353,900	124,573	
Castro	539,700	377,466	
Cochran	219,000	32,149	
Crosby	88,800	49,302	
Deaf Smith	529,200	316,991	
Floyd	579,400	295,668	
Hale	156,100	76,520	
Hockley	577,800	122,032	
Lamb	550,200	186,573	
Lubbock	580,900	183,100	
Lynn	154,100	10,325	
Parmer	546,400	417,832	
Potter	18,500	4,148	
Randall	280,000	78,512	
Total	5,215,600	2,283,605	

Numerous estimates have been made regarding the recharge of the aquifer from natural recharge (rainfall) and from the effect of deep percolation of the irrigation water applied; however, probably the correct value is yet to be determined. In order to determine this value as well as to fully understand the reaction of our underground water storage aquifer, much more detailed information must be obtained and analyzed.

THE Cross SECTION

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

Volume 17—No. 7

"THERE IS NO SUBSTITUTE FOR WATER"

July, 1971

Survey of Western States' Underground Water Management Provisions

By THAD FLOYD*

This survey is designed to show the extent of local control over the management of groundwater in various Western states and the provisions in those states for the control of groundwater "waste." It is not a comprehensive survey of all of the provisions for the management of groundwater.

Local Control

This part of the survey is to see how various Western states compare as to the amount of local control exercised over underground water. The statutory provisions of twelve states (Arizona, California, Colorado, Idaho, Montana, Nebraska, Oklahoma, Oregon, Texas, Utah, Washington, and Wyoming) were compared for this survey. Of these twelve, only six had any provisions whatsoever for local control of underground water, and of the six states with such control provisions, only three (California, Nebraska, and Texas) gave much power at all to the local agencies, while the other three (Colorado, Utah, and Wyoming) mainly gave only advisory and administrative powers to their local agencies.

No Provisions

The states of Arizona, Idaho, Montana, Oklahoma, Oregon, and Washington, have no provisions at all for local control of the underground waters, and most dealings concerning the appropriation and withdrawal of groundwater in these states, must be made with a state engineer.¹ Thus, it can be seen that the citizens of these states usually have no local representatives to help express their wishes in matters concerning the control of their underground water.

Three of the Western states, while having local control provisions in their statutes, do not vest any real powers with the local agency. Although the Colorado statutes call for a locally elected board of directors for areas which have been designated as "critical," this board is only given advisory powers subordinate to the state groundwater commission.² Wyoming's provisions for local control are very similar to Colorado's,³ but with the state water engineer retaining the power of allotment of the groundwa-



In this same space last month appeared an open letter to the residents of the High Plains written by Dan Seale, a field representative for the District, concerning the hazards of open or uncapped wells. The photo above looks innocent enough—can you spot the open well in this picture? For the location in the picture and a close up of this hazard, look on page 3.

ter.⁴ In Utah, the statutes call for the formation of local irrigation districts⁵ but, again, as in Wyoming, the state engineer retains much power including allotment of water.⁶

The three states which do have provisions for strong local control of underground water are California, Nebraska, and Texas. California statutes allow local residents to petition for and establish local water basin districts for the replenishment and conservation of underground water, and to retain powers to carry out these goals.⁷ Nebraska has statutory provisions for the formation of underground water conservation districts with powers vested locally.⁸ But a new addition to the Nebraska laws⁹ calls for no new districts to be formed after December 31, 1971.

Texas and Local Control

This brings us now to Texas, which seems to be the Western state with the strongest provisions for local control of underground waters. Texas combines several of the strong provisions, with local residents being able to petition for the establishment of an underground water conservation district, being able to form such a district, and then being able to elect local directors who are vested with various means of control.¹⁰ Local directors are able to institute wide ranging water conservation methods and they are responsive to local needs and conditions.

Waste Regulations

The Western states use various statutory methods and restrictions for the control of waste of underground water. But one thing prevails in almost all such statutes; the provisions are general with much discretion being left to the persons who implement them.

Of the seventeen Western states, three of them (Nebraska, New Mexico, and North Dakota) have no express provision in their statutes, for the prevention of waste of underground water, and California, Kansas, and Nevada only have prohibitions against the waste of artesian well water. But, with these exceptions, all the Western states provide for the prevention of waste in some manner.

Five Western states (Arizona, Idaho, Montana, Washington, and Wyoming) have waste statutes which are the same as, or similar to each others, and Arizona's statute is typical of these:

A. Groundwater which has been withdrawn shall not be allowed to waste. To effectuate the purposes of this section the department shall:

1. Require all flowing wells to be capped or equipped with valves so that the flow of water can be completely stopped when not in use.

continued on page 3 . . . SURVEY

DUGGAN NAMED CHAIRMAN OF WTCC WATER COMMITTEE

The West Texas Chamber of Commerce has named Arthur P. Duggan, Jr. as chairman of the Water Committee for that organization. Mr. Duggan is an attorney from Littlefield, Texas, and has been very active in water matters and water legislation for many years. Mr. Duggan assumes this chairmanship from George McCleskey, who is an attorney in Lubbock.

Duggan has an abundance of qualifications and experience for his new position. He was instrumental in formulating the underground water conservation laws for the State of Texas. He has authored numerous papers and has delivered several to Water Conferences at the University of Texas School of Law, where, by the way, he received his legal training.

Duggan is a member of the Natural Resources Section of the American Bar, and he recently attended the American Bar Convention which was held in London, England. At the state level, he is a member of the Air and Water Conservation Committee of the Texas State Bar, and he is a director of the Texas Water Conservation Association.

Starting out with hopes for new energy and direction to come from the West Texas Chamber of Commerce in the areas of water development and conservation, Duggan has called for a meeting of the Executive Committee of the Water Committee to be held August 12, 1971. It is to be a work planning meeting and will be held in Lubbock. Besides the Executive Committee, others present will include Harry Burleigh, Director of the Texas Water Development Board; Dr. Herb Grubb, Statewide Project Director, Input-Output Study; Beeman Fisher, President of the Texas Water Conservation Association; and members of the West Texas Chamber of Commerce staff.

The new Executive Committee includes Arthur P. Duggan, Jr., Chairman, J. W. Buchanan, Bill Clayton, Fred Conn, H. R. Drew, Owen H. Ivie, George McCleskey, Harry Moore, Jim Nichols, K. Bert Watson, and Dan Wells. Frank A. Rayner, Manager of the High Plains Underground Water Conservation District No. 1, has also recently been appointed to this Executive Committee of the Water Committee.



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

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Telephone 762-0181

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Keith Kennedy, 1972 _____ Star Rt. 2, Morton
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M. T. Darden, 1972 _____ Lorenzo
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Jack Bowman, 1974 _____ Lorenzo
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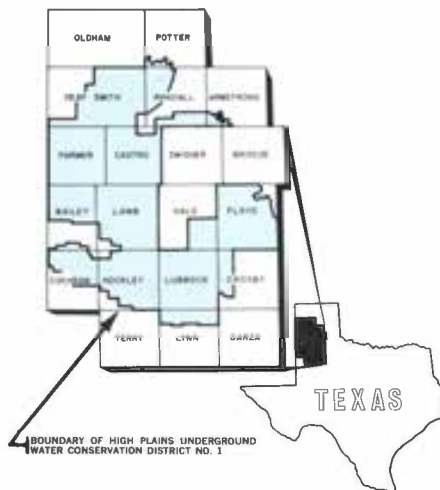
B. F. Cain, Secretary
County Court House, 2nd Floor, Hereford
W. L. Davis, Jr., 1973 _____ Hereford
L. B. Worthan, 1973 _____ Rt. 3, Hereford
Frank Zinser, Jr., 1973 _____ Rt. 5, Hereford
George Ritter, 1975 _____ Westway, Hereford
Harry Fuqua, 1975 _____ Rt. 1, Hereford

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M. J. McNeill, 1972 _____ 833 W. Tenn., Floydada
Malvin Jarboe, 1972 _____ Rt. 4, Floydada
Fred Cardinal, 1974 _____ Rt. 4, Floydada
Pat Frizzell, 1974 _____ Box 1046, Lockney

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.



Hale County

J. B. Mayo, Secretary
Mayo Ins., 1617 Main, Petersburg
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Harold D. Rhodes, 1972 _____ Box 100, Petersburg
W. D. Scarborough, Jr., 1972 _____ Petersburg
Don Hegi, 1974 _____ Box 160-A, Petersburg
Henry Kveton, 1974 _____ Rt. 2, Petersburg

Hockley County

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E. E. Pair, 1974 _____ Rt. 2, Levelland
Jimmy Price, 1974 _____ Rt. 3, Levelland

Lamb County

Calvin Price, Secretary
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Gene Templeton, 1972 _____ Star Rt. 1, Earth
W. W. Thompson, 1972 _____ Star Rt. 2, Littlefield
Lee Roy Fisher, 1974 _____ Box 344, Sudan
Jack Thomas, 1974 _____ Box 13, Olton

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Clifford Thompson, Secretary
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Glenn Blackmon, 1972 _____ Rt. 1, Shallowater
Andrew (Buddy) Turnbow, 1972 _____ Rt. 5, Lubbock
Alex Bednarz, 1972 _____ Rt. 1, Slaton
R. F. (Bob) Cook, 1974 _____ 804 6th St., Idalou
Dan Young, 1974 _____ 4607 W. 14th, Lubbock

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Reuben Sander, 1972 _____ Rt. 1, Slaton
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Roger Blakney, 1974 _____ Rt. 1, Wilson
Orville Maeker, 1974 _____ Rt. 1, Wilson

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Wilson & Brock Insurance Co., Bovina
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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, Amarillo
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W. J. Hill, 1975 _____ Bushland

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John F. Robinson, 1975 _____ 1002 7th St., Canyon
Fred Begert, 1975 _____ 1422 Hillcrest, Canyon

Ecological Edsel?

The following is an editorial by Walter J. Campbell, Editor-in-Chief, *INDUSTRY WEEK*, which appeared in *THE BETZ INDICATOR*, November / December, 1970.

Managing our environment will become the major concern for most of us for as long as we live.

It has begun with campaigns to provide cleaner air and cleaner water, but it will extend into many other areas—certainly including crime in the streets.

Environmental management will become fantastically expensive. It will cost tens of billions, perhaps hundreds of billions, annually. And it may be the most necessary expenditure made by man.

If we accept the concept that our earth is a spaceship in eternal orbit with all supplies aboard and with an ever increasing crew, then the necessity for wise and rational management becomes more apparent.

Because the problem is so fundamental and because the costs of solution will be so high, we have a gnawing uneasiness that we may blow it. We have started with public hysteria. We are demanding action without adequate definition of the prob-

lem, without sufficient information or knowledge or understanding of what needs to be done.

The public is the one to be served. The public can tell us that it wants cleaner air and cleaner water. The public cannot tell us how to achieve it, how far we must go, or what it will cost.

There are few true experts in environment. And those real experts frequently know only the questions, not the answers. Unfortunately, there are a great many pseudo experts, and even more unfortunately, many of the latter are operating in the public sector and calling the shots on environmental control.

We may be setting the stage for a ruinously expensive and ineffective program. We may be blundering into a monstrous ecological Edsel.

Dr. William T. Pecora, director of the U.S. Geological Survey and a lifetime student of our environment says: "Industry must take the leadership if alternatives are to be rationally explored. This is a time for dialog and unfortunately very little of it is going on. We must bring the cost-benefit problem out in the open rather than permitting forced politics to try to do something that is irrational."

Do You Have A New or Unusual Conservation Practice?

— SHARE IT

If you are an irrigation farmer, chances are you have run into some difficulties in irrigating efficiently while maintaining the greatest possible water conservation. A lot of thought has been put forth by a lot of individuals in coming up with farming practices and procedures which make the ultimate in beneficial use of the water with which they are irrigating. Some of the techniques follow just good common sense, while there are some instances where some real ingenuity and slick thinking has been required. There are many ideas which may have sounded unusual at first, but which have proved to be effective.

If you have a particular technique which you have developed to enable you to conserve your underground water, the High Plains Underground Water Conservation District No. 1 would like to hear from you. If the idea you have is working in your particular situation, there is a chance that it might be expanded to an area-wide practice which could benefit others in conserving their water. Write your ideas and practices down and send them to the District. If it appears that some of the ideas we receive could be of District-wide benefit, we will give distribution to them, possibly publishing them in *The Cross Section*. The District would appreciate receiving any suggestions which might improve the conservation of groundwater.

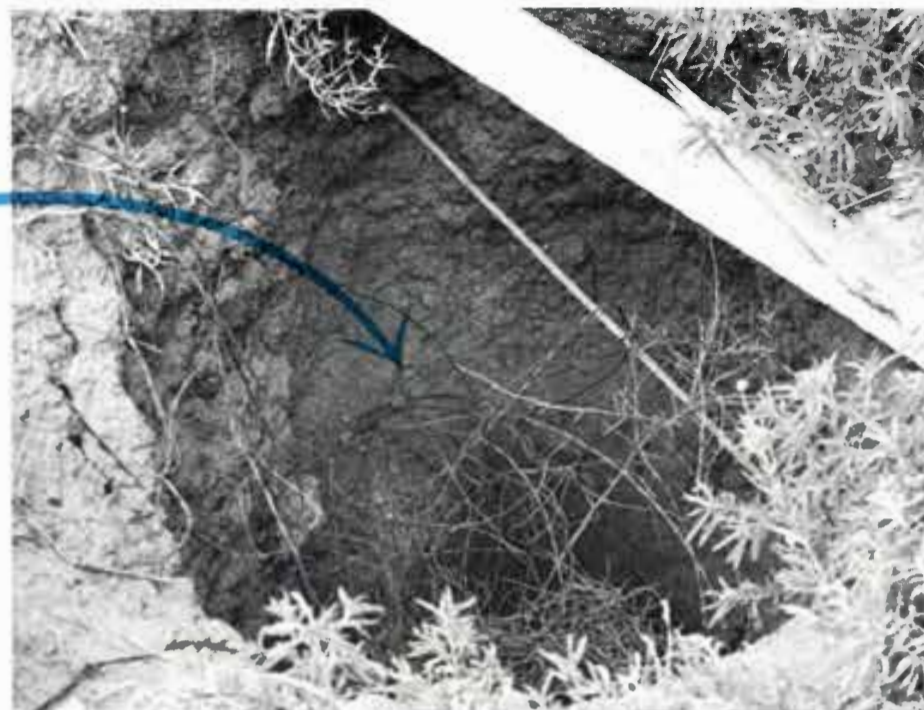
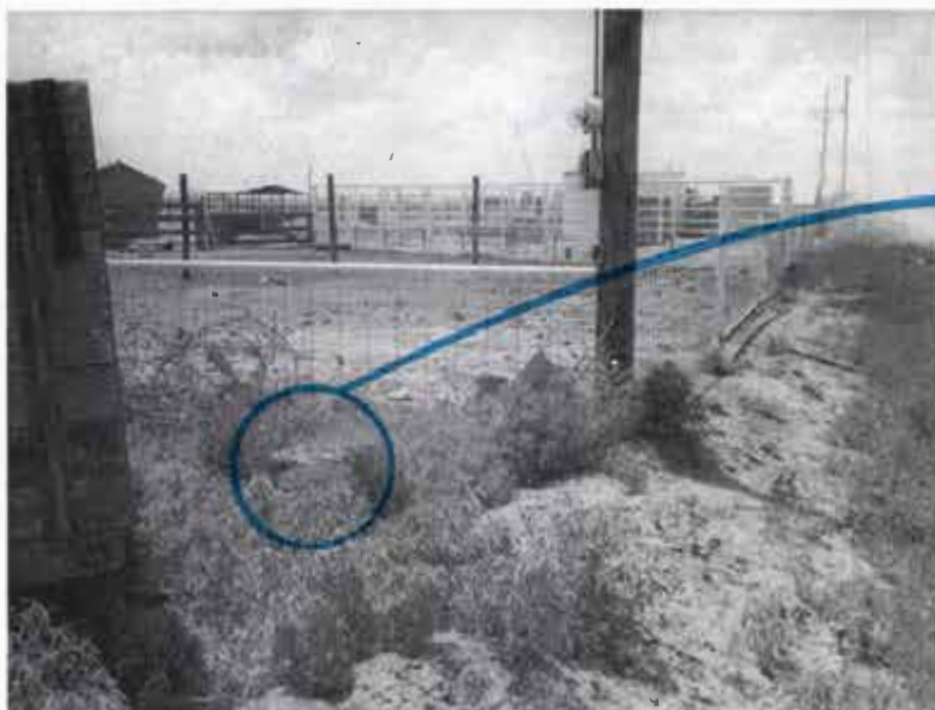
National Water Commission To Visit Texas

The National Water Commission is scheduled to visit Texas October 4-6, 1971. Besides their visit to Austin, it is possible that they will also make a short stop on the High Plains while in Texas. The stated purpose of the trip to Texas is to "broaden the Commission's understanding of the Texas Water Plan," although their interests will extend to a wide range including water conservation, development, and utilization.

The National Water Commission was established in 1968 to "review the Nation's water needs, resources, and problems, to identify alternative ways of meeting these needs, and to recommend policies that will enable the Nation to use its water resources to improve the quality of life of the American people."

Commission Members

The Commissioners of the National Water Commission include Charles F. Luce, Chairman, Samuel S. Baxter, Vice Chairman, Howell Appling, Jr., Clyde T. Ellis, Roger C. Ernst, Ray K. Linsley, and Josiah Wheat. Mr. Wheat is a Texas attorney, who has been president of the Texas State Bar and the Texas Water Conservation Association. Theodore M. Schad is the Executive Director of the Commission.



The location of the open well in this photo is circled with the heavy blue line. It can be seen that where there are weeds and other objects in the vicinity, it is quite easy for someone to miss seeing the hole, possibly falling into it. This is especially true with small children.

The open and uncovered well hidden in the previous photograph becomes apparent in this closeup. Obviously, it is not properly covered. The owner of the property on which this hole was located was contacted and asked to close the well by the District. The request was quickly complied with, and the owner closed the well in accordance with the law.

SURVEY . . . continued from page 1

GEOLOGICAL SURVEY APPOINTS YOST TO HEAD TEXAS DISTRICT

Mr. I. D. (Dale) Yost has recently been designated District Chief of the Texas District for the Geological Survey (Water Resources Division) of the U.S. Department of Interior. Mr. Yost succeeds Mr. Trigg Twichell, who recently retired after a long and distinguished career with the Geological Survey.

A native of San Benito, Mr. Yost is a veteran of World War II and spent 2½ years in the European campaign where he rose to the rank of Captain. After the completion of his military service, he studied at Texas A&M and at Texas University, where he graduated with a Bachelor of Science degree in Civil Engineering in 1948. While attending the University, and for a time thereafter, he was employed by the Texas Board of Water Engineers.

Mr. Yost joined the Geological Survey in December, 1948 and has had a wide variety of assignments in Austin, Pecos, and San Angelo, Texas; Washington, D.C.; Little Rock, Arkansas; and St. Louis, Missouri. He has served as Engineer-in-Charge of the Subdistrict Office at San Angelo, as Assistant District Chief of the Surface Water Branch in Texas, as District Chief of the Surface Water Branch in Arkansas, and as Assistant Regional Hydrologist of the Mid-Continent Region of the Geological Survey.

It can be seen that Mr. Yost is no stranger to Texas and that he has a full knowledge of the water situation in Texas. He should be extremely capable in his direction of the Geological Survey's water resources programs in Texas.

2. *Require both flowing and non-flowing wells to be so constructed and maintained as to prevent waste of groundwater through leaky casing, lack of casings, pipes, fittings, valves or pumps, either above or below the surface.*¹¹

All these five states follow this same pattern, and for the most part, they do not concisely define waste. Thus it can be seen that under these broad provisions much discretion is left to implementing officials.

On the other hand, Colorado, Oregon, South Dakota, and Utah have widely varied statutes, but again they are all very general, leaving much discretion in their application. Colorado's statute is an example of this group:

(2) *Each division engineer shall order the total or partial discontinuance of any diversion is not necessary for application to a beneficial use. . . .*¹²

And, as can be seen again, these four states, for the most part, do not define waste of underground water except in such phrases as "beneficial use."

Express Provisions

But, lastly, both Oklahoma and Texas have provisions for prevention of waste which seem to be very comprehensive, even though they still leave some discretion as to interpretation. Oklahoma has relatively wide definitions of waste in its statutes,¹³ but their provisions still talk in terms of "beneficial use" of the underground water, without really defining such use. On the other hand, although the Texas statutes use the term "beneficial purpose" in defining wasteful use of water¹⁴ they do go a bit further and put a definition on this otherwise hazy phrase.¹⁵

Therefore, it can hopefully be seen from these various statutes that waste of underground water, or for that matter, waste of any water, is not a thing capable of universal definition, but is dependent, rather, on the value judge-

ments of the various states according to the gravity of their water problems.

¹Eg. Rev. Codes Mont. § 80-2913
²Colo. Rev. Stat. § 148-18-3
³Wyo. Stat. § 41-130
⁴Id. § 41-131
⁵Utah Code Ann. § 73-7-1
⁶Id. § 73-7-2
⁷Ann. Colo. Codes, Water Code § § 60000 to 60049
⁸Rev. Stat. Neb. § § 46-614 to 46-634
⁹Id. § 46-614.1
¹⁰Tex. Civ. Stat. Ann. Art. 7880-3c
¹¹Ariz. Rev. Stat. Ann. § 45-319
¹²Colo. Rev. Stat. § 148-21-35
¹³Okla. Stat. Ann. Tit. 82 § 1002
¹⁴Tex. Civ. Stat. Ann. Art. 7880-3c, A(6) (b)
¹⁵Id. Art. 7880-3c A(7)

*Mr. Thad Floyd is a second-year student at the Texas Tech University School of Law. Mr. Floyd has been working for the District as a legal clerk for the summer.

**TAILWATER
RETURNED
IS
\$\$\$
EARNED**



Shown above is one of the District's field pickups parked at the Lubbock office. The District has been experimenting with a new look for the back of its vehicles, with them carrying slogans such as the one above advertising water conservation.

Irrigation Aids To Stabilize Economy

By JOHN SEYMOUR

The importance of irrigation to the maintenance of a stable economic picture for the High Plains area was recently pointed out once again. Pioneer Natural Gas Company was forced to reduce its supply of natural gas to Lubbock Power and Light in order to maintain an adequate supply of natural gas to the many irrigation engines in the High Plains.

The drought or near drought conditions which the High Plains has been experiencing has resulted in the irrigation pumps and engines having to run on an almost continuous basis this summer. This has meant an increased requirement for natural gas which is the primary energy source for the engines. To avoid having to shut many wells down due to a shortage of natural gas, it was decided that Lubbock Power and Light's supply of natural gas should be reduced since they have a backup capability to use diesel fuel for their production of electricity. It was believed that to shut the wells down during this critical irrigating period would affect the yields and thus have a damaging effect on the economy of the area.

Constant Yields

There is no question that the area's constantly high yields of agricultural crops is due to the fact that irrigation permits consistent production year after year regardless of whether there is a drought or not. Even in years when rainfall is inadequate, the farms in this area continue to produce without a corresponding drop in yields.

This constancy of production due to irrigated agriculture means that the economy of the High Plains does not

have a depressed condition every time that there is inadequate rainfall. The ability to produce at a reasonably static level has an effect on the economy which goes far beyond the High Plains. For instance, there is no reduction in the need for transportation of the crops which are produced in this region when the rainfall drops below normal. Train cars are not empty in years when there is little rainfall and full in years when there is abundant rain. The railroads are able to have a relatively constant haul of products from this area. Also, the grains from the area which are being transported overseas and which leave the Houston seaport flow at about the same rate each year, and thus, there is not a reduction in jobs for loading the grain in Houston merely because there was inadequate rainfall on the High Plains.

Importance to Cattle Industry

Mr. F. A. Rayner, Manager of the High Plains Underground Water Conservation District No. 1, has often pointed out the stabilizing effects on the economy of this area's ability to produce at a constant level. At a session of the Water Committee of the West Texas Chamber of Commerce, which was meeting in Amarillo for its annual convention last April, Mr. Rayner expressed his view that cattle feeding on the High Plains should have the effect of stabilizing to a certain extent the price of cattle. He told the area's water leaders who were assembled there, that, historically, cattle prices varied with the amount of rainfall. He pointed out that when there was ample rainfall, prices were high, but when the ranges dried up due to a lack of rainfall, the rush of cattle to the market resulted in a low-



Cliff Thompson, a long time staff member of the High Plains Underground Water Conservation District No. 1 stands near an irrigation well being supplied natural gas as the energy source for its engine. Irrigation wells such as these have permitted the growth of the highly stable economy which exists on the High Plains. In the background can be seen a large cattle feed lot. The growth of this new industry in the High Plains has been a result of the consistently high yields of grains due to irrigation.

ering of the price for cattle. He went on to say that as more and more cattle are being fed in feedlots on the High Plains from grain grown here, the effects of drought should be blunted as they affect cattle prices. Since there is a constant supply of feed due to the use of irrigation in the vicinity, there is no need for a rush of these cattle to market because of the drying-up of

ranges during inadequate moisture years. Cattle, he said, would not be forced on the market when the price was down. He stated that this should have a stabilizing effect on the entire country's cattle market and help to stabilize it. This, then, is one more way in which the High Plains irrigation helps to stabilize the nation's economy.

CALIFORNIA WATER TOUR

There will be a California water tour for High Plains residents from August 22-26, 1971. The tour, which is being presented by Water, Inc., will be of the California Aqueduct along with a tour of California's Central Valley.

Those on the water tour will leave Lubbock and Amarillo on August 22 for Sacramento by airplane. Once in

California, buses will be provided for the members of the tour which will include seeing parts of the California Water Project from Sacramento to Los Angeles. The tour will begin with an inspection of the Oroville Dam across Feather River. That dam is the highest in the United States and is at the beginning of the California Water Project. The canal itself will be inspected at many points along with its

lateral systems. The members of the tour will be able to discuss with farmers in the Central Valley what the aqueduct has meant to them and how it operates.

The Tehachapi Crossing or "Big Lift" should be a highlight of the tour. This is where the water of the Feather River has been channeled from hundreds of miles from the north and has to be pumped up the side of the mountains for the crossing into Southern California. This system requires gi-

gant pumping stations and many miles of tremendous tunnels.

The tour should give those on it a chance to see how a project operates which imports water. While Texas, New Mexico, and Oklahoma requirements and situations are different in many respects from those of California, the tour should provide those taking it a chance for an over-view of the basic difficulties and solutions for moving large volumes of water great distances.



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

Volume 17—No. 8

"THERE IS NO SUBSTITUTE FOR WATER"

August, 1971

WATER IMPORT STUDIES

By F. A. RAYNER

Congressman George Mahon, Chairman of the Appropriations Committee of the U.S. House of Representatives, recently announced that an appropriations bill recently passed out of the Appropriations Committee contained \$910,000 for the continuation of the ongoing West Texas—Eastern New Mexico water import studies.

History of Studies

Chairman Mahon's interest in sponsoring efforts to secure a water supply for West Texans commenced in 1934, during his campaign for election as the first Congressman to represent the newly created 19th Congressional District in Texas.

Because of the drought of the early 1930's, the subject of water most naturally caught the attention of the aspiring Mahon. Mr. Mahon has noted that, "in 1934 we had very little rainfall and a lot of politics." During his campaign travels he was repeatedly exposed to the concept that a vast river, fed from the Rocky Mountains, underlaid the entire Texas High Plains, and that the area's groundwater supply was inexhaustible.

The inception of the "inexhaustible water supply theory" probably had its roots with the early pioneers migrating to this area. Almost without exception, a well could be drilled at any site chosen by the early settlers and it would supply pure cool water for all of their domestic, stock, and small vegetable gardens and tree watering needs. However, these minor needs predated the development of the large capacity irrigation wells, and this area's resultant, mammoth irrigation economy based upon groundwater pumpage.

Shortly after being sworn in, on January 3, 1935, as a "freshman" Congressman, Mahon sought the counsel of respected hydrologists, such as the late W. N. White of the U.S. Geological Survey. Mr. Mahon was soon convinced that only a study of the water situation in the High Plains area would prove or dispel the "unlimited water supply" concept. Therefore, he actively supported the funding of ongoing groundwater data collecting studies. These studies, completed in the late 1930's and the early 1940's consisted only of inventories of wells and springs—they did not contain an analysis of these data, and, therefore, did not summarize the magnitude of the area's groundwater supplies. For



REPRESENTATIVE GEORGE MAHON

this reason these studies, to be dubbed the WPA reports, because they were funded by the Federal Public Works Administration and the Works Progress Administration, were not widely used or appreciated by the general public.

Studies Invaluable

Although lacking the embellishment of analytical text, history has proven that the WPA studies are essential to an accurate comprehension of this area's groundwater supplies.

Most present day scientists would find it mental drudgery to collect and compile the wealth of basic data published in the WPA reports; yet these same scientists could only propose theories of the effects that the large scale well development has had on this area's groundwater reservoir, if it were not for the water-level and water-quality history provided by the 1930's studies.

Since these studies were, for all practical purposes, completed before the development of irrigation wells and the resultant large scale pumpage, they exhibit conditions before man's influences commenced altering the aquifer.

It is this history that has both proved and disproved the original concepts of the occurrence of groundwater in this area. These studies were ultimately used to show that the area was underlain by a mammoth aquifer, containing hundreds of millions of acre feet of water. However, a con-

tinuing program of the annual measurement of the depth to water in selected wells—a program that was implemented, in part, as a result of the WPA studies — has unequivocally shown that this groundwater supply is not inexhaustible, in fact, that it is being depleted.

Import Proposed

After serving nearly ten years in the Congress, and appraised of the records of the (then minor but discernible) decline of the water level in the aquifer, and recognizing the lengthy time necessary to initiate Congressional action on natural resource appropriations, Mahon initiated the original efforts to try to get studies made of the possibility of importing water from the Missouri River Basin to the High Plains area.

Mr. Mahon's proposal to study the possibility of mass interbasin transfer of water was premature to the mood of Congress. Congress being preoccupied with the needs of World War II, Mahon was unable to persuade his colleagues to accept the need for funding water import studies.

Some 22 years later, and now the Chairman of the Appropriations Committee, Mr. Mahon persuaded Congress to recognize the nation's need for the consideration of interbasin transfer of water. An appropriation of \$200,000, for the fiscal year 1967 (July 1966 to July 1967), was awarded to Bureau of Reclamation, U.S. Department of the Interior, to commence a preliminary study of the possibility of transporting surplus surface water from the lower Mississippi River to the High Plains area.

As a result of the Chairman's efforts, additional sums of \$200,000 each were awarded to the Corps of Engineers and the Bureau of Reclamation during the fiscal year 1968; \$425,000 and \$467,000 each during fiscal year 1969; \$450,000 and \$555,000 each during fiscal year 1970; \$700,000 and \$545,000 each during fiscal year 1971; and \$470,000 and \$440,000 each have been appropriated for fiscal 1972. To date, \$2,407,000 and \$2,245,000 each has been appropriated and/or recommended for appropriation for the import studies, for a total of \$4,652,000.

In addition to the funds provided to the Bureau and Corps for the import studies; Congress also provided the

—continued on page 2 . . . WATER IMPORT

FIELD DAYS ON HIGH PLAINS

September will see two agricultural research stations located on the High Plains hosting annual field days. Both the High Plains Research Foundation at Halfway, Texas and Texas A&M University Agricultural Research and Extension Center at Lubbock, Texas will be having open houses including general and special tours, displays, exhibits by dealers and manufacturers of farm equipment and supplies, and conferences with agricultural specialists. The latest research and knowledge regarding agricultural procedures and products of this geographic location will be the focal points of both field days. The public in general and those individuals engaged in farming and agricultural related endeavors are all cordially invited to attend both of these events.

The High Plains Research Foundation, which has its facilities located eleven miles west of Plainview, will hold its 15th Annual Field Day activities Thursday and Friday, September 9 and 10, 1971. Field tours will be conducted both afternoons from 1:30 p.m. until 4:30 p.m.

The theme of this 15th annual pres-

—continued on page 4 . . . FIELD DAYS

ATTORNEY SEEKS FURTHER EDUCATION IN FLORIDA

John L. Seymour, who has been the attorney for the High Plains Underground Water Conservation District No. 1 for the past year, recently resigned his position in order to further his legal education. John will be attending the University of Miami, School of Law. He expects to be there for about one year before receiving his Master of Laws Degree in Ocean Law.

Mr. Seymour joined the District in mid-September, 1970; following his graduation from the School of Law at Texas Tech University. While employed by the District, John established himself as an ambitious young attorney in the field of water law.

In addition to his other duties, John was editor of *The Cross Section* for the past eight months (January through August, 1971).

Although the services of Mr. Seymour will be missed, the District wishes him the best in his schooling and in other future endeavors.



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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.



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WATER CONSERVATION SYSTEMS ON INCREASE

by ALBERT W. SECHRIST

Ecology, economics, concern, conservation, awareness, or whatever the reason, apparently the farmers of the High Plains area are becoming more and more aware of the use and depletion of the underground water resources in the Ogallala formation. This fact is borne out by surveys made by the personnel of the High Plains Underground Water Conservation District during 1968 and 1971. During each of these years, the District personnel made a survey of the tailwater return pits and the playa lake modification installations in Parmer County. During the 1968 survey the District found 186 tailwater return pits and 121 lake modifications within Parmer County. Since that time the number of both pits and lake modifications has increased quite rapidly. There are now 291 tailwater return pits and 168 lake water modifications within the same area. This three year increase of 105 tailwater return pits and 47 lake modifications indicates that the farmers are becoming aware of the advantages and the economics of both pits and lake modifications. In other words, they are becoming conscious of the water that is on the surface and the advantages of using this water rather than pumping additional water from the underground formation.

The map on page 3 of this issue of *The Cross Section* shows the locations of each of the installations which were identified by the 1971 field survey. Each of the circles represents a playa lake which has been modified and either has a pumping unit installed or is set up for a pumping unit or the pumping unit has been temporarily removed. Each of the triangles represents a tailwater return pit. Each of the pits either contains a pumping plant on the site or had the pumping plant temporarily removed at the time of the field survey.

Various types of fuel and energy are used as a source of power to pump water from both the tailwater pits and lake modifications. It is interesting to note that natural gas, electricity, and

liquefied petroleum gas are used as sources of energy for these units. Of the 291 tailwater return pits, 62 of these are using natural gas as fuel, 133 are using electricity, 80 are using L. P. gas, and 17 of the tailwater return pits did not have a type of power identified during the field survey. One of the tailwater return pits which appears to be particularly valuable was found to have two natural gas powered pumping units at the time of the field survey. Of the playa lake modifications, 51 of the installations were powered by natural gas engines, 32 by electric motors, 80 by L. P. gas engine, and 7 did not have the type power identified during the survey.

Although it is impressive to note that the some 459 installations within Parmer County being used to conserve irrigation water, this is by no means a solution to all of the problems and all of the waste. It might be noted that these installations average less than one-half installation per square mile. This means that there is a long way to go to conserve all of the water that should be conserved. Although each of these installations can be used to return water from more than one irrigation well, there are over 3,400 irrigation wells in Parmer County. This would mean that each return pit and lake modification installation could serve an average of 7 irrigation wells. Most pits or lake modifications have been designed to serve fewer wells than this figure. This means that there is still considerable need for additional conservation installations of this type. Therefore these statistics indicate that a large number of farmers are not yet conserving all of the water that they could by using return installations.

Numerous studies have been made in the High Plains of Texas to show the benefits of tailwater return systems. These studies show that a considerable amount of water can be saved or recovered by using return systems. This is one way of extending the life of the aquifer—possibly for quite a few years. Studies have

WATER IMPORT . . . continued from page 1

Corps \$500,000 in fiscal year 1970; \$676,000 in fiscal year 1971, and \$758,000 in fiscal year 1972, for a "Title I Framework Study," a comprehensive study of the water supply, water needs, economy and other conditions in the seven-state lower Mississippi River Basin area. This study will determine the magnitude and timing of the water surplus to the Lower Mississippi River Basin needs.

The findings of the Comprehensive (Mississippi) River Basin Study will be incorporated in the import studies. Reports detailing the findings of all of the import and related studies are scheduled to be released in fiscal 1973.

Interim Findings

An interim import study report, released by the Bureau in May 1968, found that: 1) it was physically feasible to transport water from the Lower Mississippi River, in the order of magnitude of 16.5 million acre feet annually, to the High Plains area, if such

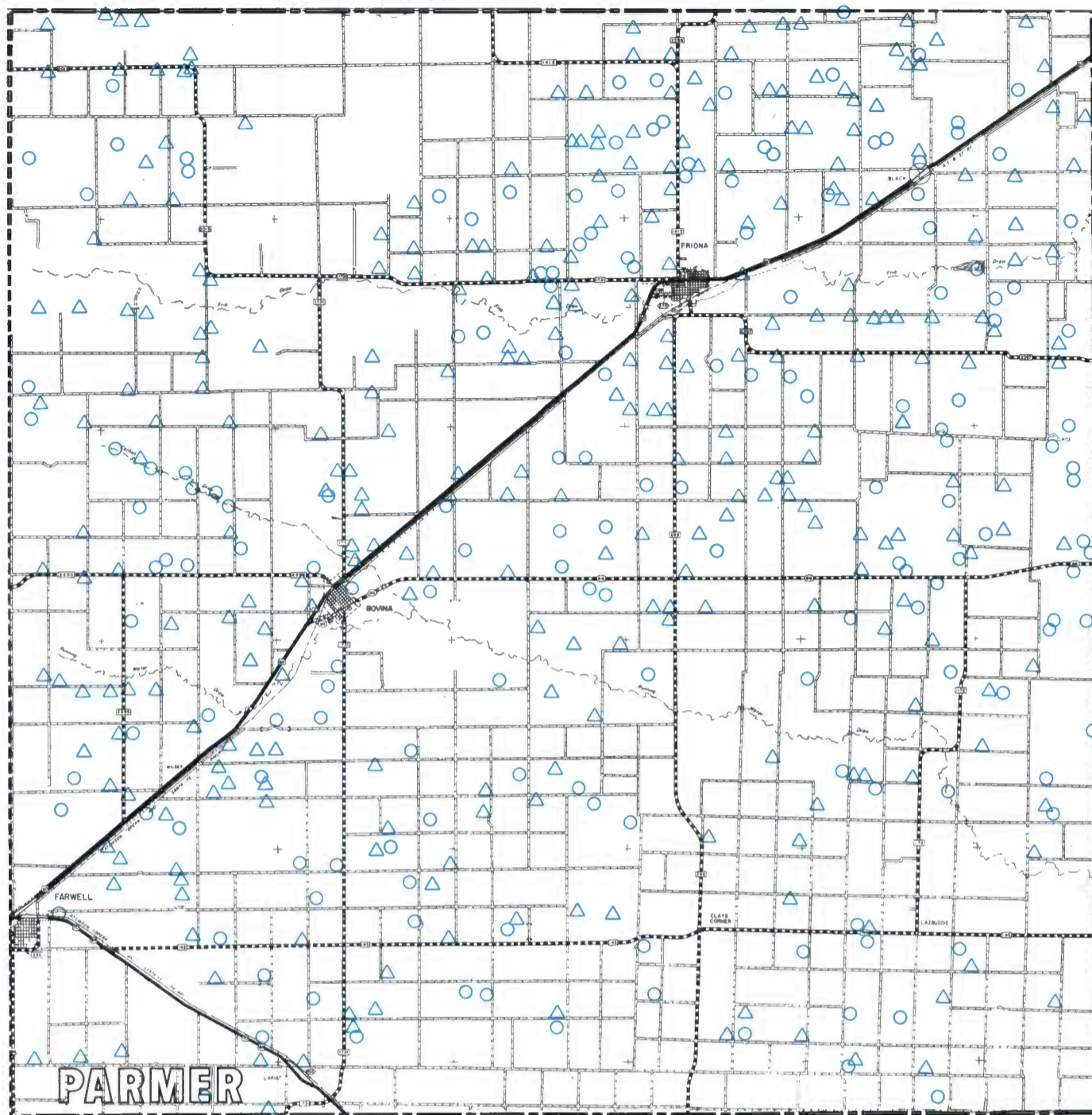
water was found to be surplus to the Basin's needs (this report did not determine what water was surplus to the foreseeable needs of the Basin of origin); 2) regardless of the route of transport, the cost of the imported water now exceeds the High Plains irrigators' ability to pay the total costs for same; 3) the economic benefits to the non-farm elements of the study area are large and appear to be sufficient to warrant payment by those non-farm elements of costs of importing water in excess of the irrigators' ability to pay; 4) the costs of delivering imported water could be reduced and the economic feasibility could be enhanced by incorporating into the project purposes other than water supply.

Whatever the conclusions of the ongoing import studies, history will no doubt record the farsightedness of their conception. Their implication and use in future national water schemes will record their benefits.

shown that as much as one-fifth of the water can be saved by using a tailwater return system. Saving one-fifth of the water would extend the life of the aquifer many years. Since the economy of the entire area is based on agriculture and on irrigation of agricultural crops, it is easy to understand that any extension of the life of the aquifer could be beneficial to all of us.

As important as the extended life of the aquifer could be, an even more important point, especially to the present farm operator, is the fact that water recovered by tailwater return system can be the cheapest water he can use. When all factors of cost are taken into consideration, the cost of pumping irrigation water can be quite high in the High Plains of Texas. The cost of pumping water from a tailwater return system can, in many cases, save the farmer a considerable amount in his overall operating cost each year. The initial cost of a tailwater return system can be recovered in a much shorter period of time than for an irrigation well. In many cases this is a new source of water which has not been considered in the past. It just might give a farmer that particular edge which he needs to boost his farming operation from a marginal to a highly profitable venture.

In many parts of the High Plains the irrigation for the 1971 calendar year is over, although there will be some irrigation in areas of the Plains later this year. Each farmer is encouraged to look at the benefits of tailwater return systems and playa lake recovery systems in order to aid his productivity in the coming years. In making plans for improvements prior to the next irrigation season, the benefits of surface water recovery systems should be examined. The old adage, "Ask the man who owns one," can be quite important here. The map shown indicates that each farmer in Parmer County, although he may not have a pit of his own, is not far from a neighbor who has one. Therefore, ask your neighbor—he can tell you the benefits of a tailwater return system. Many of these people who have tailwater return systems have told us over and over that once they installed it, they would not be without it.



**TAILWATER RECOVERY SYSTEMS
AND
PLAYA LAKE MODIFICATIONS
1971**

LEGEND

- △ TAILWATER RECOVERY SYSTEMS
- PLAYA LAKE RECOVERY SYSTEMS

SCALE 1 MILE



Shown is a newly constructed tailwater return system in Parmer County. Tailwater pits of this type have proven to be a very good means of conserving ground water.



In the photo above the playa lake's water is seen being pumped to be used on the crops of this farm. This particular playa lake has three pumps withdrawing its water. Using this water helps to save the underground water.

CLOSE THOSE ABANDONED WELLS

By ALBERT W. SECHRIST

The above words are a story that *The Cross Section* has been trying to tell for quite some time now. *The Cross Section* has shown you pictures of abandoned and uncovered wells, told of their dangers, and quoted the law that says a person must close an abandoned well. After all of this encouraging, it is still possible for the District personnel to go out in the field and find abandoned wells setting with the top of the hole wide open, easily a hazard to anyone walking in the vicinity.

Pictures in this issue of *The Cross Section* show that the District "practices what it preaches." The District maintains a network of some 850 observation wells throughout the area. These wells are used to measure the depth to water in January of each year. For the most part, the wells used as observation wells, are producing irrigation wells belonging to the farmer. Each of these wells has a tag identifying it as an observation well and is measured each year for the District's records and for the income-tax depletion records. In order to operate this program, the District employees continually check on the irrigation wells to see that they are operational and whether it will be possible to measure the depth to water in the coming season.

During a recent check, it was found that one of the observation wells was no longer in use as an active producing well. The pump and equipment had been removed and the well was covered simply with a wooden rock held in place by a sizable rock. This, of course, does not meet the rules and regulations of the District for closing

abandoned wells. However, in this case the farmer had intentionally left the well open so that it could be maintained in the District's observation well program. Upon reviewing the records of this particular installation, it was found that a long-time record had been maintained of the water level in this location. Rather than replace this observation well with a newer installation some distance away, it was determined that it would be beneficial for the District to continue to measure the water level in this particular well. In agreement with the well owner, the District capped this well.

As can be seen in the pictures, a steel casing with a flat steel plate welded on the top of it was constructed and placed inside the casing of the existing well to cover the installation. The cap that was manufactured for this particular well has a 14-inch steel casing, three feet long, welded to a 1/4-inch steel plate. This cap, weighing in excess of 120 pounds, when placed in the well serves as a proper covering for the abandoned well. A small 1/2-inch diameter hole has been cut in the center of the plate in order for the District to continue measuring the depth to water.

The costs of capping observation wells in this manner is far outweighed by the savings realized in perpetuating the continuity of the historically important water-level records.

If you have an open well on your property, please close that well before some tragedy occurs. If you know of an open well on some nearby property, ask the farmer to close it—if he refuses, there are both State laws and District rules which specifically provide for the elimination of open wells. These rules and regulations are not only for the protection of the public, but for the protection of the landowner.



The observation well shown above was improperly covered as may be seen before it was properly capped. Wells which are uncovered or improperly covered as this one should be corrected by closing and capping the well in an approved manner.



Shown in this photo is the same well that can be seen in the photo at the top of this page. It has been capped in such a way that it is no longer a danger. The heavy steel plate has a pipe welded below it which is inserted into the well, thus preventing accidental or easy removal.

15th ANNUAL FIELD DAYS

High Plains Research Foundation

"How We Can Stretch
Our Existing Water Supply"

Thursday and Friday, September 9, 10
1:30-4:30 p.m.

11 Miles West of Plainview

FIELD DAYS . . . continued from page 1

entation will be, "How We Can Stretch Our Existing Water Supply." All information given in lectures and talks at the various field tour stops and a special indoor program will emphasize the aspects of irrigation conservation.

The guest speaker for Field Day activities Friday will be John C. White, Texas Agriculture Commissioner.

The 62nd annual field day and open house for Texas A&M University Agricultural Research and Extension

Center at Lubbock will be held Tuesday, September 14, 1971 from 1:00 to 5:00 p.m. The field day, which has as its theme "Research for Progress," will be held at A&M's facilities located 7 1/2 miles north of Lubbock.

Special tours will be featured on several subjects of vital concern to High Plains agriculture including grain sorghum varieties, weed control, narrow row cotton, and verticillium wilt control.

Both of these field days should be educational, interesting, beneficial, and above all they should provide a good time for all those attending.

62nd ANNUAL FIELD DAY AND OPEN HOUSE

TEXAS A&M UNIVERSITY
Agricultural Research and Extension
Center at Lubbock

RESEARCH FOR PROGRESS

Tuesday, September 14, 1971
1:00-5:00 p.m.

7 1/2 Miles North of Lubbock

THE Cross SECTION

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

Volume 17—No. 9

"THERE IS NO SUBSTITUTE FOR WATER"

September, 1971



C. R. Baskin, Chief Engineer, and R. C. Peckham, Head of the Groundwater Division, Texas Water Development Board, receive the Parmer County report from F. A. Rayner.

PARMER COUNTY STUDY COMPLETED

An extensive study of the groundwater conditions in Parmer County, that was commenced in February of this year, was completed during August.

The report, "Groundwater Conditions In Parmer County, Texas"—containing nearly 200 pages of text; 151 pages of appendices (containing 124 pages of well tables); 16 tables (three in the appendices); 53 figures (four in the appendices); and 17 large maps (plates)—detailed the findings of this study. The table of contents of this report is reproduced on page four of this issue of *The Cross Section*.

In accordance with the provisions of the contract between the Texas Water Development Board (Board) and the District, the Parmer County report was delivered to the Board for their publication (see, *The Cross Section*, February 1971). Due to the Board's backlog of reports awaiting publication, the Parmer County report is not expected to be published for several months. Under the provisions of the Board-District contract, the Board provided the funds (\$30,000.00) for the Parmer County study, and the culminating 349 page report.

Some Study Findings

Parmer County is probably the most extensively cultivated and (groundwater) irrigated county in Texas. Approximately 84 percent of the county's 546,400 acres are cultivated. Nearly 60 percent of the county's land surface is being irrigated. This represents 4

percent of all the irrigated land in Texas.

For all practical purposes, the county's entire economy is based upon irrigated agriculture. The average farm size is 700 acres; and the county's average annual income approaches \$78,000,000.

Water Supply

The county's entire water supply is contained in the aquifer in the Ogallala formation. The Ogallala formation extends from the land surface downward to the top of the Triassic age rocks (the red beds). There is no reason to believe that any appreciable groundwater can be developed from any rocks below the base of the Ogallala formation. The Ogallala formation ranges in thickness from less than 100 to more than 525 feet.

The measured depth to water in wells (depth to the water table) ranges from about 150 to nearly 330 feet, for an average of slightly less than 240 feet below land surface. During the last nine years, the average depth to the water table in the Ogallala aquifer has increased over 34 feet.

As of 1970, the Ogallala aquifer beneath Parmer County ranged in thickness from less than 25 to more than 275 feet, and contained over 12 million acre feet of water. Seventy percent of the county's water supply is contained in the part of the aquifer ranging from 150 to 250 feet in thickness; which underlies 53 percent of

—continued on Page 3... PARMER

National Water Commission To Visit The High Plains Area

The National Water Commissioners will be visiting Lubbock on October 5 and 6.

The Commission was created by Public Law 90-515 (Senate Bill 20, 90th U.S. Congress, September 1968). The seven Commissioners — Messrs. Charles F. Luce (Chairman), New York, N. Y.; Howell Appling, Jr., Portland, Oregon; James R. Ellis, Seattle, Washington; Roger C. Ernst, Phoenix, Arizona; Ray K. Linsley,

Palo Alto, California; James E. Murphy, Kalispell, Montana; and Josiah Wheat, Woodville, Texas — were appointed by the President of the United States. Theodore M. Shad, Arlington, Virginia, is the Commission's Executive Director.

The Law provides that the Commission can be funded by appropriations not to exceed \$5,000,000, and that the

—continued on Page 3... NATIONAL

The Importance Of Agriculture In The Water District

by CARY D. PALMER†

Farm income totaled \$759 million in 1970 in the fifteen-county area of the High Plains Underground Water Conservation District No. 1. This total amounted to 21 percent of the Texas total farm income and is based on reports recently published by the Texas Crop and Livestock Reporting Service. There are ten publications — Field Crops, Cotton, Small Grains, Vegetables, Fruit and Pecans, Livestock, Dairy, Poultry, Cash Receipts, and Prices — available upon request.

These county statistics were made possible by the Texas Legislature. Starting with the fiscal year 1967-68, they responded to the many requests for county data with an appropriation to the Texas Department of Agriculture for the operation of an annual county statistical program for Texas. This program is conducted in cooperation with the Statistical Reporting Service of the United States Department of Agriculture.

Need For Estimates

Although the Texas county estimate program has a short history — only four years — the crop and livestock estimates were started by the U. S. Department of Agriculture more than a century ago to help farmers judge the value of their production. In those days, farmers were greatly handicapped in dealing with buyers who almost always had more, later, and better information on market conditions.

The scope of agricultural estimates has increased as the demands for data

—continued on page 2... IMPORTANCE



John C. White and his wife Wynell

WHITE COMMENCES WATER CRUSADE

Texas Commissioner of Agriculture, John C. White, speaking at the conclusion of the High Plains Research Foundation's 15th annual field day (on September 10th), promised to commence as a crusader for the water needs of agriculture.

The Commissioner noted that there were oceans of confusion surrounding the Texas Water Plan, and that divided leadership was at fault. He noted that the end result will be a shortage of water.

White stated that the people in this area had . . . "the most to lose the soonest" . . . and that we must become the evangelists for the planning to supply this area's water needs. He noted that we have repeatedly told ourselves about our water situation, now we must convince others of our needs; but, that the State can not get on with a water development program until we are willing to pay for it.



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

1628 15th Street, Lubbock, Texas 79401
Telephone 762-0181

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District Office at Lubbock

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IMPORTANCE . . . continued from page 1
have grown. Data are now collected on nearly 200 crops and livestock products, and issued from Washington, D. C. and the State offices in hundreds of reports each year. Agricultural estimates also have become widely used by nonfarm businesses and Government. Nevertheless, the original mission of agricultural estimates — to help farmers bargain more effectively — remains intact.

As an example of the Government's providing information to meet the needs of agriculture, in the early 1960's when cattle feeding started in earnest on the Texas High Plains, Texas cattle feeders saw the need for timely and regular information on numbers of cattle on feed, placements and marketings. Due to their requests for information, the Texas Crop and Livestock Reporting Service has provided a monthly cattle on feed report since January 1964. These monthly reports reflect the tremendous growth of cattle feeding in the High Plains area of Texas. In the last three years, marketings of fed cattle from the High Plains Underground Water Conservation District No. 1 fifteen-county area have nearly doubled, increasing from 831,000 in 1968 to 1,457,000 in 1970. These fifteen counties marketed 46 percent of the Texas total marketings of fed cattle in 1970.

Who Helps

The Texas Crop and Livestock Reporting Service publications and releases of current information on supply and prices are possible only because of the help of others. Most important is the contribution made by some 60,000 farmers and ranchers reporting by mail and 18,000 by telephone and personal interview showing the numbers of livestock and crop acres and production from their own farms. In addition, some 5,000 agri-businessmen report by mail and some 1,000 by telephone or personal interview each year.

The county agents make a most helpful contribution in furnishing a weekly crop-weather report for their county and in helping the Crop Reporting Service with lists and local information.

In addition to 40 United States Department of Agriculture and Texas Department of Agriculture employees at headquarters in Austin who run the data through the computer, summarize and analyze the reports, there are some 125 part-time enumerators located in all sections of the State who gather information from farmers by telephone and by personal interview.

Helpful information is received and adds to the accuracy and completeness of the reports from the ASCS (both State and county), Commodity Credit Corporation, Federal Census, Weather Bureau, Market News, Inspection Service, and the Animal Health Commission.

How Estimates Are Made

The Texas county statistical program for agriculture is based on probability multiple frame sampling. This means that questionnaires are mailed to a sample of farmers followed by interviews of a subsample of those that do not respond by mail. Also, over the State there are 850 randomly selected segments of land on which a complete enumeration is needed to measure the amount of agriculture represented by those not on the mail list. These segments of land are about 1 mile square in cropland areas and considerably larger in range areas and on the average include 4 to 5 farms.

In June 1970 approximately 37,400 questionnaires were mailed to a randomly selected sample of Texas farmers and ranchers. About 50 percent of these farmers and ranchers returned the questionnaire before a subsample of 5,967 non-respondents was selected for telephone and personal contact.

The fifteen-county area includes about 11,000 farms. As an example —continued on page 3 . . . IMPORTANCE



The above photograph was taken in the Oroville Dam powerhouse; which is located several hundred feet below the mountain at the south end of Oroville Dam. The room for the power plant was excavated out of solid, metamorphosed rock (shown in the background). Shown in the photograph are (left to right), Maurene Schoenrock, Alice Mitchell, Ross Goodwin, Selmer Schoenrock, Chester Mitchell, Cap Goodwin, Arland Schneider (U.S. Dept. Agri., Bushland Research Center), and Charles Von Berg (California Department of Water Resources). The District Directors were in California to attend the 8th Biennial Conference On Groundwater—"Changing Concepts in Ground Water Management", at the University of California at Davis, California. The Oroville Dam tour was provided by the California Department of Water Resources after the Davis conference. The Directors were very much impressed by the millions of dollars expended by the Department for environmental enhancement; particularly for the increased propagation of two species of fish.

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.

PARMER . . . continued from page 1

the county. Within the area where the aquifer ranges from 175 to 200 feet in thickness, 18,000 acre feet of water are stored beneath each 640 acres.

Well Development

There were 127 irrigation wells in Parmer County in 1947. As of April 1, 1970, there were 3,433 irrigation, 13 municipal, and 25 industrial supply wells in the county.

Approximately 37 percent of all large capacity wells drilled in Parmer County since 1953 did not penetrate the entire Ogallala aquifer. During 1970, about 17 percent of the wells were not drilled to the red bed (penetrating only part of the aquifer). Nearly 74 percent of the wells are equipped with 8-inch or larger pumps. The practice of drilling only partially penetrating wells, and the predominance of the large pumps, attests to the aquifer's relatively high capacity to yield water to wells.

Aquifer Depletion

Over 99 percent of the water pumped from the aquifer annually is used for irrigation.

Since 1940, nearly 5 million acre feet of water has been extracted from the aquifer. This represents nearly 29 percent depletion of the aquifer during the last 30 years. However, nearly all of this depletion has taken place in about one half of this time (during the past 15 years). Over 80 percent of the county has experienced depletion ranging from 50 to 100 feet. Beneath each 640 acres experiencing from 75 to 100 feet of decline of the water table, 8,400 acre feet of groundwater has been depleted.

At present, approximately 72 percent of the county is experiencing from 3 to 5 feet of dewatering annually. The average rate of decline of the water table approaches 4.5 feet annually.

Storage Space

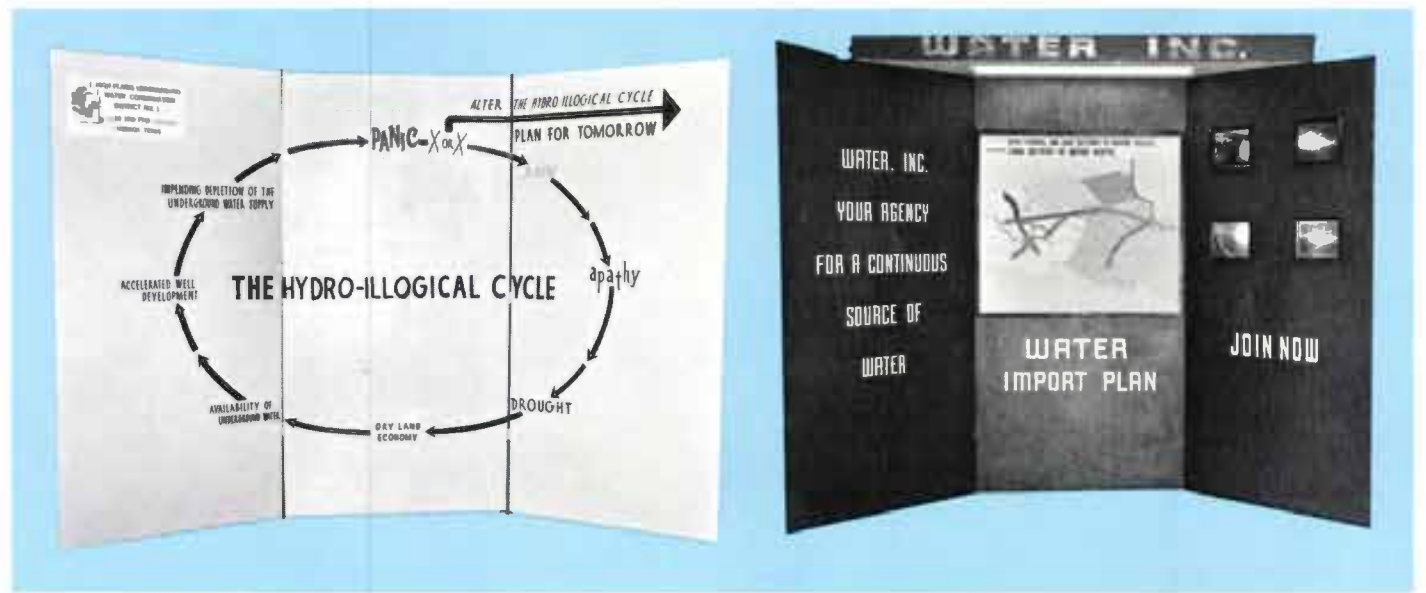
Because of the relatively deep depth to water, the subsurface storage space beneath Parmer County approaches 19 million acre feet (between the land surface and the water table). If the first 50 feet below the land surface is set aside as a buffer zone (to assimilate wastes), there still remains nearly 15 million acre feet of available subsurface space for the storage of (surface) water. In the future, this may prove to be one of the county's prime assets.

As the result of the present rate of decline of the water table, nearly 340,000 acre feet of proven storage space is being created annually. Since 1940, nearly 5 million acre feet of proven, high quality space for the subsurface storage of water has been created by aquifer dewatering.

The water in the Ogallala aquifer beneath Parmer County is of relatively high, and uniform, quality. The aquifer is protected by the mass of overlying, porous but unsaturated rocks of the Ogallala formation.

Summary

The groundwater supply beneath Parmer County probably exceeds that of any comparable size county within the District. However, in view of the fact that the accelerated irrigation development of Parmer County is, by comparison to other Southern High Plains counties, in its infancy; the extent and rate of depletion of the aquifer are notable.



The photographs above show the joint Water Inc.-Water District exhibits at the Panhandle South Plains Fair, Lubbock, Texas.

NATIONAL . . . continued from page 1

duties of the Commission shall be:

Sec. 3(a) The Commission shall (1) review present and anticipated national water resource problems, making such projections of water requirements as may be necessary and identifying alternative ways of meeting these requirements — giving consideration, among other things, to conservation and more efficient use of existing supplies, increased usability by reduction of pollution, innovations to encourage the highest economic use of water, interbasin transfers, and technological advances including, but not limited to, desalting, weather modification, and waste water purification and reuse; (2) consider economic and social consequences of water resource development, including, for example, the impact of water resource development on regional economic growth, on institutional arrangements, and on esthetic values affecting the quality of life of the American people; and (3) advise on such specific water resource matters as may be referred to it by the President and the Water Resources Council.

(b) The Commission shall consult with the Water Resources Council regarding its studies and shall furnish its proposed reports and recommendations to the Council for review and comment. The Commission shall submit simultaneously to the President and to the United States Congress such interim and final reports as it deems appropriate, and the Council shall submit simultaneously to the President and to the United States Congress its views on the Commission's reports. The President shall transmit the Commission's final report to the Congress together with such comments and recommendations for legislation as he deems appropriate.

(c) The Commission shall terminate not later than five years from the effective date of this Act.

The findings of the Commission are expected to influence national water development policies. *The Cross Section* welcomes the Commission to Lubbock, and pledges our assistance and cooperation with them in their very important work.

IMPORTANCE . . . continued from page 2

of the survey coverage, the January 1, 1971 livestock survey forms were sent to 25 percent of these farms. Forty-nine percent responded by mail and there was a follow-up telephone and personal interview of an additional 17 percent. So, approximately two-thirds of the farms contacted (16 percent of total farms in area) responded and were included in the statistical summaries. Due to their importance, the large farms are sampled much heavier than the small farms. Reports are received from nearly all of the farms with 2,000 plus acres of crop land; about half of the 600 to 2,000 crop land size farms; about a fifth of the farms with 150 to 599 acres of crops; and about 5 percent of the farms with less than 150 acres of crops.

The Lockup

The widely known "lockup" of the Crop Reporting Board symbolizes the care taken by the Statistical Reporting Service to protect the integrity of its estimates.

The overriding need for integrity, reliability, and impartiality in agricultural estimates is reflected in the laws, regulations, and procedures that govern the work of the Statistical Reporting Service.

Forecasts of production for corn, wheat, oranges, cotton, and soybeans are defined by law as "speculative". Since these commodities are traded in the commodity futures market, anyone having access in advance to the official forecast of production would have clear advantages.

Reports of survey data on the speculative commodities from the major producing states go through the mails in distinctive envelopes and receive special handling. When they arrive in Washington, they are placed in a special steel box that is secured with two separate locks. The key to one lock is retained in the Office of the Secretary, and the other is in the custody of the Chairman of the Crop Reporting Board.

Early in the morning on crop report day, the chairman of the Crop Reporting Board and a representative of the Secretary, under armed guard, open the box, remove the reports, and take them to the Board rooms.

While crop reports are being pre-

pared, the Board rooms are locked and placed under uniformed guard. Guards also patrol the area outside the lockup quarters. The window blinds are closed and sealed, and all telephones are disconnected. Food is sent in to the employees. There is no communication out of the area until the Board emerges to release its report to the waiting news media at the times specified by law.

The Water District Area

The fifteen-county area served by the High Plains Underground Water Conservation District No. 1 is tremendously important to the State's agricultural economy, and leads most areas in farm income, irrigation, production of crops, Government payments, and cattle feeding. Here are a few comparisons:

In 1970 these fifteen counties had 25 percent of the Texas income from crops, 15 percent of the income from livestock, and 21 percent of the total farm income. Income from cattle on feed is calculated on basis of value added.

The importance of irrigation is indicated by comparing with the Texas State total. These fifteen counties had 48 percent of the State's irrigated sorghum acres, 55 percent of the irrigated cotton, and 36 percent of the irrigated wheat.

In production terms, of the State's leading crops these fifteen counties in 1970 produced 32 percent of the sorghum tonnage, 36 percent of the cotton, 22 percent of the wheat, 96 percent of the sugarbeets, 27 percent of the corn, 73 percent of the soybeans, and 67 percent of the cowpeas. As of January 1, 1971, these same counties had 10 percent of all Texas cattle and calves, 14 percent of all hogs, and 46 percent of the cattle on feed for slaughter.

Government payments totaling \$168 million in 1970 are an important part—22 percent—of the total farm income. The feed, grain and cotton programs are the important Government program contributors to farm income.

† Agricultural Statistician, U.S. Department of Agriculture, Austin, Texas.

The statistics, both State and county, upon which this article is based, are available upon request from the Texas Crop and Livestock Reporting Service, P.O. Box 70, Austin, Texas 78767.

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Shown above is F. A. Rayner reviewing machine printed water-level hydrographs with B. C. Selden and Jack Page, Chief Engineer and Engineer respectively with the Internal Revenue Service (Dallas). Messrs. Selden and Page were in Lubbock to review part of the District's cost in water depletion, income tax allowance program.

THE Cross SECTION

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

Volume 17—No. 10

"THERE IS NO SUBSTITUTE FOR WATER"

October, 1971



Shown at their meeting in Lubbock are National Water Commissioners (left to right) James Ellis, Ray Linsley, Josiah Wheat, Charles Luce (Chairman), Executive Director Theodore Schad, Roger Ernst and James Murphy (photograph courtesy of Beeman Fisher, President of the Texas Water Conservation Association).

National Water Commission Meets In Lubbock

The National Water Commission met in Lubbock on October 5th and 6th (*The Cross Section*, September, 1971.)

The Commission consists of seven Commissioners, appointed by the President of the United States. Six of the Commissioners (see photograph above) met in Lubbock. Fifteen members of the Commission's staff also traveled to Lubbock. The work of the Commission is expected to help guide the formation of a national water policy.

Since the Commission has funded several studies for investigating the

laws and institutions for groundwater basin management, the District's testimony before the Commission concerned groundwater basin management; particularly as such management is practiced in the High Plains of Texas.

Two reports were prepared and presented to the Commission. One of these reports, a four-page report titled, *The Local Institution For Groundwater Basin Management—A Report To The National Water Commission*, has been reproduced in this issue of *The Cross Section*. The second paper, a 16 page report titled, *Groundwater*

Basin Management On The High Plains Of Texas, detailed the structure, funding, authority, functions and activities of the three active (of the total of six) groundwater conservation districts in the High Plains of Texas; with specific treatment of the High Plains Underground Water Conservation District No. 1. Both of these reports were printed, and copies of same are available upon request.

Two members of the District's Board of Directors, Chester Mitchell, President (Lockney), and Ray Kitten, Secretary-Treasurer (Slaton), also attended the Commission's meetings.

TAILWATER RECLAMATION PLANNED

The first planning meeting of an anticipated program for coordinating and coalescing research and other studies of tailwater reclamation was recently held at the District's Lubbock office.

Attending this meeting were, George G. McBee, Director; Leon New, Irrigation Engineer; Dr. Charles W. Wendt, Associate Professor; and Dr. Otto Wilke, Associate Professor, all of the Texas A & M University Agricultural Experiment Station, Lubbock; Arneal Scott, Area Conservationist, Soil Conservation Service, U.S. Department of Agriculture; Walter Y. Wells, Executive Director, Agricultural Stabilization and Conservation Service, U.S. Department of Agriculture; and Frank Rayner, Manager, High Plains Underground Water Conservation District No. 1.

The purpose of this meeting was to discuss the present activities and interests in tailwater reclamation of the several organizations represented, and to plan a program for merging the several diverse irrigation tailwater recovery and waste abatement programs presently pursued by these organizations.

The District's ultimate interest in

generating this coordinated effort is to develop a tailwater reclamation handbook. It is anticipated that the coalescing of the large amount of basic tailwater data assembled by the District over the past several years with the ongoing tailwater research being conducted by the Texas Agricultural

Experiment Station, and with the on-farm tailwater reclamation programs of the SCS and the ASCS, will hasten the solution of the design, financing and management problems associated with tailwater reclamation. The District proposes to accelerate the completion of a handbook combining the basic principles of the state of the art

—continued on page 2 . . . WATER



Attending the tailwater waste abatement planning meeting are (seated) Otto Wilke, Walter Wells, Leon New, (standing) Arneal Scott, Charles Wendt, and George McBee.

Board of Directors Meet

At their meeting on October 22nd, the District's Board of Directors established a program for the validation of water wells within the District by the adoption of the following resolution:

In order to provide for the validation of existing water wells that are subject to the rules and regulations of the High Plains Underground Water Conservation District No. 1 (hereinafter referred to as the District), it shall be the policy of this Board that a certification of validation for a well can be issued only after the location of the well and the well-head equipment of the well has been determined by field survey by District personnel, and/or designated agents acting for said District. The actual costs of such validation surveys; including salaries, expenses and overhead costs of District personnel; and/or fees and expenses of designated agents, and the appropriate overhead costs of the District; and/or fees and expenses for attorneys, and the appropriate overhead costs of the District; shall be borne by the well owner or his agent; providing that such costs to the well owner or his agent shall not exceed \$250.00 per well validated.

It is the privilege of this Board to cause to be issued a validation certificate for wells drilled and equipped within the district for which the landowner or his agent has not applied for an Application For Well Permit; or for wells not otherwise properly permitted, provided that such wells were not drilled, equipped and operated (pumped) in such a manner as to violate any other rules and regulations of the District; and provided that the costs of such well validation are paid to the District as provided by this resolution. Nothing in this resolution is intended to limit the powers of this Board to any other course of action granted within Texas Law, or within its rules and regulations, or within the prerogative of the Board.

The District's Manager is hereby directed to establish and administer the District's program for well validation; with appeals to the Manager's well validating

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

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Telephone 762-0181

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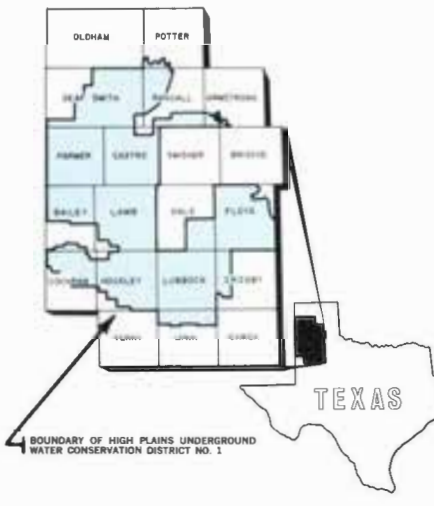
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NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

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.

WATER . . . continued from page 1

of applicable tailwater reclamation practices, that experience has demonstrated to be workable, economic and complementary to groundwater conservation.

National Program

Although the primary effort of this program is to develop a handbook to guide the installation of tailwater recovery systems in the High Plains of Texas, such a handbook will also find nationwide application — tailwater reclamation is fast becoming a necessity in both surface water and groundwater irrigated areas throughout the United States.

Concepts Must Change

The concept that a tailwater recirculation system is the second stage of a "good" water conservation program is not a practical approach to the immediate need for groundwater conservation in this area. Experience has shown that the practice of "complete," and complex, "total farm", conservation programs are not likely to find widespread adoption while there is still adequate groundwater to continue established irrigation and land management practices, that have proven to require less labor, management and are less costly.

Studies by the District, and documentation by irrigators with tailwater return systems, have shown that such systems provide a flexibility of water management not possible by other irrigation and land management schemes—this flexibility leads to major groundwater conservation. Therefore, it is the District's feeling, that the flexibility of water management afforded by tailwater return systems makes them the first stage necessity of a good water management and conservation program.

Effort Needed Now

Regardless of the position that tailwater return systems hold within the theoretical classification of what constitutes good water conservation schemes, their immediate beneficence has been amply demonstrated; and it is the position of the District that an accelerated program for promoting their widespread use is proper and overdue. Because of the relatively low cost and ease of installation of properly managed and maintained tailwater return systems, the District does not believe that their widespread use will impede the adoption of better water conservation practices, should they be forthcoming.

The second tailwater reclamation planning meeting is to be held in the District's office on November 15th.

Hardeman Appointed To TWRC



DORSEY B. HARDEMAN

On October 4th, Governor Preston Smith appointed Dorsey B. Hardeman to fill the unexpired term of Leslie R. Neal, who, on that date, due to ill health, resigned his post as one of the three Water Rights Commissioners. Neal's term was to expire on February 1, 1975.

In accordance with the provision of the Texas Constitution, Mr. Hardeman's appointment must be submitted to the Texas Senate, for confirmation, within the first ten days after the most immediate convening of the Texas Legislature.

Hardeman was born in Tennessee, and has the distinction of graduating from a college founded by his parents, and a Professor Freed—Freed-Hardeman College. He also earned a degree in Law from Vanderbilt University.

Hardeman was quick to enter public service, as an assistant to the Attorney General of Tennessee (1929-30).

On December 6, 1932, Hardeman established residence in San Angelo, Texas. He served as Mayor of that city for two years (1936-38). In 1939, he entered the Texas House of Representatives. Leaving the Texas Legislature, he enlisted in the U. S. Army in 1942. Hardeman was elected to the Texas Senate in November of 1946, and served in that capacity from 1947 to 1969, at which time he was employed as the Executive Director of the Water Rights Commission.

During his 22 years in the Texas Senate he served on numerous committees, and chaired the Senate Water Resources Committee from 1953 to 1955.

Mr. Hardeman is a member of the San Angelo law firm of Hardeman, Smith, Keever and Courtright, and is on leave from that firm.

LESLIE R. NEAL

The Cross Section extends our sincere appreciation to Mr. Neal for his past public service in the interests of water development in Texas, and our wishes to him for a speedy return to good health.

MAKE WATER
CONSERVATION PAY
INSTALL A TAILWATER
RETURN SYSTEM

The Local Institution For Groundwater Basin Management— A Report To The National Water Commission*

In recent years there has been an accelerating increase in the general public's appreciation for the major benefits to the environment afforded by groundwater. Through this realization the layman has also been generally appraised of the multiplicity of groundwater development, depletion and contamination problems. Unfortunately, all too often this new realization is not sufficiently thorough enough to guide the public to reasonable programs for the alleviation of groundwater problems. The popular shortcut to more laws, bigger and broader governmental powers and agencies, is most often proposed as the "ultimate" answer.

Groundwater being "hidden" beneath the land surface breeds a wealth of superstition, speculation and supposition as to its occurrence and quality. It is not surprising that the general public has failed to appreciate the relatively rigid, and simple, hydrologic parameters controlling groundwater, since even the courts have described its occurrence as "secret and occult". Perhaps it is this occultism that leads the public to believe that some secret capability within big government can solve groundwater problems.

Is bigger government the answer to groundwater basin management? The physical parameters of aquifers, and the present psychology of their utilization do not lend themselves to management by "big" government. Unlike the atmosphere, aquifers have finite boundaries, and unlike surface streams they do not occupy space at the land surface, and the rate of water movement therein is negligible. Therefore, management that is convenient and adaptable to these two fluid regimens is not the most efficient for groundwater basin management.

Basically, groundwater basin management involves the regulation of water wells, which, in turn, involves the regulation of well owners. Since most wells are privately owned, then groundwater basin management is the management of thousands of private properties, and the resultant management of thousands of individuals — a people management problem.

Advantages of Local Management

Because of the normal heterogeneity of aquifers, exceptions and modifications of specific groundwater basin management rules — such as well production or spacing rules — sometimes require consideration and review by the managing authority. Therefore, because of the time and costs involved, it is apparent that a local unit of government could more efficiently administer such rules, and the resultant applications, modifications and exceptions thereto.

The convenience of access to the groundwater basin managing entity, by those dependent upon the development of the aquifer for their livelihood, is another prime asset of management by local government. The general public's control over the policies and activities associated with groundwater basin management is strongly manifested through the local agency. In Texas, the executive officers of such agencies are elected to

office by the voting public. In the case of the High Plains Underground Water Conservation District No. 1, the Board of Directors consists of five elected officials, living in communities scattered throughout the District's 8,149 square-mile area. In addition to the five directors, the District also has five elected county committeemen representing each of the 15 counties with the District. These 80 elected offices represent more elected officers (excluding legislators) than has any State in the Nation. (For an explanation of the executive structure of groundwater conservation districts, see the paper "Groundwater Basin Management On The High Plains of Texas".[†])

Probably the most saleable reason for local groundwater basin management, is the assumption of the costs of such management by those benefiting from it. The economy of local government, as compared to that of distantly headquartered super agencies, has been repeatedly demonstrated throughout the Nation.

Summary of Benefits

The benefits of groundwater basin management by local government can be summarized as follows:

- 1) Controlling agency overlies the (local) regimen being controlled.
- 2) Local government is usually more directly answerable to the governed.
- 3) The direct benefactor of groundwater basin management pays the costs for receiving such governmental benefits.
- 4) The costs of local government are much less than those of larger governmental units.
- 5) There are existing and tried governmental frameworks already established to facilitate local groundwater basin management.

Problems of Local Control

Probably the major problem of local groundwater management authorities is their limited income, and nearly unlimited responsibilities. Underground water conservation districts created under Texas Law (Chapter 52) are charged with a multitude of responsibilities, however, under the procedures for their creation, the voting public determines the extent of their funding. It has not been uncommon for the voters to elect to participate in a district, but refuse to tax themselves to provide for such services; and there is no way provided by the Law to reduce a district's responsibilities to its financial capacity to support such services.

The district's charge to enforce its rules through the injunctive processes, subjects such districts to large and burdensome legal fees. Groundwater basin management districts have not escaped the present popularity for "bucking the system". The styming of rules' application through the courts is becoming a much used "legal dodge".

Although uncommon, it is possible for local entities to become self seeking and thereby obstructionists to good governmental service. Just as there

can be too big of government, there is also a minimum logical size for a local district. It is also possible for the executive officers of some local districts to lose sight of the authorized purposes of such districts.

It would be difficult to claim that all local districts enforce all of their rules all the time, however, neither can any State or National regulatory agency make such a claim. Bigger government does not always make a better or more thorough government. Quite the converse would be true if the State or Federal Governments attempted to manage groundwater basins by governmental decree issued from some distant capitol city.

It should be expected that groundwater problems will continue to attract the attention of those proponents — both within and without the Government — for more Federal and State laws and controls. Groundwater is an integral part of the State and National environment; in the High Plains area it is the "foundation" of our environment. Herein lies the State and Federal Governments' interests and responsibilities for protecting, preserving and enhancing this environment. However, since adequate local government is the most adaptable and beneficial tool for proper groundwater basin management, State and Federal efforts should be directed through such local entities.

The numerous theoretical concepts of groundwater basin management fall short of implementation because of a lack of a vehicle to carry these concepts through testing and demonstration programs. Financial aid from State, Federal and other agencies to local groundwater basin management districts would provide a means of testing untried concepts for the improvement of groundwater basin management. Through the district's existing and already authorized powers, groundwater basin management techniques could be tested without the necessity of creating new laws and expanding State and Federal governmental agencies. The High Plains Underground Water Conservation District No. 1 has demonstrated the economy and quality of using State and Federal funds to perform groundwater studies and research; thereby reducing wasteful government duplication.

The periodic review of the activities of all water districts and river authorities, by a board of their peers and including State and Federal agencies, could possibly lead to better and more thorough adherence to the dictates of the laws whereunder such districts, authorities, and agencies were created.

The establishment of uniform procedures and times for conducting and coordinating local governmental elections with regional, State and/or Federal elections would be a considerable improvement to local government.

These are some of the areas where-in State and Federal Governments could aid local districts. Local government is an extension of Federal and State Governments. It is not logical to expect better government by supplanting local government by that of the State and Federal systems.

With the privilege of the democracy of self (local) control must come the discipline and responsibility for earn-



DR. DAN M. WELLS

Wells Receives Award

Dr. Dan M. Wells, professor of civil engineering and director of the Water Resources Center at Texas Tech University, has been named as the recipient of the Spencer A. Wells Foundation Faculty Award for 1971. The award, which includes an honorarium of \$1,000, is sponsored by the Texas Tech Dads Association in recognition of outstanding professional performance. It was presented to Dr. Wells, a Texas Tech graduate, on October 9th at the annual Dads Day Luncheon.

Spencer A. Wells was a founder of Hemphill-Wells and a former chairman of Tech's Board of Regents and at one time president of the Texas Tech University Foundation.

The selection committee cited Wells' "outstanding reputation as a teacher". He has directed the work of several successful candidates for advanced degrees and has pioneered an interdisciplinary series of courses in environmental problems which was successful "beyond anyone's anticipation", the committee said, adding that Wells also has enhanced the reputation of Texas Tech both regionally and nationally through his competent research in problems of great significance to West Texas. The committee cited Wells particularly for his research contributions in water quality management, water treatment and reuse, and water resources planning.

Wells is a Registered Professional Engineer, and the President of the South Plains Chapter of the Texas Society of Professional Engineers. He earned his bachelor's degree at Texas Tech in 1951, his master's at the University of Missouri in 1954 and the doctoral degree from the University of Texas in 1966.

Dr. Wells is also one of the co-principal investigators of the ongoing Tech-District aquifer model research. This research is funded by the Office of Water Resources Research, U. S. Department of the Interior.

The Cross Section congratulates Dr. Wells, and notes with appreciation his diversified water interests, and the contributions he has made to the water conservation interests of West Texas.

ing and retaining this privilege. For over 19 years, the High Plains Underground Water Conservation District No. 1 has accepted the responsibility of this privilege.

* Prepared by F. A. Rayner and presented before the National Water Commission, Lubbock, Texas, October 6, 1971.

† The report, "Groundwater Basin Management On The High Plains Of Texas", was also presented before the National Water Commission on October 6.

BOARD . . . continued from page 1

decisions being subject to Board review at any of its regularly called meetings, or at special called meetings.

WHY VALIDATION IS NEEDED

Within the District's present rules and regulations there are no specified procedures for validating the existence and operation of wells subject to the District's rules and regulations that were: 1) in existence at the time the District was created; 2) not drilled within ten yards of the site specified on the *Application For Water Well Permit*, as issued by the District; 3) not equipped or operated in accordance with the *Application For Water Well Permit* and/or *Registration And Log Of Well*; 4) not registered with the District as the result of the landowner's or applicant's failure to return to the District a properly executed *Application For Water Well Permit* and/or *Registration And Log Of Well*; 5) drilled, and/or reequipped, and/or deepened, and/or replaced without the benefit of a properly executed *Application For Water Well Permit*.

The overwhelming majority of the wells within the District requiring validation are those wells that were not located within 10 yards of the site specified on the *Application For Water Well Permit*; and those wells drilled, reworked, or otherwise reequipped in violation of the District's rules (primarily Rules 3, 7, 11 and 12.) Since such wells fail to comply with the District's rules and regulations, through oversight or by intent of the owners or operators, it was the Directors' feelings that the absorption of the costs for bringing such wells into compliance with the District's rules should not be borne by those taxpayers that have made every conscientious effort to abide by the District's rules. Hence, the Board's decision to pass on the actual costs of such validation to those directly benefitting from the program.

MAXIMUM COSTS

The maximum validating costs of \$250.00 per well, as set by the Directors, is recognized to be in excess of the generally expected costs for such services. A recent test of the costs involved in providing the records research, and field survey, for two wells located in Lamb County amounted to \$38.00 (or \$19.00 per well). However, the Directors also recognized

AGRICULTURE MUST TELL ITS STORY

The agricultural community can not long continue to escape the national trend to question the worth of those segments of our society that strive to create, produce, build and prosper. However, the very distended nature of agricultural endeavor makes it difficult to repeatedly demonstrate its worth to our Nation. The abundance of high quality, low cost, food and fiber is no longer accepted as satisfactory evidence of agriculture's worth—this bounty is now taken for granted.

The recipients of the Texas Crop and Livestock Reporting Service questionnaires, now being mailed out, can help to tell agriculture's story. You are urged to accurately complete these questionnaires and return them to the Service. Agriculture can not tell its vital story if its statistics are not available.

that costs associated with well validating procedures that require the District to retain the services of an attorney are most likely to be in the order of magnitude of several hundreds to thousands of dollars.

PERMANENCY OF VALIDATION

The recognized legality of a well will be finitely established for any well for which there is issued a well validation certificate. A validation certificate will supersede any *Application For Water Well Permit* or *Registration And Log Of Well* applicable to the same well. The long standing policy of the District to recognize the validity of only those wells which comply with all of the District's rules and regulations, and which were drilled and completed in strict accordance with all of the statements and information supplied by the applicant on the *Application For Water Well Permit* will no longer be the sole responsibility of the well owner, after such wells are properly validated by the District. However, well validation certificates will not authenticate the precise ownership of the well or the land whereon it is located.

A well validation certificate will represent recognition by the District of the well's compliance with the District's rules and regulations at the site the well is located, and in the manner in which it is equipped at the land

surface at the time of its validation. Alteration of these conditions, that are subject to the District's rules and regulations, are the responsibility of the well owner and his agent, and are not further binding upon the District. A well validation certificate is intended to meet all of the requirements for land ownership transfer and estate settlements.

BOARD ORDERS

During the meeting of October 22nd, the Directors instructed the Manager to take steps to validate, or otherwise bring into compliance with the District's rules, six irrigation wells on the H. C. Wells Estate in Parmer County, three wells in Lamb County, and three wells in Lubbock County. The Directors also ordered the owner and operator of one well in Lubbock County to reequip or otherwise reduce the pumping capacity of the subject well to that capacity granted by the well's *Application For Water Well Permit* or to otherwise show cause, within 30 days, why the District should not take steps to enjoin the operation of same.

OTHER ACTIONS

In addition to acting on each of the other 14 items on the agenda of the Board of Directors' meeting of October 22nd, the Directors also executed a new 5-year contract with the Manager.

TWRC EXECUTIVE DIRECTOR NAMED

On October 12th, the Texas Water Rights Commissioners appointed Louis L. McDaniels as that agency's Executive Director. This position was vacated when Mr. Dorsey Hardeman was appointed Commissioner.

Mr. McDaniels was born in Lufkin, Angelina County, in 1911, and graduated with honors from Palestine High School. Mr. McDaniels is quick to note that he does not have a college degree, but he is also quick to note that he is a self-educated hydrologist—and he has the credentials to prove it.

Louis was employed as a hydrographer in August 1944, by the (then) Texas Board of Water Engineers, as resident-in-charge of the Board's East Texas field office. For over 27 years he has worked as a hydrologist for the many predecessor agencies to the Texas Water Rights Commission, and for the U. S. Geological Survey.

Upon appointing McDaniels, the Commissioners noted that they ". . . feel that McDaniels' knowledge of the states' water resources and the work of the Commission, having passed through the ranks, assures its successful continuity of purpose and performance through the chief administrative officer."

The Cross Section offers our congratulations to Louis, and our assistance if called upon.



LOUIS L. McDANIELS

THE Cross SECTION

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

Volume 17—No. 11

"THERE IS NO SUBSTITUTE FOR WATER"

November, 1971

Texas Supreme Court Rules For Groundwater Owner

On October 27, 1971, the Texas Supreme Court handed down its decision in *Sun Oil Co. v. Whitaker* granting the landowner, Earnest Whitaker, damages because Sun Oil Company had used fresh water belonging to Whitaker for waterflooding purposes. The Court enjoined Sun from using any additional water belonging to Whitaker. The Court, however, did not require Sun to pay exemplary damages to Whitaker. Sun has filed a motion for rehearing with the Clerk of the Supreme Court.

Sun had filed suit against Whitaker in 1966 seeking to enjoin Whitaker from interfering with Sun's use of Ogallala water for waterflooding purposes. Sun claimed the right to use Ogallala water free of charge because of its rights under its oil and gas lease. Thereafter, Sun began to use fresh water for waterflooding purposes and Whitaker filed a cross-action seeking to stop Sun from using water and for damages from Sun for water used by Sun. Judge M. C. Ledbetter (the 121st District Court of Cochran County) entered a judgment for Whitaker after a jury found in favor of Whitaker.

The Supreme Court stated that the principal questions to be answered by the jury were:

- 1.) Does Sun's use of Ogallala water underlying Whitaker's tract interfere with Whitaker's surface use?
- 2.) Does Sun have a reasonable

alternative which would enable Sun to produce its oil?

The Supreme Court found that the jury's answers in Whitaker's favor on these issues were supported by evidence.

Thus, unless the Supreme Court should revise its decision in response to Sun's motion for rehearing, Sun can no longer use Ogallala water for waterflooding free of charge and will have to pay Whitaker for water it has already used.

The Court's decision relied upon the case of *Getty Oil Co. v. Jones* (discussed in the December, 1970, issue of *The Cross Section*) as authority for the proposition that the mineral owner can not make a use of the surface estate which unduly interferes with the rights of the surface estate owner, if there are reasonable alternatives available to the mineral owner.

The Water District has filed briefs in support of the landowner's position in this suit. Mr. Whitaker has been represented by Mr. Earl Allison and on appeal by Nelson, McCleskey, Harriger, & Brazill. The full text of the Supreme Court's opinion is printed in this issue of *The Cross Section*.

Articles describing the Whitaker case have been published in the July, and September, 1966; February, July and October, 1967; February 1968; January, May and November, 1969; and January, July and December, 1970, issues of *The Cross Section*.



Richard Peckham, Head of the Groundwater Division, Texas Water Development Board, Austin; Steve Messenger, Accountant, Friona; Sam Aldridge, Attorney, Farwell; Ross Goodwin, Muleshoe; and Chester Mitchell, Lockney, attend the presentation of the recently completed report, "Groundwater Conditions in Parmer County, Texas" (story on page 2).

TO TELL AGRICULTURE'S STORY

The article, "The Importance Of Agriculture In The Water District", by Cary D. Palmer, and the notice, "Agriculture Must Tell Its Story", that appeared in the September and October issues of *The Cross Section* respectively, created notable reader response.

One of the letters received, from Congressman George Mahon, outlines the beginning of a program that should be very effective in "telling agriculture's story". This letter is reproduced below.

The prettily packaged farm products, be they a beefsteak or a sleek gown modeled by a young girl, mask the rigors and risks endured in their production. It is only this ultimate, high quality, product that most of the present "good life generation" has been exposed to — and consequently has come to expect as a matter of "right".

Efficient, mechanized, chemical farming has created this "right", however, the agribusiness industry is now being called upon to defend its contribution to our well being. Perhaps the program outlined by Congressman Mahon, and other endeavor in this field by other civic leaders, will lead to the restoration of the general public's appreciation of the privilege to the "right" to enjoy high quality agricultural products.

GEORGE MAHON
19TH DIST., TEXAS

CHAIRMAN
COMMITTEE ON APPROPRIATIONS

Congress of the United States
House of Representatives
Washington, D.C. 20515

November 12, 1971

Mr. Frank A. Rayner, Manager
High Plains Underground Water
Conservation District No. 1
1628 15th Street
Lubbock, Texas 79401

Dear Frank:

I just had an opportunity to look at the October issue of *THE CROSS SECTION* and I note the special message titled, "Agriculture Must Tell Its Story." I am very pleased to see this and I thought I would inform you about a development on this subject which might become significant.

The National Agricultural Institute, which has among its members a number of representatives in West Texas, asked me to join with Senator Curtis of Nebraska in trying to promote the objective of improving the image of agriculture among rank and file citizens, in order that we might have a better opportunity to carry on farm programs which are in the best interest of the farmer and the people generally.

On November 8, we had a meeting in the Capitol in regard to the proposition that agriculture's role in the American economy is not adequately understood, especially in urban areas, and that a centrally coordinated effort might be undertaken to present messages to the public in behalf of producers and agriculture generally. This program would include convincing the agribusiness complex to direct a portion of the advertising effort of various organizations such as equipment manufacturers, oil companies, chemical companies, etc., to putting in proper perspective the role of agriculture in American life and expounding the many benefits which accrue to consumers by virtue of the progress and efficiency of American agriculture. The idea is to convince big advertisers whose business relates directly or indirectly to agriculture that it is in their own best interest to put in plugs for agriculture in their advertising and other public relations programs.

I realize this meeting may not have been of world-shattering importance, but in view of the notice in *THE CROSS SECTION*, I thought I might call it to your attention. I feel that this effort has some potential to be helpful in the long run in battles here on agriculture related matters.

Best wishes.

Sincerely,

George Mahon
George Mahon



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

1628 15th Street, Lubbock, Texas 79401
Telephone 762-0181

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Keith Kennedy, 1972 _____ Star Rt. 2, Morton
Jessie Clayton, 1974 _____ 706 S. Main Ave., Morton
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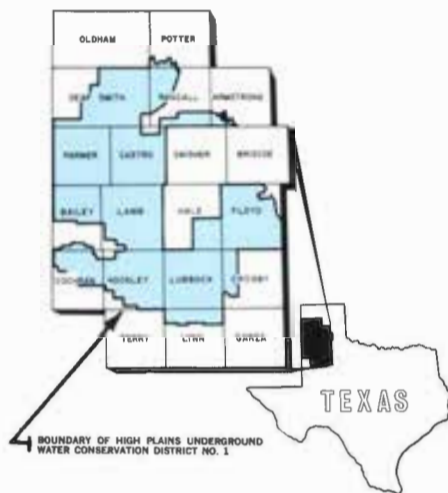
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M. T. Darden, 1972 _____ Lorenzo
E. B. Fullingim, 1972 _____ Lorenzo
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Dan Young, 1974 _____ 4607 W. 14th, Lubbock

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CIVIC LEADERS HEAR GROUNDWATER REPORT

Approximately forty people gathered at the Parmer County Courthouse, in Farwell on November 22nd, to hear Frank Rayner present a brief synopsis of the findings of the recently completed groundwater study in Parmer County. The Parmer County groundwater study, culminating in the 349 page report, "Groundwater Conditions in Parmer County", was completed by the District under contract with the Texas Water Development Board who provided the funds (\$30,000) for this study (also see *The Cross Section*, September 1971).

Ross Goodwin, Vice President of the District's Board of Directors — the Director for District Precinct 3, Bailey, Castro and Parmer Counties — introduced Mr. Chester Mitchell, Lockney, President of the District's Board of Directors; and Mr. Richard C. Peckham, Head of the Groundwater Division of the Texas Water Development Board.

County Judge Archie Tarter; Parmer County Commissioners, Thomas Lewellen, Friona, Charles Jefferson, Bovina, Guy Cox, Farwell, and Raymond Treider, Lazbuddie; representatives of the cities of Bovina, Farwell, and Friona, and other local governments; interested officials of agribusiness and financial institutions, and other civic leaders had an opportunity to view the numerous maps, figures,

tables and other information and statistics developed during the Parmer County study.

In response to a question from the floor regarding the anticipated date for the publication of the Parmer County report, Mr. Peckham noted that the Texas Water Development Board had a backlog of some 30 reports pending publication, but that the Board intended to have the Parmer County report published and available for free distribution by September of 1972 — in accordance with the provision of the District-Board contract covering this study.

Others in attendance at this meeting were, Charles Flynn (Mayor), and Aubrey Brock, both from Bovina; Elmer Hargrove (Mayor), Sam Aldridge, Bill Bolling, G. N. Earl, Mack Heald, Joe W. Jones, Prentice Miller, and Hugh Moseley, all from Farwell; R. L. Fleming (Mayor), A. Outland (City Manager), A. L. Black, Floyd Brookfield, Marion Clark, Jim R. Daniel (County Committeeman), Herb Evans, Wendell Gresham, Louis Welch, Edwin Livengood, Steve Messenger, Porter Roberts, and Waymon Wilkins, all from Friona. Other District staff members in attendance were Mrs. Dana Wacasey, Don McReynolds, Don Smith and Tony Schertz. Also in attendance were Pat Messenger, Amarillo, Gary Brown and Leroy Johnson.



Chester Mitchell tells the Parmer County gathering about the value of accurate groundwater information.



Judge Archie Tarter addresses the group gathered to hear the Parmer County report.

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.

DIRECTORS ATTEND NWRA MEETING

Four of the District's five Members to the Board of Directors, Messrs Chester Mitchell, Lockney; Ross Goodwin, Muleshoe; Ray Kitten, Slaton; and Selmer Schoenrock, Level-land, attended the 40th annual convention of the National Water Resources Association, in Dallas, Texas, November 2 - 5, 1971.

The theme of this year's meeting was, "The Thinking Man's Environment", and over 30 speakers espoused their views on the "new environmental concern".

The Directors heard William Giannelli, Executive Director of the California Department of Water Resources; Congressman Jim Wright, of Fort Worth, Texas; W. E. Tinsley, President of the Board of Directors of the Texas Water Development Board, and many other fine speakers express their dire concern for the possible cessation of any additional water development projects as a result of the legal and other actions of what were termed "environmental obstructionists". Some speakers noted that funds for water development projects are dwindling, while the costs for such development are skyrocketing, and that the pronouncements of the spokesmen of naturalist groups has created havoc with orderly water planning.

Mr. Schoenrock noted that "... the mood of the water developers is at a very low ebb, and will require renewed vigor if surface water is ever to be imported to this area". Messrs Goodwin, Mitchell and Kitten all noted that through the legal maneuvering of those groups and individuals opposing surface water development, untold years are being added to the normally several decades necessary to develop dams, reservoirs, canals and pipelines. The Directors further noted that it can be expected that some groups will use every means available for preventing the importation of surface water to this area, therefore, the Directors concluded, it is imperative that we make every effort to conserve and prolong the life of this area's dwindling groundwater supplies.

Mr. Kitten also noted that although the entire convention program concerned itself with the ill effects of the "new environmental concern", primarily as espoused by the country's youth, there was practically no participation on the program and no discernable attendance at the convention of the young. He noted that the average age of the conventioners probably exceeded 50 years. It was Kitten's observation that those who question the possible adverse environmental impact of water development projects will never be properly appraised of the "real world" water needs and problems, if they are not brought into the confidence and cooperative fold of the present water leaders.

Mr. Kitten also noted that the program for the wives of the conventioners was, for the most part, separate and not directed toward the convention concern for water resources problems. This, Kitten believes, must also change. It is his view that the magnitude of the country's wealth and property controlled by women makes mandatory their direct participation in water development proposals.

Water And West Texas

by ARTHUR P. DUGGAN JR.

Water supply is not an immediate problem in West Texas or in Texas. Far-sighted planning and development have provided dams, aqueducts, brush control and conservation of ground water in such a manner that most demands are being met in adequate fashion.

The future, however, presents massive challenges. The drought this very year occasioned water shortages on farms, ranches and in several of our cities, highlighting vulnerable situations. Within 30 years it is estimated there will be a water shortage in El Paso. Every year irrigation is lost in areas dependent on ground water. Within less than 35 years there no longer will be water enough in the Ogallala ground water reservoir in Texas to support irrigation in much of the area now producing abundant harvests and supporting vast livestock feeding. Irrigation accounts for an estimated two-thirds (sometimes more) value of production in most sections having irrigation.

Loss of the greater portion of West Texas production of food and fiber would be disastrous not only to West Texas but also to the remainder of Texas and would be a serious blow to the economy, strength and welfare of the United States.

In water rich Southeast Texas, Houston water has been rationed on more than one occasion; nearby, because of heavy ground water withdrawal, (1) the land surface is sinking, posing the threat of salt water sometime covering more of the surface and (2) deep underground, salt water is being pulled into the reservoir. The Lower Rio Grande Valley needs over 200,000 acre feet of water a year to continue suitable irrigation. Elsewhere in Texas, over six million acre feet of water a year goes unused into the Gulf of Mexico. U. S. Army Engineers have said the State as a whole will be short of water by the year 2000 — less than 30 years away. It has been estimated that, after making use of all water in the State, there will need to be imported some twelve million acre feet a year; and this would not add one acre of irrigated land.

Many believe the limiting factor on ultimate Texas vitality, growth and well-being will be water or lack of water. Therefore, an entire Texas Water Plan must be considered.

Studies of a means to import water to Texas from the Mississippi River are being made by the United States Bureau of Reclamation and Army Corps of Engineers. A report on the results of these studies is to be submitted to Congress in 1973. After completion of these planning studies, there must be efforts to implement the resultant projects. Adoption and carrying out of these plans will require wholehearted support by the Congress of the United States, by the Legislature of the State of Texas, by Federal and State agencies, and by cities and people of the entire State and Nation.

Most imported water will be used for irrigation, although a considerable amount of imported water will be destined for thirsty cities and industry. Will support be forthcoming in West Texas, in the State of Texas and in the United States?

Take a look at the public state of mind. The housewife in New York City and Galveston is paying what she considers very high prices for meat, vegetables and clothing. Grumbling is evident in respect to farmer payments at the same time surpluses are said to exist. Blame has fallen, albeit incorrectly, on the livestock raiser and the farmer, both of whom are in the State and National doghouses. Conveniently overlooked are U. S. import duties and labor policies that have put a cost-price squeeze on farmers. Few realize today only 17 percent of our disposable income is spent for food, whereas in the year 1900 Americans spent 40 percent of their disposable income for food. Do we dare return to the "good old days"?

West Texas as a region is in the doghouse, the statement has been made that the area is a desert by nature and should be returned to a desert, and thereby to a *deserted* condition — and this in spite of the fact food and fiber are being produced here on a large scale more cheaply and more *cleanly* than elsewhere. The reason being millions of acres of rich level land in a climate requiring minimum use of pesticides, are tilled by well educated farmers with business acumen.

There exists a feeling West Texas is not worth enough to the State or Nation to justify assistance in maintaining our economy. The dollar impact of West Texas business on other areas needs to be pointed out. Also relevant, the loss of West Texas agricultural and livestock production would result in: (1) increased food and fiber costs for the entire nation, (2) a decrease in foreign exports, and (3) loss of national self-sufficiency.

Water development projects, even those under construction, are being fought (even in court) on an unprecedented scale; and this in spite of their marvelous environmental contribution and their critical recreational assets.

In endeavoring to import water into Texas and into West Texas for any use, we are in the doghouse.

Why? Because people are not acquainted with the facts. The facts are that water development and conservation have improved the environment, improved our standard of living, and decreased food and fiber costs to a remarkable degree. The facts are that agriculture, livestock and related industries produce a volume of business

in Texas comparable to and an integral part of that of the petroleum industry. The facts are that West Texas food and fiber make possible a national reserve in basic commodities; the alternative could be national suicide.

A solution is available. Simply tell and retell the documented facts as they are to the people of Texas and to the people of the Nation. The effect may be similar to starting a nuclear reaction.

At the same time, West Texans must demonstrate a high quality of self-discipline to prove their ability to manage their local resources and to repay the costs of imported water. Conservation, brush control, cleaning up and development of water resources should be continued, expanded and publicized. A "SAVE A DROP" of water campaign should be conducted. A close look at weather modification is indicated.

RECOMMENDATIONS

It is recommended the Water Committee of the West Texas Chamber of Commerce, in cooperation with Water, Inc., Texas Water Conservation Association, and other willing participants, initiate an educational program designed to acquaint the public with the facts.

It is suggested the first stage be directed to the people of West Texas. Until West Texans are united in their understanding of and approach to our water problems and develop cooperative, unselfish enthusiasm, we cannot seek, effectively, necessary State and National support to solve our long range water problems.

The second stage, it is submitted, should be directed to the State and to the Nation in order to create an understanding that the importation of water to Texas and West Texas is vital to the State and Nation, will result in National environmental improvement, in continued decreased food and fiber costs, and in ability to maintain National self-sufficiency with accompanying strength.

(EDITORS NOTE: The report, "Water and West Texas—1971" was presented before the Water Committee of the West Texas Chamber of Commerce, meeting in San Angelo, Texas, on November 18, 1971.

The author, Arthur P. Duggan, Jr. is the Chairman of the Chamber's Water Committee. Mr. Duggan is a retired attorney living in Littlefield, Texas.



Frank Rayner reads excerpts from the Parmer County groundwater report (story on page 2).

SUN vs WHITAKER—

THE OPINION OF THE TEXAS SUPREME COURT

Sun Oil Company, Petitioner, From Cochran County,
v. Earnest Whitaker, Respondent. Eleventh District.
No. B-2300

This case was before us at an earlier time in an appeal from a judgment entered in a proceeding for a temporary injunction. See 424 S.W.2d 216 (1968). A part of the factual statement set out below has been lifted from our former opinion.

Earnest Whitaker is the owner of the surface estate and Sun Oil Company is the owner of a mineral leasehold estate in a 267-acre tract of land in Hockley County. Sun acquired its lease on the property on April 5, 1946, from L. D. Gann and his wife, then the owners of the fee title subject to an outstanding non-participating one-sixteenth free royalty in the west one-half of the tract. The land was conveyed by Gann and his wife to Whitaker on January 2, 1948. The conveyance to Whitaker was subject to Sun's lease, and the deed expressly excepted and reserved all minerals that might be produced from the land to the Ganns, their heirs and assigns.

Sun's lease has been kept alive beyond the primary term of five years by production from eight oil wells which are producing from the San Andres formation. When production from its oil wells decreased because of diminishing pressure in the San Andres formation, Sun sought and obtained permission from the Railroad Commission to take fresh water from the Ogallala formation and inject it into the San Andres in furtherance of a pressure maintenance program. Whitaker and his son-in-law, Doyle Henderson, are using water from the Ogallala formation for cultivating the land as an irrigated farm.

Following our decision in the appeal from the temporary injunction judgment, the parties proceeded to trial of the case on its merits. Sun sought a permanent injunction enjoining the defendants from interfering with its production of not more than 100,000 gallons of fresh water per day from the Ogallala formation underlying Whitaker's tract of land for use in producing the oil. By cross action Whitaker sought to enjoin Sun from producing and using the fresh water to produce the oil. Whitaker also sought to recover actual damages for the water theretofore used and for crops destroyed, and, as well, exemplary damages. The case was tried to a jury and, based upon the jury's verdict, judgment was rendered that Sun take nothing by its suit, that Whitaker recover the sum of \$12,598.03 for actual and exemplary damages, and that Sun be permanently enjoined from producing and using the fresh water for its waterflood program. The court of civil appeals affirmed. 457 S.W.2d 96. The judgments of the courts below are reformed and, as reformed, are affirmed.

Sun's lease grants and leases the 267-acre tract to Sun "for the purposes of investigating, exploring, prospecting, drilling and mining for and producing oil, gas and all other minerals. . . ." The lease also provides: "Lessee shall have free use of oil, gas, coal, wood and water from said land except water from Lessor's wells for all operations hereunder. . . ."

Sun has two legal theories upon which it bases its claimed right to use the water in question, to wit: (1) the implied right of a mineral lessee to use such part of the surface and so much thereof as may be necessary to effectuate the purposes of the lease; and (2) the expressed contractual right to "free use of . . . water from said land . . . for all operations" under the lease. In affirming the trial court's judgment, the court of civil appeals dealt with the case as though it involved only the second of Sun's theories; the court held that the quoted language authorizing free use of water was ambiguous, and that evidence introduced on the trial supported jury findings that the parties to the lease did not contemplate or intend that such large quantities of water would be used for waterflood purposes. Actually, analysis of the two theories discloses that the second adds no basis for the right not furnished by the first.

For present purposes, the first theory may be stated with somewhat more particularity as an implied grant to the lessee, absent an express provision for payment, of free use of such part and so much of the surface estate as is reasonably necessary to effectuate the purposes of the lease, having due regard for the rights of the owner of the surface estate. *Humble Oil & Refining Co. v. Williams*, 420 S.W.2d 133 (1967); *Brown v. Lundell*, 162 Tex. 84, 344 S.W.2d 863, at 869 (1961); *Meyer v. Cox*, 252 S.W.2d 207 (Tex. Civ. App.—San Antonio 1952, writ ref'd); but, stated negatively, the lessee may not use any part of the surface estate unless it is reasonably necessary for such purposes. *Brown v. Lundell*, supra. One of the purposes for which the Whitaker tract is leased to Sun is the production of oil. Water, unsevered expressly by conveyance or reservation, is a part of the surface estate. *Fleming Foundation v. Texaco*, 337 S.W.2d 846 (Tex. Civ. App.—Amarillo 1960, writ ref'd n.r.e.). It follows that if, in the production of the oil, use of the Ogallala water underlying the tract in the quantity sought, is reasonably necessary, having due regard for the rights of Whitaker, Sun has the right to the free use thereof by implied grant. *Stradley v. Magnolia Petroleum Co.*, 155 S.W.2d 649 (Tex. Civ. App.—Amarillo 1941, writ ref'd). The quoted contractual provision will not be interpreted as giving a greater right and, hence, is not in conflict with and adds nothing to the implied right. See *MERRILL, COVENANTS IMPLIED IN OIL AND GAS LEASES* § 6 (2d ed. 1940). It is thus immaterial whether the

quoted contractual provision is ambiguous and whether in agreeing to it the parties contemplated and intended, or did not intend, that Sun have free use of the Ogallala water underlying the tract for its waterflood project; and the principal question to be decided is whether the use of the water is reasonably necessary, having due regard for the rights of Whitaker. Having thus narrowed the principal question in the case, it is perhaps wise at this point to recognize that certain other related questions are not in the case.

Our decision in the temporary injunction appeal turned on the fact that issue had been joined by the parties on a contention by the defendants and an intervenor that Sun's proposed use of water for waterflood purposes constituted statutory "waste," but that the issue had not been decided by the trial court. The issue of waste was later eliminated by withdrawal of all pleadings raising it and is not now in the case. The defendants stipulated at this trial that, (1) "the waterflood process is a reasonable and proper operation for the production of oil from the San Andres Reservoir under the L. D. Gann tract"; (2) the use of "Ogallala water as the extraneous or make-up water for injection into the San Andres Reservoir under the L. D. Gann tract in conducting secondary recovery of oil by a waterflood process" is a reasonable and proper operation; and (3) "the location of the injection wells and the rates of water injection" as conducted by Sun "constitute reasonable and proper operations for the production of oil." There is, therefore, no issue in the case concerning the stipulated matters. There is no question in the case concerning an express or implied right of a mineral lessee to free use of impounded water without the consent of the surface owner who impounded it. As to that question, there is a division of authority. See 23 A.L.R.3d 1434.

Coming now to a consideration of the principal question as stated above, it seems clear that the answer must be arrived at by application to relevant jury findings of the law announced in our recent decision in *Getty Oil Co. v. Jones*, — S.W.2d — (Tex. Sup. 1971). In *Getty* we recognized, once again, that a severed mineral estate is the dominant estate and the surface estate is servient; but our opinions on original submission and rehearing should have dissipated any idea that the right of the owner of the mineral estate to use of the surface estate is absolute or unfettered. We not only reemphasized the limitations on the rights of the owner of the mineral estate to uses which are reasonably necessary and which are made with due regard for the rights of the surface estate owner, we also held that the selection of a use which unduly interferes with existing uses by the surface estate owner, if there are reasonable alternatives available to the mineral estate owner, will be held unreasonable and, consequently, not reasonably necessary to effectuate the purposes of the lease. The principal question is divided, therefore, into two parts: (1) Does Sun's use of Ogallala water underlying Whitaker's tract unduly interfere with Whitaker's surface use? (2) Does Sun have a reasonable alternative?

The jury made three findings which have a material bearing on proper answers to the questions. In answer to Special Issue Nos. 3, 4, and 7, the jury found that: ". . . the use of fresh water by Sun Oil Company for secondary recovery purposes from the well which it has drilled on said tract will materially affect the supply which the surface owner could produce by wells"; ". . . it is not reasonably necessary for Sun Oil Company to use water from the Ogallala formation underlying the Whitaker farm to waterflood the L. D. Gann lease"; and ". . . the proposed use of fresh water by Sun Oil Company for waterflood purposes will substantially devalue the farm owned by the Defendant Whitaker". These fact findings are supported by probative evidence which may be summarized as follows: The Ogallala formation is a closed and isolated underground reservoir in which the water is not replenished except by such surface water as may percolate down into the reservoir. It is the only source of water available to Whitaker for domestic and irrigation purposes, and the water was being so used by him before Sun entered upon its waterflood project. Sun proposes to produce from its single well and to use 4,200,000 barrels of the water, which use will shorten the life of Whitaker's water supply from forty-four to thirty-six years if conditions remain as they existed at the time of trial and from eighteen to ten years if the property on the four sides of his tract are fully developed. This has and will cause a substantial decrease in the value of the land. Sun can purchase the water from an adjoining tract owner for \$42,000.

As indicated, the recited evidence supports the jury findings that the waterflood project will materially affect the supply of water available for the uses to which Whitaker was putting it and will substantially reduce the value of the tract as farm land. It also supports the findings that it was not reasonably necessary for Sun to use the water underlying Whitaker's tract. We recognize that there is evidence in the record that the 966,703 barrels of water produced and used by Sun before trial had not reduced the water level at Whitaker's wells, and also other evidence upon which the jury could have made findings favorable to Sun; but the fact that there may be evidence which would support contrary jury findings does not authorize us to set aside a verdict which has support in probative evidence.

But Sun argues that its use of the water is both reasonably necessary and with due regard for Whitaker's rights

as a matter of law. We disagree. Both concepts are relative. There are undoubtedly uses of the surface estate by mineral estate owners which as a matter of law are both reasonable and with due regard. Just so, also, certain uses would be held as a matter of law to be unreasonable and without due regard for the rights of the surface owner. Then, just as in so many areas of the law, there will be certain uses which cannot be categorized as a matter of law; and, in such instances, whether the use is or is not reasonably necessary and with due regard will be a fact question. It is our considered judgment that this case, like *Getty*, falls into the last group. In *Getty*, we held that the issue was one for the jury in spite of the fact that, if the jury found against it, *Getty* would be required to expend some \$12,000 to change the manner of its use of the surface so as not unduly to interfere with the use of the surface by the owner of that estate. *Getty* stood to gain no additional benefits by the expenditure. In this case, Sun may be required to expend some \$42,000 for water; but, by so doing, it and other mineral owners will gain some \$3,200,000 from the sale of the oil produced by use of the water. The facts in the instant case thus make it a stronger case for holding that the manner or extent of the mineral lessee's use of the surface estate is not reasonably necessary.

We hold that the jury findings compel the conclusion that Sun's use of 4,200,000 barrels of the Ogallala water underlying the Whitaker tract, (1) constitutes an undue interference with Whitaker's reasonable use of the surface, and that (2) Sun has a reasonable alternative. The judgments of the courts below correctly denied Sun's prayer for an injunction and correctly awarded injunctive relief and damages to Whitaker. However, the judgment for damages must be reformed.

In response to special issues, the jury found that the reasonable cash market value of the water produced and used by Sun to the date of trial was \$9,667.03; that the reasonable cash market value of destroyed growing crops was \$431.00; and that \$2,500.00 should be adjudged against Sun as exemplary damages for willfully and maliciously producing and using the water. The trial court awarded Whitaker judgment for the total of the three sums, \$12,598.03, with interest thereon at the rate of 6% from the date of the judgment until paid.

After return of the jury's verdict but prior to the entry of judgment, Sun tendered the crop damage sum of \$431.00 to Whitaker, and, upon his refusal of the tender, paid the sum into the registry of the court to be disbursed to Whitaker. We agree with Sun's contention that judgment should not have been rendered against it for this sum, and in no event should Sun be required to pay interest thereon. We also agree with Sun's contention that the evidence does not support the award of exemplary damages. The evidence does not support a conclusion that Sun's production and use of the water in the waterflood project was, or is, "of a wanton and malicious nature, or, as sometimes stated, somewhat of a criminal or wanton nature". *Ware v. Paxton*, 359 S.W.2d 897, 899 (Tex. Sup. 1962). Whether Sun's lease authorized free use of the water in the waterflood project was a question of first impression in this state, and continued production of the oil was manifestly justified considering that rights of royalty owners were also involved. The \$2,500 awarded Whitaker must be eliminated from the judgment.

The judgments of the courts below are reformed by reducing the sum recovered by Whitaker to \$9,667.03, with interest thereon at the rate of 6% from April 30, 1969, the date of the trial court's judgment, until paid. No doubt the trial court will, upon application, order the fund in the registry of the court paid over to Whitaker.

Costs are assessed one-third to Whitaker and two-thirds to Sun.

ROBERT W. CALVERT,
Chief Justice.

Opinion delivered October 27, 1971.

Associate Justice McGee notes his dissent.

Associate Justice Walker not sitting.



EARNEST WHITAKER

J. E. Sturrock Dies



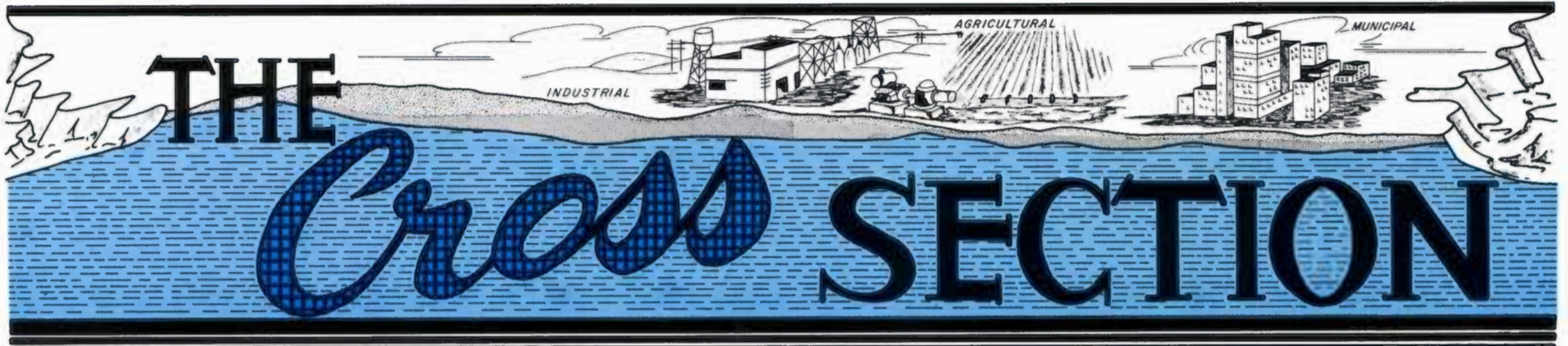
JOHN E. STURROCK

Described as a "... bright and inquisitive child, born to parents living so deep in the Big Thicket that they used wildcats for watchdogs and hoot owls as roosters . . .", John Ellison Sturrock recently passed away at the age of 71.

Sturrock was born in the fall of 1900 in the little town of Colmesneil, Tyler County, Texas. He attended Tyler Commercial College. In 1927 he was appointed deputy tax collector of Tyler County, and elected as the Tyler County Judge in 1929. The ambitious Sturrock continued to study, and in 1931 he received a license to practice law in Texas.

This water conservation pioneer commenced his long career in the water field when he was employed as an attorney by the Texas Board of Water Engineers, in 1935. In 1944, he was one of the principals that worked to create the Texas Water Conservation Association, and in that year he became the Association's first General Manager. He served in this capacity for the next 24 years, until his retirement in 1968; at which time Bill Waddle was employed to replace Sturrock. At times, during several early lean years, Sturrock had to forego his salary in order to keep the Association solvent.

Judge Sturrock enjoyed National recognition as one of the foremost experts on water development and conservation. He received several National and State awards recognizing his leadership and water acumen. The water community will miss Judge Sturrock.



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

Volume 17—No. 12

"THERE IS NO SUBSTITUTE FOR WATER"

December, 1971

THE 1972 DISTRICT ELECTION

In conformance with the laws of Texas, the High Plains Underground Water Conservation District No. 1 will hold an election on Tuesday, January 11, 1972. This election will be held in only those counties, or parts of counties, in District Director's Precincts 1, 2 and 5—Crosby, Lubbock and Lynn; Cochran, Hockley and Lamb; and Floyd and Hale Counties respectively.

In January 1971, as it will be in January 1973, the District elections were held in the other District counties comprising District Director's Precincts 3 and 4—Bailey, Castro and Parmer; and Armstrong, Deaf Smith Potter and Randall Counties respectively.

Absentee balloting for the 1972 election commenced on December 22, 1971, and will extend through January 7, 1972. Clifford Thompson, of the District's staff, is the absentee Judge and the County Secretaries for Cochran, Hockley, Lamb, Floyd and Hale Counties are serving as deputy Judges for absentee voting. Qualified voters residing within the District in Crosby, Lubbock and Lynn Counties can vote absentee at the District's Lubbock office or by mail by written request to the Lubbock office. Qualified voters in those parts of the counties in District Director's Precincts 2 and 5, residing within the District, can vote absentee at the District's offices (see listing in columns 1 and 2 on page 2) in these counties, or by mail through these offices as set forth above.

Qualified Voter

Any person possessing a valid voter registration certificate and residing within the area within the District, in the eight counties wherein the election is to be held, is eligible to vote in the District's election.

Any qualified voter may vote within their county of residence for one District Director and for County Committeemen-at-large, for that District Director's Precinct within their county. However, only qualified voters residing within the County Commissioner's Precinct can vote for the County Committeemen to be elected for that County Commissioner's Precinct. The election judges at each of the polling places (see map and later text) will have maps depicting the area within each county within the District, and the County Commissioner's Precincts therein.

—continued on page 3... ELECTION



THE PRESIDENT'S 1971 REPORT

As President of the Board of Directors of the High Plains Underground Water Conservation District No. 1, it is my privilege to submit to you, the District's residents and taxpayers, this brief report concerning the activities and current status of your District.

The year 1971 has seen the District take giant strides toward fulfilling its obligations and objectives, as specified by State Law — groundwater conservation.

In addition to maintaining, expanding and streamlining all of the established District programs, a few of which are, the observation well program, the cost-in-water-depletion, income-tax-allowance program, the well permitting system, tailwater waste abatement program, the aquifer model research, and publication of The Cross Section — recognized as one of the leading monthly groundwater publications in the Nation — the District continued to expand its activities, accepting and surmounting several new challenges.

The very first annual report, summarizing the structure, financing and activities of the District, "District Status Report 1970", was released in April of this year. Two reports, regarding groundwater basin management were prepared for the National Water Commission, and several small specialty reports and statements were also prepared for public release. However, the District's major contribution to groundwater literature, and to the thorough understanding of the groundwater conditions in a part of the Dis-

trict, was the report, "Groundwater Conditions In Parmer County, Texas". This report, funded by the Texas Water Development Board and pending publication by that agency, represents the most comprehensive analysis of groundwater conditions ever prepared for any county in this area. In conformance with an agreement executed between the District and the Texas Water Development Board in February of this year; the Parmer County groundwater study and report was to have been the first of several such studies and reports to include nearly every county within the District. However, early in April, the District was informed that the Texas Water Development Board was anticipating a regional environmental study of the Rio Grande Valley and intensified study of the Edwards and Carrizo-Wilcox aquifers in the San Antonio area, and that "... the Water Development Board will not be funding additional groundwater studies with your Agency in the immediate future".

The accurate documentation of groundwater conditions afforded by studies such as the Parmer County inventory, are an essential prerequisite to the planning and implementation of water importation to this area. Therefore, it is hoped that the demonstrated success and economies of the inter-agency cooperation that resulted in the Parmer County report will lead to the resumption of these valuable and essential studies, and the resultant elimi-

—continued on page 2... PRESIDENT

WATER LEVELS TO BE MEASURED IN JANUARY

The measurement of the depth to water in over 700 water wells located throughout the District will commence on January 3, 1972. The 1972 measurements will constitute the continuation of an annual water-level measuring program that was first commenced by the U. S. Geological Survey in the 1930's.

History of Program

In 1936, the U. S. Geological Survey in cooperation with the Texas Board of Water Engineers (later the Texas Water Commission, now the Texas Water Development Board) commenced an inventory of wells, well logs, and water-level measurements in several counties in the High Plains. These Works Progress Administration funded studies provided the framework and the nuclei for the area's first observation well program.

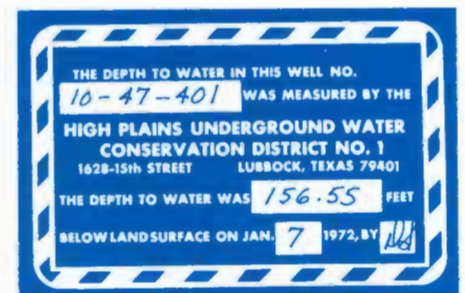
From 1936 to 1948, the observation well program continued to expand until about 500 wells were included in the Southern High Plains program. Some of these wells were widely spaced, windmill wells — located near the arterial highways traversing the Plains. However, the majority of the annual water-level measurements were being made in irrigation wells concentrated in irrigation enclaves near Hereford, Lockney, Lubbock, Muleshoe, and Plainview.

In 1956, District personnel added about 69 wells to the observation well program, and commenced making some of the annual, water-level measurements in cooperation with the U.S. Geological Survey and the Texas Board of Water Engineers.

In September 1960, the Texas Water Commission assumed responsibility for the formerly joint (with the U.S. Geological Survey) program.

In August 1962, the District entered into a contract with the Texas Water Commission to expand, upgrade and revise a part of the observation

—continued on page 2... WATER



THE 1972 MEASUREMENT TAG

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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Frank Rayner, P.E. Manager; Albert W. Sechrist, Graduate Engineer; Don Smith, Geologist; Don McReynolds, Geologist; Tony Schertz, Draftsman; Obble 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, Vice President Muleshoe; Precinct 4 (ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES) Billy Wayne Sisson Hereford; Precinct 5 (FLOYD and HALE COUNTIES) Chester Mitchell, President Lockney

COUNTY COMMITTEEMEN

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; Ronald Coleman, 1972 Rt. 1, Morton; Dan Keith, 1972 Rt. 1, Morton; Keith Kennedy, 1972 Star Rt. 2, Morton; Jessie Clayton, 1974 706 S. Main Ave., Morton; Hugh Hansen, 1974 Rt. 2, Morton.

Crosby County

Clifford Thompson, Secretary; 1628 15th Street, Lubbock; W. O. Cherry, 1972 Lorenzo; L. B. Worthan, 1972 Lorenzo; E. B. Fullingim, 1972 Lorenzo; Jack Bowman, 1974 Lorenzo; Kenneth Gray, 1974 Lorenzo.

Deaf Smith County

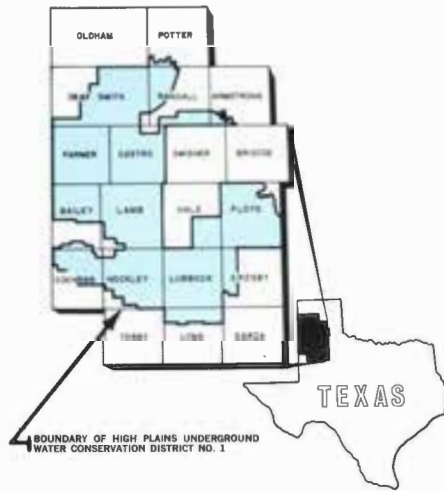
B. F. Cain, Secretary; County Courthouse, 2nd Floor, Hereford; W. L. Davis, Jr., 1973 Hereford; L. B. Worthan, 1973 Rt. 3, Hereford; Frank Zinser, Jr., 1973 Rt. 5, Hereford; George Ritter, 1975 Westway, Hereford; Harry Fuqua, 1975 Rt. 1, Hereford.

Floyd County

Gayle Baucom, Secretary; Farm Bureau, 101 S. Wall Street, Floydada; M. M. Julian, 1972 Box 55, South Plains; M. J. McNeill, 1972 833 W. Tenn., Floydada; Malvin Jarboe, 1972 Rt. 4, Floydada; Fred Cardinal, 1974 Rt. 4, Floydada; Pat Frizzell, 1974 Box 1046, Lockney.

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.



Hale County

J. B. Mayo, Secretary; Mayo Ins., 1617 Main, Petersburg; J. C. Alford, 1972 Box 28, Petersburg; Harold D. Rhodes, 1972 Box 100, Petersburg; W. D. Scarborough, Jr., 1972 Petersburg; Don Hegl, 1974 Box 160-A, Petersburg; Henry Kveton, 1974 Rt. 2, Petersburg.

Hockley County

Jim Montgomery, Secretary; 609 Austin Street, Levelland; Ewel Exum, 1972 Rt. 1, Ropesville; H. R. Phillips, 1972 711 Cameron, Sundown; Douglas Kauffman, 1972 200 Mike St., Levelland; E. E. Pair, 1974 Rt. 2, Levelland; Jimmy Price, 1974 Rt. 3, Levelland.

Lamb County

Calvin Price, Secretary; 620 Hall Avenue, Littlefield; Ardis Barton, 1972 Hiway 70, Earth; Gene Templeton, 1972 Star Rt. 1, Earth; W. W. Thompson, 1972 Star Rt. 2, Littlefield; Lee Roy Fisher, 1974 Box 344, Sudan; Jack Thomas, 1974 Box 13, Olton.

Lubbock County

Clifford Thompson, Secretary; 1628 15th Street, Lubbock; Glenn Blackmon, 1972 Rt. 1, Shallowater; Andrew (Buddy) Turnbow, 1972 Rt. 5, Lubbock; Alex Bednarz, 1972 Rt. 1, Slaton; R. F. (Bob) Cook, 1974 804 6th St., Idalou; Dan Young, 1974 4607 W. 14th, Lubbock.

Lynn County

Clifford Thompson, Secretary; 1628 15th Street, Lubbock; O. R. Phifer, Jr., 1972 New Home; Reuben Sander, 1972 Rt. 1, Slaton; Dale Zant, 1972 Rt. 1, Wilson; Roger Blakney, 1974 Rt. 1, Wilson; Orville Maeker, 1974 Rt. 1, 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.

President's Report . . .

continued from page 1

nation of duplicative governmental effort. The much lower costs for such studies, when performed by the District, should not be overlooked as a means of reducing overall State and Federal expenditures.

During this year, the District Directors toured several state and Federal water agencies, and attended the conventions and seminars of several state and national water organizations and associations. Throughout these travels, the Directors were repeatedly informed about the increasing difficulties confronting the funding and development of surface water projects. The Directors heard several reports of the declining of Federal funding of water development projects, and the serious modification or abandonment of several water projects due to the obstructions proposed by the, so-called, environmentalists. In all, your Directors emphatically affirmed their conviction that conservation and proper utilization of this area's groundwater supplies is the District's first and immediate responsibility. The present trend to increasing opposition to large surface water development schemes — such as the proposed West Texas-Eastern New Mexico water import proposal — makes imperative the continuation of the District's efforts to attain near waste-free utilization of the area's dwindling groundwater reserves, as we continue to strive for the eventual importation of surface water to this area. It is to these objectives that we solicit the help and cooperation of the area's many land-owners and irrigators.

The effectiveness and stability of local government is, in the large part, determined by its financial well being. I am happy to report that the financial stability of the District continued to improve in 1971. During the year a building fund — the District has leased its present office in Lubbock since 1954 — and a legal contingency

WATER . . . continued from page 1

well network within the District. Under this contract about 210 new wells were added to the program, in areas not previously covered by the observation well network.

As the result of the increased need for more accurate water-level data — as required by the District's cost-in-water-depletion, income-tax-allowance program — the District, in 1967, commenced a program to upgrade the observation well program throughout the entire District.

As a result of the District's work, each observation well was identified by a metal tag; located by a detailed map(s); photographed for identification; the measuring point at the land surface photographed; the well's altitude determined; and computer programs were developed to analyze and process the water-level measurements made therein. The present excellence of the observation well program within the District has established it as a model for similar programs being developed throughout the Nation.

By letter, dated April 8, 1971, the Executive Director of the Texas Water Development Board withdrew the Board's participation in the observation well program; and by reply letter, dated April 19, 1971, the District's Manager accepted full control and re-

continued on page 3 . . . WATER

fund, to offset the increasing attorney and court costs that are sometimes encountered in enforcing some of the District's rules and regulations, were established. The table accompanying this report summarizes the District's financial condition at the end of the years listed. Annual audits itemizing the expenditures of the District during these same years have been filed for public record.

Respectfully submitted, Chester W. Mitchell, CHESTER MITCHELL, President Board of Directors

SUMMARY OF THE DISTRICT'S FINANCIAL STANDING 1961-1971*

Table with 8 columns: Year, Net Tax Receipts, Other Income, Bank Notes, Grant and Contract, Total Income, Cash On Hand, Accounts Payable, Net Worth. Rows for years 1961 through 1971.

* All values are in dollars and cents as taken from the respective year's official audit report; except for the 1971 values which were compiled from the District's books through November; and estimated through December 31, 1971.

- 1. Each year ending December 31st.
2. Includes: Map sales, permit deposit forfeits, equipment sales, well validation certificates, insurance refunds, interest earned on time deposits, etc.
3. All income for 1968-1970, and \$20,000 in 1971 was received from the Office of Water Resources Research, U.S. Department of the Interior, for the Tech-District aquifer model research. In 1971, \$30,000 was received from the Texas Water Development Board for the Parmer County groundwater inventory and report.
4. A minus sign (-) indicates a net indebtedness — expenditures exceed income. A plus sign (+) indicates uncommitted cash on hand — income exceeds spending.
5. This total also contains the District's Building and Legal Contingency funds, established in 1971. These funds now contain (with interest through November 1971) approximately \$52,465 and \$20,787 respectively.

WATER DEPLETION TAX ALLOWANCE MAPS

The 1971 cost-in-water depletion, income-tax-allowance guideline maps, for all of the counties within the District, will be released on January 18, 1972.

The Internal Revenue Service has authorized the same cost-in-water values used for land purchased in 1969 to be used for land purchased in 1971. The 1971 cost-in-water tables can be secured without cost by contacting the District's Lubbock office.

The District is continuing its work toward the complete automation (machine processing) of the cost-in-water depletion, income-tax-allowance program. In order to implement these procedures, it will be necessary for each claimant, or his agent (accountants), 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 I.R.S. Form 665, noting on same the total acres in each parcel; or,
- 2) returning to the District the 1971 decline map with the parcel(s) shown thereon (the District will, in turn, return the map to the party providing same); or,
- 3) providing the District with a list of the legal descriptions of the parcels claimed. Forms for this purpose can be obtained from the District.

Tax accountants who have not supplied the District with the required information should do so immediately. Accountants that have acquired additional claimants since originally supplying the required information, should submit to the District the necessary information on their new accounts, in order to keep such records current with the District. If the District's efforts to automate this program are successful, then parcels of land that have not been submitted for machine processing could lose a year's allowance, while they are being processed for machine programming.

WATER... continued from page 2

responsibility for this program. On November 15, 1971, the Board again expressed their willingness to assist the District with the annual water-level measurements. The Board has now agreed to measure the depth-to-water in 296 of the District's 732 current observation wells, during January 1972. Although the Board's participation in this year's water-level measuring program is considerably reduced from that of the 1971 program, the District welcomes the Board's assistance and hopes that this cooperative effort can be expanded in the future. This program constitutes one of the most essential and beneficial services performed by both the District and the Board.

Measurement Tag

Each year, since 1968, a stick-on measurement tag has been affixed to the well-head equipment of each observation well. This tag shows the measured depth to water in the well. A different colored tag is used each year. The 1972 tag (as shown on page 1) will be green and white.

Election . . .

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Ballots

The names of all candidates to be voted on within each county will be listed on the ballots. Voters can vote for the candidate(s) of their choice by placing an X in the box preceding the candidate's name or by placing an X in the box preceding the space provided for a write-in vote, and by writing in the name of the person of their choice.

The position of the candidate's names upon the ballots was determined by drawing lots, in accordance with Texas' election laws.

Polling Places

For the 1972 election, a total of 24 polling places have been established; this is an increase of three additional polling places over those used during the 1970 election.

The names and addresses of the candidates for election; the locations of polling places; and the names and addresses of the election judges are listed below.

NOMINEES FOR DISTRICT DIRECTOR

Director's Precinct No. One—Territory within the District which is situated in each of the following counties:

Crosby, Lubbock and Lynn.

Ray Kitten, Route 1, Slaton, Texas
C. C. Sherrod, Route 1, Box 48, Lubbock, Texas

Director's Precinct No. Two—Territory within the District which is situated in each of the following counties: Cochran, Hockley and Lamb.

Selmer Schoenrock, 112 Rip, Levelland, Texas
D. A. Ramsey, 406 E. Garfield, Morton, Texas

Director's Precinct No. Five—Territory within the District which is situated in each of the following counties: Floyd and Hale.

Chester Mitchell, Route M, Lockney, Texas

NOMINEES FOR COUNTY COMMITTEEMEN

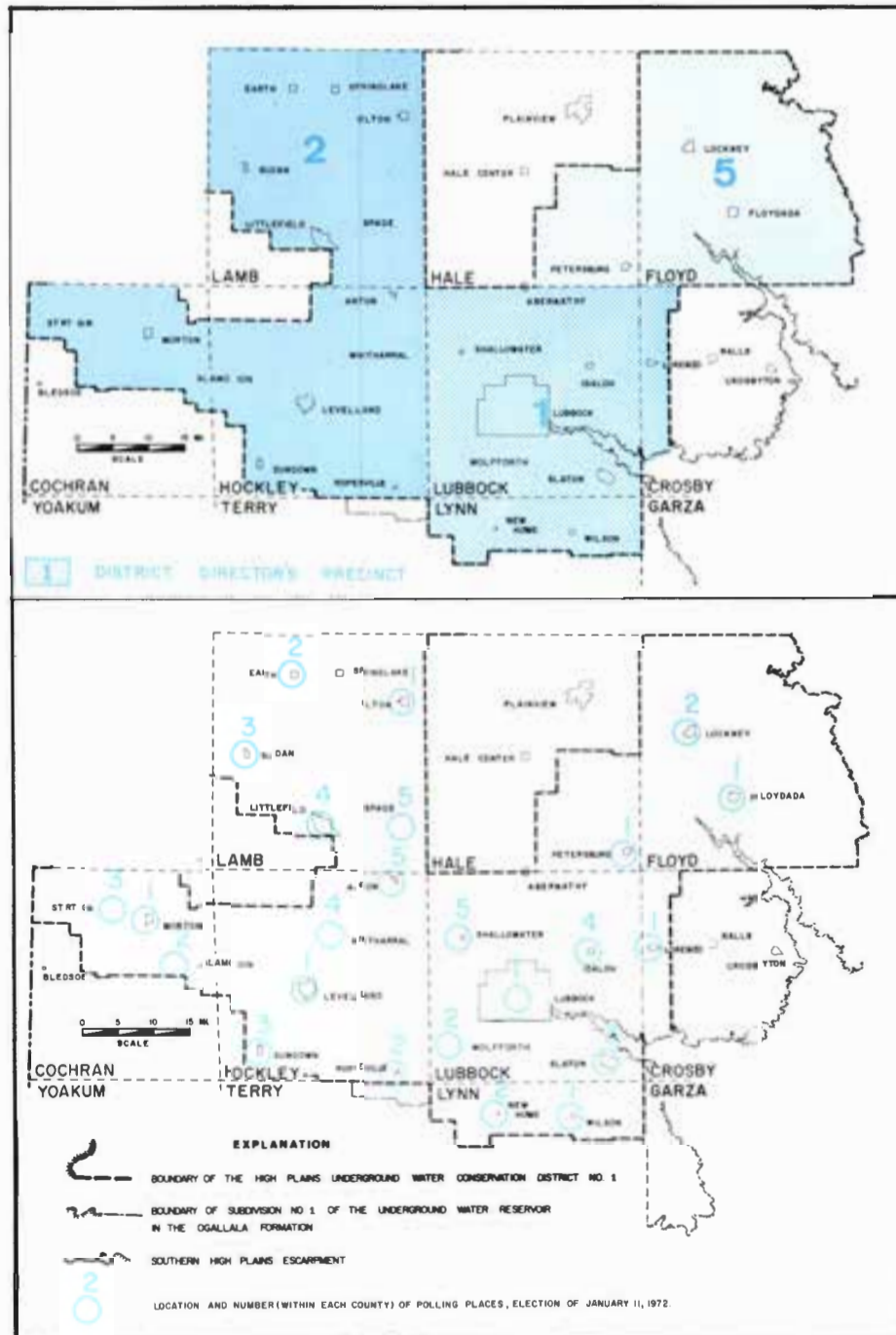
COCHRAN COUNTY

Residents of Commissioner's Precinct 2 vote for one

Dan Keith, Route 1, Morton, Texas
D. F. Burris, Route 1, Morton, Texas

Residents of Commissioner's Precinct 3 vote for one

H. H. Rosson, Route 1, Morton, Texas
C. O. Bryant, Route 1, Morton, Texas



Map showing the area—District Directors Precincts 1, 2 and 5—wherein the election will be held on January 11, 1972; and map showing the locations of polling places.

Residents of Commissioner's Precinct 4 vote for one

Keith Kennedy, Star Route 2, Morton, Texas
Danny Key, Star Route 2, Morton, Texas

CROSBY COUNTY

Residents vote for three

E. B. Fullingim, Lorenzo, Texas
W. O. Cherry, Lorenzo, Texas
M. T. Darden, Lorenzo, Texas

FLOYD COUNTY

Residents vote for one Committeeman-at-large

Malvin Jarboe, Route 4, Floydada, Texas

Residents of Commissioner's Precinct 1 vote for one

Connie Bearden, Route 1, Floydada, Texas

Residents of Commissioner's Precinct 3 vote for one

M. M. "Jack" Smitherman, Silverton Star Route, Floydada, Texas

HALE COUNTY

Residents vote for three

Clint Gregory, Jr., Box 98, Petersburg, Texas
Henry Scarborough, Route 2, Petersburg, Texas
Homer Roberson, Route 2, Petersburg, Texas

HOCKLEY COUNTY

Residents of Commissioner's Precinct 1 vote for one

Ewel Exum, Route 1, Ropesville, Texas

Residents of Commissioner's Precinct 2 vote for one

Billy Ray Carter, Route 5, Levelland, Texas

Residents of Commissioner's Precinct 4 vote for one

Douglas Kauffman, 200 Mike, Levelland, Texas

LAMB COUNTY

Residents vote for one Committeeman-at-large

Donnie Clayton, Box 276, Springlake, Texas

Residents of Commissioner's Precinct 2 vote for one

T. H. Lewis, Box 255, Earth, Texas

Residents of Commissioner's Precinct 3 vote for one

Gene Templeton, Star Route 1, Earth, Texas

Residents of Commissioner's Precinct 4 vote for one

W. W. Thompson, Star Route 2, Littlefield, Texas

Residents of Commissioner's Precinct 2 vote for one

Mack Steffey, 905 E 5th, Littlefield, Texas

Residents of Commissioner's Precinct 3 vote for one

W. W. Thompson, Star Route 2, Littlefield, Texas

Residents of Commissioner's Precinct 4 vote for one

Glenn Blackmon, Route 1, Shallowater, Texas

Residents of Commissioner's Precinct 1 vote for one

S. B. Rice, Route 1, Wilson, Texas

Residents of Commissioner's Precinct 1 vote for one

W. R. Steen, Route 2, Wilson, Texas

Election . . .

... continued from page 3

Residents of Commissioner's Precinct 4 vote for one

O. R. Phifer, Jr., New Home, Texas

POLLING PLACES AND OFFICERS FOR THE ELECTION COCHRAN COUNTY

Polling Place No. 1: County Activities Building, Morton, Texas

Presiding Judge: Clayton Stokes, Morton, Texas

Polling Place No. 2: Alamo Gin, Route 1, Morton, Texas

Presiding Judge: Mrs. Ray Carter, Morton, Texas

Polling Place No. 3: Star Route Gin, Morton, Texas

Presiding Judge: T. M. Tanner, Star Route 2, Box 111, Morton, Texas

CROSBY COUNTY

Polling Place No. 1: Lorenzo Community Center, Lorenzo, Texas

Presiding Judge: Mrs. Ralph Wiese, 203 Harrison Ave., Lorenzo, Texas

FLOYD COUNTY

Polling Place No. 1: County Courthouse, Floydada, Texas

Presiding Judge: R. M. (Fred) Battey, 529 W. Virginia, Floydada, Texas

Polling Place No. 2: Barker Ins. Agency, Main & Locust, Lockney, Texas

Presiding Judge: Barry Barker, Box 518, Lockney, Texas

HALE COUNTY

Polling Place No. 1: Community Center, Petersburg, Texas

Presiding Judge: Gaylord Groce, Petersburg, Texas

HOCKLEY COUNTY

Polling Place No. 1: County Courthouse, Levelland, Texas

Presiding Judge: B. D. Carter, Box 534, Levelland, Texas

Polling Place No. 2: Ropesville Co-op Gin, Ropesville, Texas

Presiding Judge: Frank Sylvester, Ropesville, Texas

Polling Place No. 3: City Hall, Sundown, Texas

Presiding Judge: Mrs. T. I. Elliott, Box 743, Sundown, Texas

Polling Place No. 4: Whitharral Lions Club Bldg., Whitharral, Texas

Presiding Judge: Robert E. Avery, Jr., Route 2, Levelland, Texas

Polling Place No. 5: City Hall, Anton, Texas

Presiding Judge: Orval Williams, Box 748, Anton, Texas

LAMB COUNTY

Polling Place No. 1: Olton Co-op Gin, Olton, Texas

Presiding Judge: Eldon Franks, Box 36, Olton, Texas

Polling Place No. 2: Earth Gin, Earth, Texas

Presiding Judge: Bob Belew, Box 62, Earth, Texas

Polling Place No. 3: City Hall, Sudan, Texas

Presiding Judge: Coleman Terrell, 412 Furneaux, Sudan, Texas

Polling Place No. 4: County Courthouse, Littlefield, Texas



During December, four units of the District's 5-vehicle fleet were replaced. The fleet now consists of three, 1972-model pick-up trucks and a sedan, and one 1970-model sedan. The many thousands of miles driven by District personnel on tail-water abatement, well validation, water-level measuring and other types of field work, and other inter and out of District travel, requires safe vehicles. The four 1968-model vehicles that were replaced had, on the average, been driven in excess of 100,000 miles each.

Presiding Judge: Mrs. Arthur Jones, 707 Littlefield Dr., Littlefield, Texas

Polling Place No. 5: Farmer's Co-op Gin, Spade, Texas

Presiding Judge: C. C. Byars, Box 343, Spade, Texas

LUBBOCK COUNTY

Polling Place No. 1: Basement of new County Courthouse, Lubbock, Texas

Presiding Judge: James H. Goodman, 1412 - 15th, Lubbock, Texas

Polling Place No. 2: City Hall, Wolf-forth, Texas

Presiding Judge: Mrs. E. R. Haskins, Wolf-forth, Texas

Polling Place No. 3: Community House, Slaton, Texas

Presiding Judge: Wayne Liles, 305 S. 11th St., Slaton, Texas

Polling Place No. 4: City Hall, Idalou, Texas

Presiding Judge: Carlos May, Idalou, Texas

Polling Place No. 5: Community Club-house, Shallowater, Texas

Presiding Judge: Alton Hardy, Box 225, Shallowater, Texas

LYNN COUNTY

Polling Place No. 1: Wilson Co-op Gin, Wilson, Texas

Presiding Judge: Mrs. W. C. Maeker, Box 92, Wilson, Texas

Polling Place No. 2: New Home Co-op Gin, New Home, Texas

Presiding Judge: Joe Lewis, Route 4, New Home, Texas

**GOOD GOVERNMENT IS NO ACCIDENT
IT IS A CREATION OF PUBLIC INTEREST**

VOTE ON JANUARY 11, 1972