THE Cross SECTION

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

Volume 19—No. 1 "THERE IS NO SUBSTITUTE FOR WATER" *January, 1973*

1973 ELECTION RESULTS

The results of the January 9, 1973, election of the High Plains Underground Water Conservation District No. 1 were declared official on January 16 by the District's Board of Directors. The Board canvassed the votes and named two Directors and 21 County Committeemen to new terms.

Billy Wayne Sisson, incumbent for District Director's Precinct 4 (Armstrong, Deaf Smith, Potter and Randall), won re-election to a second two-year term. Sisson, a Hereford farmer-rancher, was unopposed on the ballot. He tallied 55 of the 57 votes cast.

Elected to fill the seat vacated by Ross Goodwin of Muleshoe, past President of the Board, is A. W. Gober of Farwell. Gober polled 51 of the 126 votes cast in District Director's Precinct 3. Wade Mills of Nazareth received 26 votes and John Gunter of Muleshoe ran a close second to Gober with 44.

Gober, representing Bailey, Castro and Parmer Counties, was serving Parmer County as a County Committeeman at the time of his election to the Board.

Other members of the Board beginning the second year of their present terms are Chester Mitchell, Lockney; Ray Kitten, Slaton, and Selmer Schoenrock, Levelland.

Officers Elected

At a noon luncheon, January 16, Judge Pat S. Moore of the 72nd District Court administered the oath of office to Sisson and Gober. The Board of Directors and District staff attended the ceremonies.

Following the luncheon, the Board reconvened and elected officers for the year 1973 to 1974.

Elected were Chester Mitchell, President; Billy Wayne Sisson, Vice President, and Ray Kitten, Secretary-Treasurer.

County Committeemen

Twenty-one County Committeemen were elected January 9 from Director's Precincts 3 and 4. These men will serve four-year terms. They are:

BAILEY
Eugene Shaw, Muleshoe
Joe (Archie) Sowder, Goodland
Jessie Ray Carter, Muleshoe

CASTRO
Jackie Clark, Dimmitt
Joe Nelson, Dimmitt
Bob Anthony, Dimmitt

PARMER
Troy Christian, Farwell
Joe Moore, Lazbuddie
Dalton Caffey, Friona

ARMSTRONG
Guy Watson, Wayside
C. D. Rogers, Wayside
Bill Heisler, Wayside

DEAF SMITH
James E. Higgins, Hereford
Garland Solomon, Hereford
W. L. Davis, Hereford

POTTER
Henry W. Gerber, Amarillo
Jim Line, Bushland
Albert Nichols, Amarillo

RANDALL
Harry LeGrand, Amarillo
Joe Albracht, Bushland
Leonard Batenhorst, Canyon

—continued on page 3 . . . ELECTION

Judge Pat S. Moore of the 72nd District Court issued the oath of office to A. W. Gober and Billy Wayne Sisson on January 16, 1973, at the Red Raider Inn in Lubbock.

Bailey R. Mayo, right, President of the South Plains Chapter of the Soil Conservation Society of America, presents a plaque to Frank Rayner and Rebecca Clinton for the excellence of the District's publication, **The Cross Section.**

Cross Section Honored By SCSA

The Water District is pleased to announce that *The Cross Section* was recently awarded a plaque for "outstanding conservation publicity" by the Soil Conservation Society of America (SCSA).

Bailey R. Mayo, President of the South Plains Chapter of the SCSA, presented the award to Frank Rayner, Manager of the District, and Rebecca Clinton, Editor, during an SCSA dinner January 4 in Lubbock.

Arneal Scott, Public Relations Committee Chairman, said the award was presented to the District's publication for "coverage of pollution abatement practices, irrigation tailwater recovery systems, conservation and outdoor classrooms in public school systems."

The Cross Section, the only monthly groundwater conservation publication in existence today, has been published by the District each month since June, 1954. The District mails 12,000 copies monthly to people in each of the 50 states and 15 foreign countries. The publication is read by legislators, federal government employees, geologists, hydrologists and educators, as well as farmers and many others in agriculture-oriented fields; however, it is aimed primarily at the High Plains irrigation farmer.

Nine editors have contributed to the merit of *The Cross Section* since its inception. Those men and women are: F. B. Jeu Devine, Allan White, Claudette McInnis, B. J. Waddle, Tom Moorehead, Jimmy Ross, Frank Rayner, John L. Seymour and Rebecca Clinton. Rayner has served twice as Editor, taking on the duty each time while also serving as Manager of the District.

The District is proud that its publication has been so honored by the Soil Conservation Society and wishes to thank the SCSA for its recognition.

Depletion Maps Released By District

The 1972 cost-in-water depletion, income-tax-allowance guideline maps for the High Plains Underground Water Conservation District No. 1 were released by the District's Lubbock office January 10. The price of the maps will remain the same as last year—$7.50 per copy.

These guideline maps, used by landowners and their accountants to determine the water depletion allowance on their 1972 income tax, depict the decline of the water table beneath 14 of the 15 counties comprising the Water District.

Data for Parmer County will be supplied this year for individual parcels at $5 per claim. The print-out, water-level decline data, will be furnished in lieu of a map. The District is attempting to automate this program with a test of these procedures in Parmer County.

If the machine processing proves successful, it will probably be expanded to other counties in the near future.

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Telephone 762-0181

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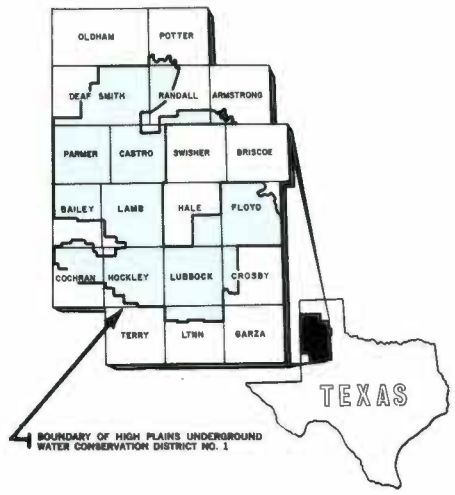

NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

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.

TO PRE-IRRIGATE . . . OR NOT TO PRE-IRRIGATE

By CHARLES W. WENDT*

Conservation of our underground water is the key to prolonging the irrigated economy of the Texas High Plains. As we enter the 1973 crop year, one place where we might conserve irrigation water is in the preplant irrigation. A producer should decide as to his objective of this irrigation. Is the irrigation to add deep moisture to the profile, or is it to wet the surface soil to germinate seeds and get the crop started?

The 1972 soil moisture survey taken in December, 1971, through February, 1972, by Mr. O. H. Newton and Dr. O. C. Wilke, Advisory Agricultural Meteorologist, National Weather Service, and Assistant Professor, Texas Agricultural Experiment Station at Lubbock, respectively, indicated that the deep soil moisture was adequate over most of the area and that the only moisture the soil would hold was that in the first 12 inches of surface soil. The probability of getting enough rain to supply the 1.5 inches of water to take care of this need was 87 percent (Table 1). Since the rains as projected by the probability did occur, there was no need for any preplant irrigation over most of the area in 1972. In cases where the farmers irrigated prior to the rains, it was necessary to apply up to six inches of irrigation water to obtain the necessary 1.5 inches due to the dry Spring and rough soil conditions. This means that in 1972 up to 75 percent of the irrigation water applied as preplant irrigation was not beneficially utilized by crops.

Tillage Study Conducted

Since the probability of receiving adequate rainfall to supply the top 12 inches was high, no pre-irrigation was applied to a tillage study in 1972 at the Texas Agricultural Experiment Station at Lubbock. The four treatments included in the study were no tillage, minimum tillage, moldboarding and chiseling. Prior to planting, the soil moisture in the surface was lowest in the moldboarded plots, followed by the chiseled, minimum-tilled and no-tilled plots.

Adequate moisture was available in the no-tilled and minimum-tilled plots for germination and crop establishment prior to the May rains. The plots with no tillage and the chiseled plots stored more of the May rain than did the other treatments. In general, the yields of cotton and grain sorghum were equal in the minimum-tilled, chiseled, and moldboarded plots and lower on the plots which were not tilled.

A Look at 1973

What does all this mean for 1973? With all the snow and Fall rains, there is a good possibility that part of the High Plains area has all of the deep moisture that can be stored for summer crops. From the soil moisture survey currently underway, it appears that the sandy and mixed soils from the Lubbock area and south have already received all the deep moisture they can store and that a preplant irrigation to add deep moisture will not be necessary.

The samples taken to the north and east of Lubbock in the clay soils are quite variable. Some of them have adequate moisture, while others are dry between two and three feet.

A soil moisture survey to be issued by Newton and Dr. Wilke in February will give more information concerning the status of soil moisture in the Texas High Plains. This survey will be published in *The Cross Section* and some of the area newspapers and will be available from the county agents in the counties comprising the survey.

Conserve Moisture

For those areas which have adequate deep moisture, the only moisture necessary will be that for crop germination and establishment. From the 1972 data at the Texas Agricultural Experiment Station at Lubbock, it appears that the less the land can be tilled, the more moisture will be conserved. If the soil was not packed with heavy equipment in wet weather, only a shredding, disking, and bedding may be all that is necessary. If it was worked with heavy equipment during harvesting and deep tillage is necessary to eliminate compacted areas, chiseling is better than breaking from the standpoint of conserving rainfall.

The long term odds of getting adequate rainfall for germination and crop establishment are excellent (Table 1). Further, to date we have received over an inch of moisture in 1973. In the past 60 years, when over an inch of water was received in January, at least two more inches of rain were received prior to planting. Thus, the odds are very good that enough rain will be received prior to planting in 1973 so that farmers will not have to pre-irrigate those soils which already have deep soil moisture.

As previously mentioned, the soil moisture survey, which will be available in February, will provide further information regarding the surface and deep moisture before the farmer needs to make a decision concerning this practice.

However, due to the depletion of the aquifer system supplying water to the High Plains, it would benefit the irrigation farmer to seriously consider setting aside a portion of his farmland this planting season so as to test the minimum tillage and no-preplant irrigation concepts.

*EDITOR'S NOTE: Associate Professor, Texas Agricultural Experiment Station, Texas A&M University Agricultural Research & Extension Center, Route 3, Lubbock, Texas 79401.

TABLE 1. Percent probability for rainfall equal to or greater than amount stated.

Rainfall (inches)	March 21 April 20	March 21 April 30	March 21 May 10	March 21 May 20	March 21 May 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 AGRICULTURAL ECONOMY --- IN BRIEF*

Farm income for the 15-county area of the High Plains Underground Water Conservation District No. 1 totaled $711 million in 1971. This total, based on the recently-published *Texas Crop and Livestock Report,* is 19 percent of the state total farm income.

These counties served by the Water District, five percent of the total land surface of the state, lead most areas in farm income, crop production, irrigation and cattle feeding.

In 1971 these 15 counties tallied $576 million in total crop and livestock income, or 18 percent of the state's total.

Upland cotton production in this section of the High Plains exceeded 575,000 bales—29 percent of the cotton production of the entire state.

Cattle Feeding Increasing

During the past several years, cattle feeding has become an important part of the High Plains agricultural scene. As of January 1, 1972, the 15-county area claimed 791,000 (44 percent) of the 1,781,000 cattle on feed in the state. Total grain sorghum production amounted to 39 percent—more than 118 million of the total 303 million bushels produced in Texas.

Herbert Grubb and John Perrin, Manager and Staff Member of the Division of Management Science, Office of Information Services, Office of the Governor of Texas, present in their December, 1972, report, *Selected Population, Economic, and Agricultural Data for the Texas High Plains,* conclusions based on 1967 estimates and 1967 dollar values. Their researchers have been gathering data since that year, and, in some cases, have updated figures with which to compare the 1967 data.

The Grubb-Perrin report looks at the High Plains as a whole. Where possible, the 15-county area making up the Water District is compared to the High Plains and the State of Texas. Several assumptions taken from their report follow.

Report Looks At High Plains

In 1970 the 56-county area known as the Texas High Plains accounted for 9.2 percent of the total personal income in Texas and 39.4 percent of the state's total farm income. In the same year, farm earnings accounted for 17.8 percent of total personal income on the High Plains.

Looking at irrigation, the impact of that practice in the High Plains area is evident. Thirty-six percent or 4,834,316 of the 13,547,822 acres of cropland on the High Plains was under irrigation in 1969. This compares to the state's total—6,888,075 of the 38,762,277 acres, or 17.12 percent. The 15-county area within the Water District irrigated 43.37 percent of its 6,111,629 acres under production in 1969. Calculated, this would indicate that 38.48 percent of the state's total irrigated acreage lies within the Water District.

Area Leads In Farm Income

Forty-three percent of the state's total farm earnings in 1967 were a result of contributions of the High Plains. Personal income in the area amounted to only 10 percent of the state's total for that year. However, state tax revenues for the same year collected in the High Plains area totaled 21.7 percent of the taxes collected throughout the state and 17 percent of the federal taxes collected in Texas.

"If no taxes were collected in the High Plains, federal tax collection in the rest of the state would have to be increased by 20 percent and state taxes would have to be increased by 28 percent in order to raise an equal amount of tax revenues," quotes the report.

Of interest to High Plains farmers is the conclusion that in 1970 the net primary benefits to farmers from present groundwater irrigation methods (after pumping costs and all other production costs have been deducted) equalled $14 per acre foot (assuming the average use of one acre foot per irrigated acre). By 1980, the projected estimate is $12 per acre foot.

However, the gross value of irrigation water per acre foot is $275 for 1970 and projected to go up to $301 by 1980. The value for the same acre foot of water is then expected to drop slightly by 1990 to $277 and to $272 by the year 2000.

Pumping Costs Estimated

An estimated $17 per acre foot in pumping costs could have been saved in 1970 had irrigation water been available without the expense of pumping underground water. It is also estimated that, based on the 1970 figures, the maximum average price farmers could pay for irrigation water delivered to farms would be $31 per acre foot. This value is the sum of the net primary benefits of groundwater to farmers and the estimated cost of pumping local area groundwater.

The report backs up the fact that irrigation sustains the current high level of agricultural output by noting, "In 1967, the total impact of the High Plains economy of crop production was $2.2 billion of which $1.6 billion was attributable to the increased production made possible by irrigation."

Based on these figures the "indirect and induced output" of the rest of the state (in 1967) would have been reduced by $180 million had crops been produced under dryland conditions.

Projected Figures Conservative

It is worth noting that the projected figures presented above may be extremely conservative, considering that the projections are based on 1967 dollar values, with no allowance built in for inflation. Statistics have proven that the price index, the weighted average price ratio of a selected group of commodities taken from the general economy, is up 128 percent today as compared to 1967. Continuous updating of the study is in progress and on the agenda for the future.

*EDITOR'S NOTE: This is a brief summary of agricultural-economic statistics which recently appeared in two publications, *The Texas Crop and Livestock Report* and *Selected Population, Economic, and Agricultural Data for the Texas High Plains.* The reports are published by the Texas Department of Agriculture and the Office of Information Services, Office of the Governor of Texas, respectively.

Reinstatement of REAP Under Study

A bill that would reinstate the Rural Environmental Assistance Program (REAP), terminated by the U. S. Department of Agriculture (USDA) upon orders of President Nixon on December 22, 1972, has been introduced by U. S. Rep. Bob Poage of Waco.

Poage, Chairman of the House Agricultural Committee, said his bill would continue the $225 million authorization in the old act and make the payments mandatory. The old law leaves the program to the discretion of the USDA.

The program, administered by the Agricultural Stabilization and Conservation Service, with technical assistance from the USDA, Soil Conservation Service, since March 1, 1971, provides Federal cost-share assistance to farmers and ranchers for carrying out soil and water conservation practices.

One of the major aid areas of the program has been the installation of underground irrigation pipeline. Approximately one-half of Lubbock County's allocation in recent years has been in this area. Land preparation, such as, chiseling, deep plowing, land leveling, terracing and cover cropping, accounted for about 30 percent of the allocation. Federal funds defrayed 30 to 50 percent of the cost of such conservation programs. The farmer, himself, paid the remaining cost.

The use of underground pipeline is considered by many to be an effective conservation measure, as the pipe curbs seepage into the soil and evaporation that would result from open ditches.

Another conservation practice allowed by the old REAP program is the installation of tailwater recovery systems, allowed under the section providing for sediment or chemical runoff control measures. This constituted a major groundwater conservation measure, and a program of paramount importance to the High Plains area.

ELECTION . . . continued from page 1

Light Voter Turnout

The small number of votes cast in the 1973 election can be attributed in part to the hazardous weather conditions suffered by the area during the first of the new year. However, few or no votes were cast absentee and only six were polled at Dimmitt. *The Cross Section* urges the District's voters to take a greater part in the future in electing the men who set policy for the District's residents.

Hardeman Named TWRC Chairman

Governor Preston Smith, in one of his last official gestures in early January, appointed Dorsey Hardeman to replace Otha Dent as Chairman of the Texas Water Rights Commission (TWRC).

Hardeman had been appointed to the three-member Commission by Governor Smith in 1971 to fill the unexpired term of Leslie R. Neal, who resigned due to ill health.

Other members of the TWRC are Otha Dent of Littlefield and Joe D. Carter of Sherman. Dent, whose present term on the Commission expires in 1977, has served since 1953 and has been Chairman since October, 1969.

Carter, Chairman from 1961 to 1969, will conclude his present term on the Commission this year.

Hardeman's present term expires in 1975.

WADDLE RECOVERING FROM HEART ATTACK

Bill Waddle, former Water District employee, suffered a heart attack December 25, 1972, in Austin. He is presently recovering at his home there.

Waddle, General Manager of the Texas Water Conservation Association (TWCA) since February, 1968, served the District as Editor of *The Cross Section* from June, 1964, until January, 1968. Bill is expected to return to his TWCA duties in a few months.

The Board of Directors and District staff extend to Bill and his family their best wishes for his speedy and full recovery to health.

Albert Sechrist, Bill Claborn and Frank Rayner review print-outs showing the water level decline for individual parcels of land in Parmer County prior to mailing the print-outs to accountants and tax payers as part of the District's cost-in-water depletion, income-tax-allowance program.

TWO DIRECTOR'S SEATS FILLED FOR 1973-1975

BILLY WAYNE SISSON

Billy Wayne Sisson of Hereford was re-elected to his second two-year term on the Board of Directors of the High Plains Underground Water Conservation District No. 1 on January 9, 1973. The Board, in their first meeting of 1973, named him Vice President for the coming year.

Sisson, representing District Director's Precinct 4 (Armstrong, Deaf Smith, Potter and Randall Counties), was a County Committeeman from 1965 to 1971.

Born at Tahoka in 1930, Sisson has been involved in farming most of his life, with a brief recess for college and his military obligation. A graduate of McMurry College with a degree in physical education, he played varsity football for four years.

Following graduation, the Director served in the U. S. Army for a year and then operated a Hale County cotton gin for several years. In 1950, he married DeAun LaNoe Kinkler. Their two daughters, Shalyn, 17, and Shavon, 9, are a senior and fourth grader, respectively.

Farming since 1959, Sisson now farms approximately 2,700 acres of grain sorghum and wheat. He also has cattle interests.

The Director, with 26 irrigation wells on his farm, is well acquainted with the importance of water conservation. He has proven his desire to abate tailwater runoff and the problems of silt buildup resulting from such waste, by installing two tailwater pits and four grassed waterways leading to the pits.

BILLY WAYNE SISSON

Pictured above are the District's Board of Directors for 1973. Seated are Chester Mitchell, President, and Billy Wayne Sisson, Vice President. Standing, left to right, are Selmer Schoenrock; Ray Kitten, Secretary-Treasurer, and A. W. Gober, newly-elected Director from Farwell.

When asked about the worth of recovery systems, Sisson said, "I have found that tailwater pits can pay for themselves if you have enough waste water and the slope of the land is right." He continued, "I am pleased with the efficiency of my pits and would recommend that all farmers consider adding one to their conservation program."

A concerned farmer, Sisson has first-hand knowledge of the problems resulting in an area where water conservation is not practiced. He has shown continued efforts to notify High Plains farmers of the need to preserve the area's limited underground water supply for future generations and to reap more productive results from the water that is used.

Concerning groundwater basin management and pending legislation regarding such, Sisson has strong sentiments. "I feel very strongly that control of underground water should remain on the local level—in the hands of entities such as the Water District," he affirmed. "I am opposed to state control of groundwater."

The District is pleased that Mr. Sisson has kept his place on its Board of Directors and takes this opportunity to publicly thank him for his past services to the District and look forward to his continued participation as Vice President of the Board.

A. W. GOBER

A. W. Gober, Parmer County farmer, is the new Board Member for Director's Precinct 3, representing Bailey, Castro and Parmer Counties.

Farming nine miles northeast of Farwell since 1946, Gober is not a new face to the Water District. He has served as a County Committeeman for seven years prior to his election in January to the Board of Directors. Gober fills the seat vacated by Ross Goodwin of Muleshoe.

Gober, born in Frederick, Oklahoma, in 1918, moved with his parents to the Farwell area in 1925. Before taking over the farm in 1946, he attended Texas Tech University in Lubbock for three and one-half years, majoring in agricultural education. He also completed a three-year tour with the U.S. Navy.

The Director now farms 480 acres of milo, grain sorghum and wheat. Having irrigated since 1953, Gober has three irrigation wells on his 480 acres, another three on a farm in which he owns interest, and one on a farm owned by his wife.

When asked what he thinks of recovery systems, Gober says he believes they have been proven to be good conservation methods. He does not have a return system at present, but has a site set aside on his farm for a tailwater pit.

Gober has strong sentiments about the waste of groundwater. "Waste is not as bad as it was in this area, but we all must be more particular in the handling of water," said Gober.

Gober and his wife of 30 years, Irene, have four children, three of whom reside in Lubbock. The oldest son, Jerald, is a Texas Tech graduate with a masters degree in business and works for a Lubbock insurance firm. Their daughter, Kathryn, works at the South Plains Mall, and the youngest son, Alan, is a freshman at Texas Tech. Dale, another son, also graduated from Tech with a degree in agricultural engineering. He now farms with his father.

Gober, also a member of the Co-Op Elevator Board of the Bovina Wheat Growers Association, feels there is much to accomplish as a Director. "This is a very interesting and challenging position and I am proud to be serving the Water District in this capacity," said the new Director.

He also added, "I will do what I can to keep the powers of the Water District intact and the ownership of groundwater in the hands of the landowner."

The Cross Section is proud to welcome Mr. Gober to the Water District and its Board. The voters' confidence in him lends proof to his ability to seek out problems and to solve them. His work in water conservation is much needed and will be welcomed by all irrigation farmers on the High Plains of Texas.

A. W. GOBER

HIGH PLAINS UNDERGROUND WATER
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SECOND CLASS PERMIT

THE Cross SECTION

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Members of the District's Board of Directors meet with Governor Dolph Briscoe in Austin during the annual Texas Water Conservation Association convention. From left to right are Ray Kitten, Selmer Schoenrock, Governor Briscoe and Chester Mitchell.

Goodwin and Rayner Elected to Panels

Frank Rayner, Manager of the District, and Ross Goodwin, past President of the District's Board of Directors, have been re-elected to the groundwater and irrigation panels, respectively, of the Texas Water Conservation Association (TWCA). The elections came during the annual TWCA convention, held in Austin February 21-23.

Keynote speakers for the convention were Lieutenant Governor William P. Hobby, State Representative Bill Clayton, Attorney General John Hill and Dr. Cooper Wayman, Regional Counsel, Environmental Protection Agency, Region VI, Dallas. The convention was ended with the feature address by Texas Governor Dolph Briscoe (see pages 3 and 4 for the text of his speech).

The Resolutions Committee, composed of two members from each of the seven panels and headed by Walter Wells of Waco, passed several resolutions concerning Texas Water Development, Federal programs and general policies of the TWCA.

Resolution Passed

The resolution concerning TWCA's stand on the possibility of state control of groundwater states in full:

"Be it resolved that the Texas Water Conservation Association considers that existing state laws provide adequate authority for effective control and management of the state's groundwater resource through establishment of local districts for such purposes, and that a general law of statewide applicability is not necessary or desirable as a means of coping with special problems of less than statewide scope."

Attending the convention for the Water District were Chester Mitchell, Board President; Ray Kitten, Secretary-Treasurer; Selmer Schoenrock, Member; Frank Rayner, and Rebecca Clinton.

The convention concluded with Governor Briscoe's speech, the presentation of the new TWCA President, Henry Graeser of Dallas, and the dedication of the convention to Otha

—continued on page 4 . . . GOODWIN

SOIL MOISTURE CONTENT HIGH FOR 1973

By O. H. NEWTON and O. C. WILKE*

*EDITOR'S NOTE: This study by O. H. Newton, Advisory Agricultural Meteorologist, National Weather Service for Agriculture, and O. C. Wilke, Assistant Professor of Agricultural Engineering, Texas Agricultural Experiment Station, Lubbock, is reproduced in *The Cross Section* to present to irrigators the belief of many that this may be the year to try minimum tillage or the no-preplant irrigation concept. Conditions seem to be favorable in most areas to set aside a portion of farm land on which to test these groundwater conservation practices.

The data collected during the 1972-1973 fall and winter soil moisture survey has shown that about four-fifths of the 14 counties studied have a good supply of subsurface moisture. In this area, normal rainfall will add enough moisture to maintain normal growth in most crops to the early fruiting stages. The drier areas will need more than normal rainfall moisture which may require an early season irrigation. The soil moisture requirement chart shown on page 2 defines those areas that need certain amounts of water to rewet the soil layers to a depth of five feet.

Purpose and Significance of the Survey

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

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

Until recent years, farmers could only guess at the amount of water needed to wet the soil, but, with modern techniques, it has been possible to make a reliable estimate of additional preseason water needs.

Farmers who irrigate in excess of that which is needed probably will lose money and valuable water, and those having sandy soils could lose nutrients which may be leached out of the soil.

Effects of Rainfall and Past Season Irrigation

The 1972 summer and early fall season was characterized by heavier than normal rainfall from May to early October. Moisture in excess of the amounts used by plants and losses to evaporation established high soil moisture levels, but, since plants continued to extract moisture after the rains decreased, some fields lost some of this moisture.

This has caused a higher variability from field to field than has been found in previous soil moisture surveys. This means that farmers should expect drier soils in those fields that had a heavy crop cover up until the first freeze.

In most cases it was found that this lower moisture content was confined to the second and third feet below the soil surface. Some moisture has been added to the top foot to 18 inches by winter rains and snows. but indications are that very small amounts of this moisture have moved into the deep layers.

Soil Moisture Evaluation Methods

It would be highly preferable to evaluate the soil moisture in every field in the South Plains to determine water needs, but, because this is well

—continued on page 2 . . . SOIL

RAYNER TESTIFIES BEFORE NWC

Frank Rayner, Manager of the High Plains Underground Water Conservation District No. 1, appeared before the National Water Commission (NWC) on February 5 and 6 during a public hearing in New Orleans, Louisiana, held to air the findings of the *Proposed Report of the National Water Commission.* Rayner presented the composite opinion of the members of the District's Board of Directors. The District's 19 pages of comments on the NWC report were primarily confined to those parts of the report dealing directly with groundwater management.

The District criticized the Commission for its suggestion that the Federal Government abandon its interests in the development of water projects throughout the nation by noting "The abandonment of Federal participation in water development programs will only lead to a worsening of already burgeoning social problems . . ."

The District's statement also noted that the report projects an "apparent bias" against further water development, particularly for the purpose of irrigated agriculture.

"An adequate irrigation water supply eliminates one of the crucial risks of agriculture, drought, and adds stability to our agricultural production," Rayner claimed.

"It is this dependability that permits us to enjoy high quality, low cost food and fibre products . . ."

The District's statement pointed out that under the present stability of irrigated agriculture, and in spite of the absence of a definable national water policy, Americans only spend approximately 16 percent of their total income for food products—far less than any other major nation in the world.

In regard to groundwater management, the District's opinion was that the Commission failed to grasp the desirable objectives of groundwater management. "The Report does not even mention conservation of groundwater to be one of its management

—continued on page 3 . . . RAYNER

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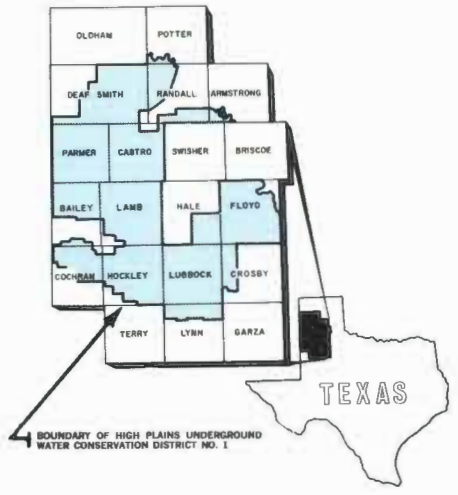

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Weather Modification Committee Meets In Lubbock

The evaluation of weather modification projects in Texas was the subject of discussion by the Weather Modification Subcommittee of the Executive Water Committee of the Texas Society of Professional Engineers, during their meeting of January 30, in the Lubbock offices of the High Plains Underground Water Conservation District No. 1 (see picture, page 3).

Committee members present were the Chairman, Owen Ivie, Manager of the Colorado River Municipal Water District, Big Spring; Victor Jaeggli, Manager of the West Central Texas Municipal Water District, Abilene, and Frank Rayner, Manager of the High Plains Water District. A fourth committee member, Walter Wells, General Manager of the Brazos River Authority, Waco, was not present.

Ivie reported on his District's rainfall generation program in the upper reaches of the Colorado River above Lake J. B. Thomas. He noted that the District's limited efforts to evaluate their two years of weather modification have convinced him that they have affected the rainfall in their target area; however, without proper evaluation, he noted, it is not possible to determine the extent of their success.

Jaeggli summarized his observations of the weather modification reports presented at the Cloudtap Conference in Dallas in October of 1972. He noted that this was a joint conference sponsored by Texas and Oklahoma, and observed that Oklahoma, primarily because of the strong leadership of Governor David Hall, has been quite active in weather modification programs.

Programs Needed

Jaeggli noted it is imperative that some programs be established in Texas as to evaluate the ongoing weather modification projects in our state "if we are ever going to remove the doubts, uncertainties and prejudices that have made the layman view the whole business as some sort of witchcraft".

Rayner presented a brief report to the committee showing the estimated effects that the generation of only one inch of beneficial rainfall would have on groundwater conservation, and the resultant savings in natural gas—the fuel used to pump most of the area's irrigation water.

He reported that one inch of ideally beneficial rainfall could result in a savings of more than one billion cubic feet of natural gas. He went on to note that the potential savings in energy used to pump groundwater may generate widespread interest in rainfall augmentation in the future "if the prophecies of the much-heralded energy crisis come to pass".

One Inch Equals $7 Million

Rayner also noted that, when compared to the value of irrigation water, as set forth by a recent report released by the Texas Governor's Office, one inch of applicable rainfall falling only upon the irrigated area within the High Plains Water District would be valued at more than $7 million.

Rayner went on to add, "There is no reason to believe that an inch of well-timed rainfall would be any less valuable to all land in the District, including ranchland, city lawns and parks, cultivated dryland, etc.; therefore, a one-inch rain could be worth more than $100 million."

He emphasized that the area applicable to his estimates was only that area within the High Plains Underground Water Conservation District No. 1, which represents only a frac-

—continued on page 3 . . . WEATHER

SOIL . . . continued from page 1

beyond the scope of this survey, a wide-spaced sampling technique was used. Up to 12 representative locations were selected in each of the 14 counties in which the amount of available moisture was determined.

Since South Plains soils are quite variable in texture and, thus, water-holding capacity, the values found were compared to the highest values ever found during previous readings. In most cases this high value was recorded during the 1969-1970 survey which followed an excessive rainfall period.

The technique further involved the best information available on the water-holding capacity of various soils in the area. The accuracy of this technique was proven at two locations where heavy irrigation had been applied. In each case, the additional water needed to wet the soil was indicated to be very near zero.

Probabilities of Spring Rainfall

The probability of spring rains is also an important consideration for the farmer as he applies a preplant irrigation. It may be true that we cannot be sure that the coming season will produce above or below normal precipitation, but seasonal trends are reliable.

The chance for rain does increase rather rapidly, starting the last few days of March and continuing well into May. If farmers are to take advantage of this rainfall, they must have room to store the water. This means that the soil must be unsaturated if it is to store even a part of the spring rains.

Rainfall records at Lubbock have been examined and a 55-year period subjected to computer analysis to determine the rainfall probability from March 20 to May 31.

1973 Soil Moisture Conditions and Requirements

The amount of soil moisture in the top five feet of the soils over the 14-county area of the South Plains is considered good. Winter additions of moisture as rain and snow have wet the top 12 to 18 inches but have not rewet the entire five feet in most areas.

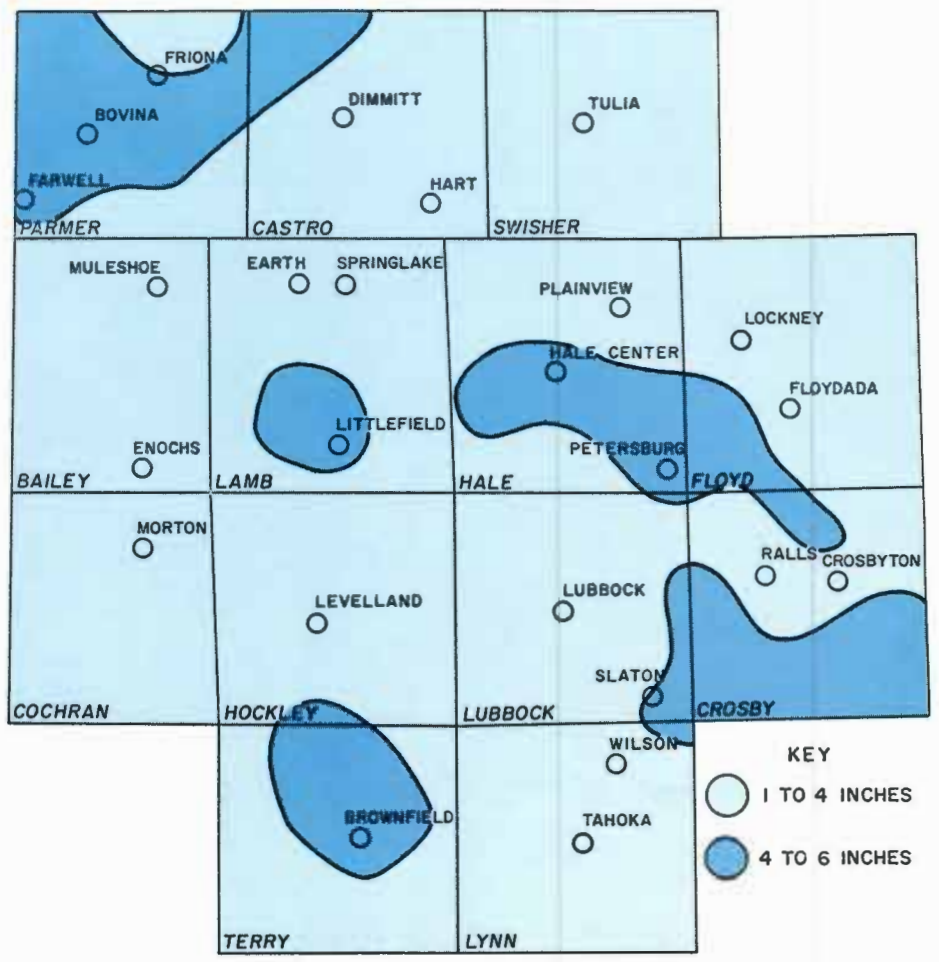
The chart on this page shows the five areas that are driest. These drier areas comprise only about one-fifth of the entire area, and it is in these areas that a preplant irrigation will give the best results. In the remaining four-fifths of the area, the chances are reasonably good that rainfall will be heavy enough to wet the soil and allow farmers to delay irrigations until after the crops have established a fair amount of growth.

One important factor that has not been found in previous soil moisture surveys is the relatively low water needs in most of the western and southwestern areas. No doubt this is due to the better penetration of winter moisture into the sandier soils.

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

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

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



Briscoe Speaks To TWCA*

*EDITOR'S NOTE: Printed below is the full text of Governor Dolph Briscoe's speech to the Texas Water Conservation Association Convention in Austin.

It is a very great pleasure to be here with you today. I am always pleased to be a part of any group which is working to help build a better Texas. This group is dedicated to that task, and you are involved in an area of great importance to our future.

Texas is a state which needs . . . and uses . . . a large quantity of water.

We are depleting our water supply at a rate faster than it is being replenished.

We have not inherited this problem overnight. And we have not just begun to grope for solutions.

Water needs for West Texas and the High Plains are and have long been a recognized condition for the overall growth, development and prosperity of all our State. Various solutions have been relied upon from time to time. But today, in 1973, we find ourselves face to face with the problem of developing long range solutions . . . and I emphasize long range.

I also wish to emphasize my belief that no long range solution for our State's overall water needs will be complete unless there is a special emphasis on water conservation.

What we do in this field in the next few years will determine not only the future of the plains of Texas and our other water deficient areas . . . it will also determine the kind of State, and the way of life, that we will pass from our hands to the hands of our children in not too many years.

Many good people have associated themselves in a number of groups and addressed themselves to this problem. Countless thousands of man hours have been spent identifying and promoting common goals. Yet all these efforts could be for naught if we sit back and assume that the future water needs of Texas will automatically be taken care of by the ultimate importation of a supplemental water supply from outside the State to areas where it is needed.

Many people thought that was an idea whose time had come in 1969. Today, in 1973, it is an idea whose time is past due.

My feeling is that the water needs of Texas can be broadly categorized in two ways . . . Urban needs and Agricultural needs.

Let us briefly consider this first category.

For better or worse, Texas is no longer a rural State. Over half the population in Texas now resides in only 8 of our 254 counties.

Rural population is diminishing while urban population increases. During the 1960s, 166 Texas Counties showed a population loss while the other counties gained.

In that decade, over 90 percent of the population growth in Texas took place in our four largest metropolitan areas . . . Houston, Dallas, San Antonio and Fort Worth.

Some estimates have it that the Texas population will reach 15 million people by 1980. We even hear predictions of 21 million people by the year 2000.

The Texas Urban Development Commission has reported that one of the most urgent problems facing Texas today is the undeniable strain on our State's resources . . . our land, our air and our water.

To maintain our relatively high standard of living in the face of this rapid urbanization and increasingly higher levels of population, it will take new dimensions of planning and management of Texas' water resources.

It is also going to take a greater level of understanding, cooperation and education between government and industry, the scientific community and the community at large, and between every region of our State with their counterparts.

There is little disagreement between all these groups over the general situation. The facts speak for themselves.

In 1960, municipalities and industry required 2.6 million acre feet of water, and by 1990 it is estimated they will need 6.5 million acre feet.

In 1960, irrigation required 12.5 million acre feet of water, and by 1990 it is estimated irrigation will need over 14 million acre feet of water.

In all, where Texas needed about 15 million acre feet of water in 1960, it will need an estimated 21 million acre feet in 1990.

A number of Texas cities are now looking, or have been seeking, supplemental water supplies for industrial and municipal use.

Everyone agrees that Texas needs more water and that Texas needs better water conservation practices . . . but not everyone agrees on what should be done.

Let us also briefly touch on the water requirements of the second category . . . that of agriculture.

The strength of this Nation is largely based upon a tremendously productive and efficient agricultural system.

It cannot be taken for granted simply because we have grown used to abundance.

The Texas High Plains make up a very vital part of the Great Plains area of America.

Stretching South from near the Canadian border to near Old Mexico, this wide belt of Central America has long been described as our Nation's Bread Basket. Nowhere else in this Country is the prolific, Great Plains agricultural production equaled.

In recent years, the efficiency of agricultural production in this area has contributed greatly to our Nation's foreign commerce. Foreign trade is essential to the overall economic condition of our Country. Today, there are greater opportunities for foreign trade than perhaps ever before. There is also perhaps a greater economic necessity for foreign trade than ever before.

Agriculture is more than just the backbone of the Nation in the obvious sense . . . the sense that it provides the food for our tables and a domestic economic complex upon which a large segment of our population depends for employment. American agriculture is also, in my judgment, America's best hope for salvation in the International marketplace.

In an effort to solve the recurring

—continued on page 4 . . . BRISCOE

Owen Ivie, left of Big Spring, Frank Rayner and Victor Jaeggli, Abilene, meet in Lubbock to discuss weather modification projects currently being conducted in Texas.

WEATHER . . . continued from page 2

tion of the total High Plains of Texas.

There was considerable discussion of the differences in the purposes of weather modification for hail suppression, as compared to weather modification for the sole purpose of creating additional rainfall. It was noted that there is considerable diversity of opinion as to the effects that hail suppression have on rainfall.

Some claim that any hail suppression will result in a corresponding reduction in rainfall. However, the proponents of hail suppression contend that their practices create rainfall. It was the opinion of the committee that, without an adequate, scientifically controlled evaluation of such weather modification practices, neither the proponents or the opponents have much proof of their contentions. Jaeggli noted that the layman is caught in the middle, not knowing what to believe.

Rayner reported that the District's Board of Directors has not adopted a policy in regard to the ongoing hail suppression program covering a part of the area within its boundaries. He noted that the policy of the District, and its purposes and functions, is to facilitate the conservation of the area's groundwater supplies.

Groundwater Conservation

"However, it is apparent that, although these conservation measures, as specified by law, deal directly with groundwater, it is evident that conservation of groundwater could also hinge upon the weather modification practices of others."

"If a weather modification practice for the sole purpose of hail suppression results in a reduction in rainfall, the District's Board of Directors would probably want to seriously evaluate such practices in order to determine if they are irreconcilable with the conservation objectives of the District," Rayner continued.

"If hail is suppressed without any resultant loss in normal rainfall, it appears that such a program is conducive to groundwater conservation, because, with hail so suppressed, with no loss of rainfall, there is no additional pumpage of groundwater. In fact, there may be considerable reduction in ultimate pumpage since additional irrigation would not have to be repeated in those areas that would have been otherwise hailed out."

Rayner went on to note, "If rainfall can be enhanced and hail suppressed, it is apparent that there is more than a two-fold benefit to groundwater conservation."

He concluded, "Without the benefits of a systematic, qualified assessment of weather modification practices, there remain conflicting priorities and assessments that the District's Board of Directors must face before it can adopt a policy toward weather modification."

Evaluation Needed

The committee agreed there is a critical need to commence programs for evaluating weather modification in Texas. The Chairman concluded, "Since the Weather Modification Act of 1967 places full jurisdiction for such practices in Texas within the prerogative of the Texas Water Development Board (TWDB), it is logical for that fact-finding agency to take the lead and responsibility for such evaluation programs."

RAYNER . . . continued from page 1

objectives—the only cited objective is to regulate groundwater."

The Commission, disdaining the development of groundwater in excess of natural recharge, suggests a pump tax be imposed on the withdrawal of groundwater at the rate at which its imposition will reduce some of the pumpage. The tax, by squeezing out marginal farms, is hoped to be a solution to the continued use of groundwater.

According to the District's statement, the tax, if set high enough, is only a method to "prevent" the use of groundwater. "The Commission should be informed that the initiation of a pump tax for the sole purpose of reducing groundwater pumpage would be in violation of the groundwater users' civil rights; and, further, it is particularly inappropriate to suggest that taxpayers are going to permit a taxing authority to collect taxes for which they (the taxing authority) have no known or planned use."

The statement also noted that groundwater is best conserved through administration on the local level, such as carried on by the four active groundwater conservation districts in Texas.

BRISCOE . . . continued from page 3

crisis of the stability of the American dollar abroad, it has been devalued for the second time in fourteen months . . . the latest time by 10 per cent.

America had a deficit in foreign trade last year of $6.4 billion. And the President said recently when he announced the latest devaluation that it was only a temporary solution.

American agricultural products are extremely important to our foreign trade. Last year, U.S. exports of farm products such as wheat, corn, soybeans and feed grains totaled over $9 billion.

The present . . . and the potential role of American agricultural production cannot be over-estimated in its importance to the balance of payments question. The American agricultural system can produce like no other. And it is now operating at 50 percent of capacity. We need more productivity, not less. We need more productivity to satisfy our demands at home. We need more productivity to help rescue America from our unfavorable balance of payments.

The only way we can possibly hold our own . . . much less realize our potential . . . in Texas is by securing an adequate water supply for the future.

Texas now ranks number three in terms of agricultural production in America. It is my belief that we can and should . . . and must become number one.

When we talk about the need for water in the agricultural areas of Texas which are water deficit, we are talking about a problem which is much larger in scope than most people ever dream. We are talking about a problem of severe national and international consequences.

The High Plains of Texas is one of the largest and most productive segments of the Great Plains area. The combination of favorable range land, relatively insect free climatic conditions, fertile and easily tilled soils, and an inexpensive, prolific and widely available ground water supply have combined with the expertise of the High Plain's agriculturist to form an agricultural complex of indisputable importance to Texas, the Nation and the World.

This area's only limited asset is water.

Groundwater is the foundation of this area's great productivity. This foundation is being pumped out of the ground at a measurable and predictable rate.

The reality of the fact that the current supply of water is limited must be accepted and it must be accepted without defeatism. It is an obstacle . . . it is a great challenge . . . and the people of Texas must rise as one to accept this challenge and overcome it.

We must first approach this problem by recognizing that we cannot segment it. We cannot say that we have a West Texas Water problem . . . or a South Texas water problem . . . or an Urban water problem . . . or an Agricultural Water problem.

We have a Texas Water problem . . . there is no other way to put it.

We must address ourselves to the total picture . . . and our ultimate solution must provide for all our State's water needs.

The environmental consciousness which has swept large sections of the public during the past few years has brought home the fact that all our natural resources are closely linked together in one system of interdependence. We will not succeed in meeting the water needs of the High Plains unless we also succeed in meeting the water needs of our municipalities.

We must develop very sound conservation practices so that water is not wasted where the raindrop falls.

Water which is used and depended upon by our urban areas must not be wasted through insufficient treatment procedures.

Conservation of ground water in our agricultural areas must be so efficient that there is absolutely no waste.

And we must develop a sound, practical and acceptable program of water importation to these highly important water deficit areas.

My administration lists the problem of our State's water needs as a top priority of State government.

We have already taken several steps to insure the better utilization of water supplies in our municipal areas.

I have appointed Texas Water Rights Commission member Joe D. Carter as Chairman of the Commission. Mr. Carter has been an outstanding member of the Texas Water Rights Commission since 1961, and has extensive experience in this field.

I also submitted 7 specific recommendations to the Legislature designed to close loopholes in the present law governing municipal water districts.

These measures are not only designed to help protect the buying public . . . they will also have the effect of creating more adequate controls in the area of better conservation of municipal water supplies.

Our forefathers drank the cool waters from the springs which bubbled clear and pure out of the ground from the Carrizo or the Edwards and marveled at them. Today, we compute their quantities in acre feet and estimate their lifespans.

If there is one clear lesson to be learned of man's experience with God given resources . . . it is that they cannot be taken for granted.

Instead of taking water . . . or any of our other resources for granted . . . we must use our God given intellect and make the best use of those resources through proper management.

We can *manage our water resources so that our cities can continue to prosper . . . and our agricultural areas can continue to be productive.*

Government is the only vehicle for this management.

This administration is dedicated to a system of water conservation and water importation to meet the total needs of all our State.

We seek your help, your advice and your support in this endeavor.

Otha Dent, Texas Water Rights Commissioner; Joe D. Carter, Water Rights Commission Chairman; Chester Mitchell; Ross Goodwin, past President of the District's Board of Directors; Selmer Schoenrock, and Ray Kitten take a break during the TWCA Convention in Austin (see stories, this page and page 1).

Carter Appointed Chairman

Texas Water Rights Commissioner Joe D. Carter, appointed by Governor Dolph Briscoe on February 6 to serve as that commission's Chairman, received Senate confirmation February 22.

Carter, Chairman from 1961 to 1969, was to conclude his present term on the Commission this year; however, his new appointment as Chairman will begin another six-year term with the Commission.

Carter's background is replete with water- and government-oriented work. After earning a B.A. degree in government and a Doctorate of Jurisprudence from the University of Texas in 1948, Carter went almost immediately into State government service.

He served in the Texas House of Representatives from 1949 to 1951 and the Texas Senate from 1951 to 1953. In 1953 he was employed as Chief Legal Counsel of the State Board of Water Engineers, one of the predecessor agencies of the Texas Water Rights Commission.

In 1957 he served as Governor Price Daniel's legal advisor on water matters, and from 1958 to 1961 he became the first Executive Director of the newly created Texas Water Development Board.

In 1961 Carter was appointed a Commissioner to the Texas Water Commission, the predecessor agency of the Texas Water Rights Commission, by Governor Daniel. He was reappointed to that post by Governor John Connally in 1968.

The Water District is confident that Mr. Carter will continue the fine work he has carried on with the Commission and the State of Texas. We congratulate him for his appointment and confirmation.

GOODWIN . . . continued from page 1

Dent, Texas Water Rights Commissioner.

The Cross Section would like to also inform its readers of the improved condition of Bill Waddle, Secretary and General Manager of TWCA. Having suffered a heart attack in December, 1972, Waddle, on doctor's orders, did not appear at the convention, but he is expected to reach full recovery within the next few months.

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 3 "THERE IS NO SUBSTITUTE FOR WATER" *March, 1973*

CONSERVATION SYSTEMS IN CASTRO COUNTY

By DON McREYNOLDS

As residents of the High Plains of Texas have been faced by a rapidly declining water table, many farmers are becoming increasingly aware of the need to beneficially conserve the remaining groundwater supply.

This situation was demonstrated by surveys conducted by members of the High Plains Underground Water Conservation District No. 1 in June and July of 1972.

In driving to the irrigation wells in the field and plotting these wells on topographic maps of Castro County, a secondary survey of tailwater recovery systems and playa lake modification recovery systems was conducted.

1969 and 1972 Surveys Compared

A similar survey was conducted in 1969 and the results of that survey can be compared to the 1972 statistics.

Playa lake modifications in Castro County totaled 147 in 1969 compared to 206 in 1972. This indicates a 40 percent increase in the number of such units in three years.

Tailwater recovery pits totaled 148 in the 1969 survey compared to the 1972 total of 181. These figures indicate a 22 percent increase in the number of tailwater recovery pits in Castro County since 1969.

A comparison of total numbers of recovery systems located in 1969 to those found in 1972 can be made. With 295 recovery systems in Castro County in 1969 and 387 systems in 1972, there was an overall increase of 31 percent in the three-year period.

On the map on page 3, the approximate location of each lake modification recovery system and tailwater recovery pit is designated by a symbol. Tailwater recovery systems are denoted by a triangle, while lake modification recovery systems are denoted by a square.

The systems shown on the map indicate only those systems found to be in use at the time of the survey or those systems with some indication of having been used in the immediate past.

A glance at the map indicates that the use of tailwater recovery pits and lake modification recovery systems is relatively uniformly distributed over the county. An exception seems to be the area outside the boundaries of the District, located in northeast Castro County, where the groundwater supply is limited.

Three Fuel Sources in Use

Energy or fuel sources for the recovery systems are basically of three types—natural gas, liquified petroleum gas (bottled gas) and electricity. Lake modification recovery systems are primarily fueled by bottled gas in order to afford the mobility often necessary for such a system.

In order that the pumping equipment and its fuel supply can be moved to follow the fluctuating water level

—cont. on page 3 . . . CONSERVATION

ALBERT W. SECHRIST

Sechrist Resigns From District Staff

Albert Sechrist, Agricultural Engineer for the District since September, 1968, resigned his position in March in order to dedicate his full attention to maintaining a farm in Crosby County.

Sechrist, a native of Lorenzo and a 1964 graduate of Texas Tech University with a degree in Agricultural Engineering, is farming 520 acres of cotton and grain sorghum near Lorenzo.

While with the District, the engineer worked on the Tech-District aquifer-modeling program. He also completed course requirements and received a Masters Degree in Agricultural Engineering from Tech in 1972.

Prior to his employment with the District, Sechrist was a Research Associate with the Tech Agricultural Engineering Department.

Sechrist, his wife, Susan, and their two children, Julie and Calvin Wayne, recently moved from their Lubbock home to the Crosby County farm.

The Directors and District staff are reluctant to lose Albert, but extend to him and his family every wish for success in his new career.

Taking advantage of a January snow cover, Don McReynolds, Frank Rayner and Dan Seale (left to right) plan an aerial survey of some of the oil fields within the District. (See story on page 4.)

CHARLES SCHLABS

RECOVERY SYSTEMS BASIC TO FARMER

Charles Schlabs is an outstanding conservation farmer.

Having farmed in Castro or Deaf Smith County all of his life (reared near Dimmitt and, now, farming by himself near Hereford), this young man is very sensitive to the declining water supply and his duty to preserve it for future generations.

"Saving water is like having a savings account," says Schlabs. "You can draw it all out in one week or one year, or you can save it for 50 years, drawing it out only when absolutely necessary."

The irrigation farmer keeps a constant check on the decline of the water table in the area and says he can tell a difference in the water supply in the years he pumps less groundwater.

Schlabs, however, does not stop with measuring the decline on his farm—a drop which he says is 17 to 18 feet over a five-year period—but transforms his thrift theory to applied practice.

Farmer Has Seven Systems

During the past seven years, Schlabs has installed seven recovery systems on his 1,800 acres, digging each system larger than the last. Six of the systems are tailwater pits and the seventh is a modified playa lake with a one-half-mile transfer pump flowing to the lake. The lake can hold 30 acre-feet of water, while the largest pit holds five.

The farmer also believes strongly in the water-saving ability of underground pipeline and has proved it by installing nearly seven miles of concrete and plastic gated pipeline. He uses no open air ditches—only underground transfer pipe on the entire place.

Although Schlabs has 16 irrigation wells equipped for operation (most of them six inch), he says he waters only two-thirds of the time from the wells. He has found that his recovery systems account for the remaining supply of irrigation water.

Farmers May Lose Incentive

When questioned about the Federal Government's withdrawal of the REAP assistance program, he said, "I think the farmers who have the money to adopt a conservation pro-

—continued on page 4 . . . RECOVERY

OWRR REPORT TO BE RELEASED SOON

The final report for the second phase of the research project funded by the Office of Water Resources Research (OWRR) has been completed and is currently being printed in book form. The research, entitled *Mathematical Management Model Unconfined Aquifer, Phase II,* was a joint effort by the Texas Tech University Water Resources Center and the High Plains Underground Water Conservation District No. 1.

Dr. Dan Wells, Director of the Tech Water Resources Center, and Frank Rayner, Manager of the District, served as co-principal investigators responsible for planning and development of work schedules and project technical quality.

The Tech-District aquifer model project was initially funded in 1968 by a $98,578 grant from OWRR. A

—continued on page 2 . . . OWRR

THE Cross SECTION

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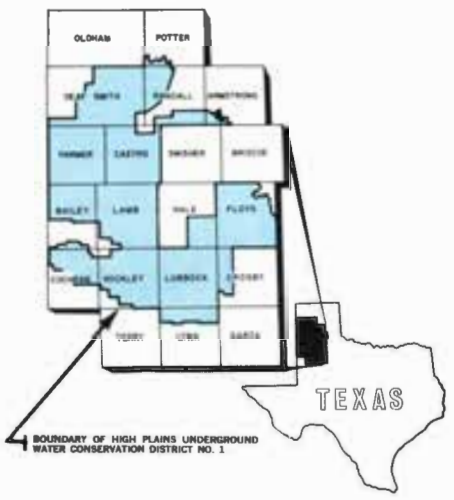


NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

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.

"Watering Up" -- A Preplant Alternative

by JIM VALLIANT*

In an effort to find a reasonable alternate to a preplant irrigation, a study was started at the High Plains Research Foundation, Halfway, Texas, to make more efficient use of the declining supply of water in the Ogallala formation. This study, partially supported by a grant provided by the High Plains Underground Water Conservation District No. 1, is a joint effort by two organizations vitally interested in prolonging the life of the groundwater in the Texas High Plains.

A preplant irrigation is usually applied three to six weeks before planting and the beds are worked with an implement such as a rod weeder, bed shaper or rolling cultivator before planting. As a result, 30 to 60 percent of the water applied can be lost before any seed is placed in the soil.

One of the alternates being investigated by the Foundation is irrigation for germination, or "watering up".

Irrigation for Germination

Irrigation for germination after the grain sorghum is planted would allow for immediate use of the water by the germinating and growing plant and provide additional amounts of available water during the early stages of plant growth. In instances where uniform soil moisture is a problem, irrigation for germination may produce more uniform stands.

One thing producers often overlook is the fact that, when they plant large acreage in a short time period, the entire acreage will require irrigation at the same time to prevent yield reducing moisture stress on the crop. Irrigation for germination would "stretch" the irrigation period so that the grain sorghum could be irrigated before or nearer the stress period with a minimum of moisture stress.

Planting to irrigate for germination may eliminate the need for this irrigation completely if adequate rainfall should be received before planting as in 1972. Rains from May 5 through May 15 amounted to 4.2 inches and eliminated the need to provide moisture for germination by irrigating.

The area receiving a preplant irrigation plus three summer irrigations produced 5,311 pounds of grain per acre, requiring 15.4 inches of irrigation water. The area planted on moisture provided by rainfall plus three summer irrigations required 14.9 inches of irrigation water, about the same as the preplant area, but produced a *significantly higher yield of 5,822 pounds of grain per acre with higher irrigation and total water efficiencies.*

The area planted on rainfall moisture and irrigated at emergence plus three summer irrigations produced 5,333 pounds of grain per acre.

Methods and Procedure

Three 1.5-acre areas were selected for the 1972 study, one to be preplant irrigated, one to be irrigated for germination and one to be planted on rainfall moisture.

The preplant area was preplant irrigated April 19, approximately three weeks before the intended planting date. Rains of 4.2 inches, from May 5 through May 15, delayed planting of the grain sorghum until May 23.

Because of the 4.2 inches of rain received just before planting, the germination irrigation was not applied. An irrigation at this time, even though planned, would not have been beneficial and a later date for the irrigation was selected. This irrigation was applied on June 8, when the grain was up to a good stand, as soon as the areas had been fertilized.

Three replications of each area, .306-acre in size, were combine harvested December 4 after adverse weather delayed harvest for almost 30 days. All plot weights were converted to pounds-per-acre at 14 percent moisture.

Results and Discussion

Severe lodging of the grain sorghum reduced yields in the 1972 study. The lodging, caused by ice and snow storms and high winds, reduced yields from 1,500 to 2,000 pounds per acre as indicated by hand harvesting of random plots. The study was combine harvested so results would be similar to those which might be obtained by farmers.

The area planted on rainfall moisture and irrigated three times during the growing season produced significantly higher yields than the other two areas. Method III, the rainfall moisture planted area, produced 5,822 pounds of grain per acre compared to 5,311 pounds per acre for the preplant irrigated area, Method I, and 5,333 pounds per acre on the rainfall moisture plus emergence, Method II.

All three methods of irrigation received similar amounts of irrigation water, with Method I requiring 15.4 inches per acre while Method II and III received 14.7 and 14.9 inches per acre, respectively. Method I, which received a preplant irrigation, produced the lowest irrigation efficiency of 344.9 pounds of grain per inch of irrigation, which was significantly lower than the 390.7 pounds of grain per inch produced by Method III. Method II produced 362.8 pounds per inch, which was higher, although not significantly, than Method I.

When considering total water (rainfall plus irrigation) efficiency, Method III produced 159.1 pounds of grain per inch of water compared to 145.7 pounds per inch for Method II and 143.2 pounds per inch produced by Method I.

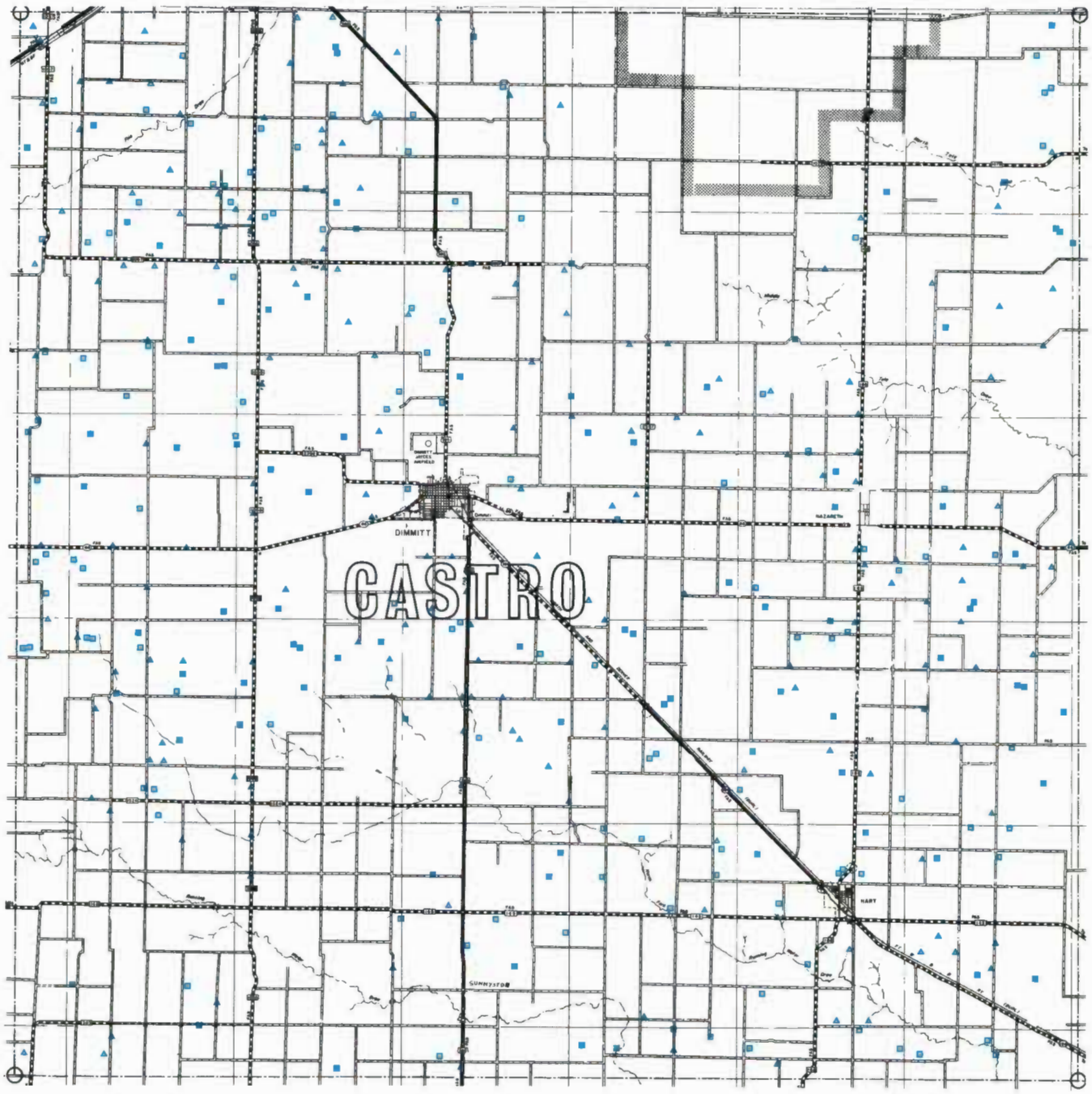
OWRR . . . continued from page 1

similar grant of $100,263 was awarded to Tech and the District in 1970 to continue with the second phase of the research.

The initial objective of the study was to develop a digital computer mathematical model of the Ogallala aquifer that would be capable of predicting aquifer response to various schemes of well-field development, management and recharge.

Phase II modeled a portion of the aquifer where the irregularities of the base of the aquifer affect the rate and areal extent of responses to stimuli.

*EDITOR'S NOTE: Director of Research and Agricultural Engineer, High Plains Research Foundation, Halfway, Texas.



TAILWATER RECOVERY SYSTEMS AND PLAYA LAKE MODIFICATIONS 1972

CONSERVATION . . . cont. from page 1

of many of the lake modifications or to facilitate the use of one set of equipment at different locations, many farmers have selected liquified petroleum gas systems.

In surveying Castro County, 73 of the 206 systems, 35 percent, were powered by bottled gas with natural gas being used by 54 systems or 26 percent, and electrical power was used by 46 systems or 22 percent of the total number of lake modifications.

Because some lake systems were temporarily inactive or the power units were being repaired or being used at another site at the time of the survey, 33 sites were not determined as to the source of power.

Pits Use Same Fuels

Fuel sources for tailwater recovery pit systems were also natural gas, bottled gas and electricity. Natural gas-powered systems totaled 16 units or nine percent of the 181 tailwater recovery pit systems identified. Bottled gas-powered systems accounted for 39 units or 22 percent.

The largest proportion of tailwater recovery systems were powered by electricity. These accounted for 97 units or 54 percent of the total. Twenty-nine tailwater recovery systems were not determined as to fuel requirements.

A comparison of the total number of tailwater recovery systems and lake modifications to the total number of producing wells can provide interesting speculation.

With 387 recovery systems in operation and more than 3,500 producing wells in Castro County, each recovery system could serve an average of nine wells.

In fact, each recovery system serves considerably less than nine wells. Assuming an ideal ratio of one recovery system to three wells, there would need to be 1,178 recovery systems in Castro County to serve the number of producing wells in 1972.

If each group of three wells was served by a single recovery system now in operation, 33 percent of the producing wells would contribute to a recovery system.

Tailwater Re-use Beneficial

The re-use of tailwater in irrigation offers several benefits. The most obvious benefit, particularly to the user of groundwater who has been watching the steady decline of the water level in his well, is conservation of the remaining supply of groundwater in the Ogallala aquifer.

If any excess that is now pumped and sometimes wasted could be left in the aquifer, this water might be utilized later and possibly extend the life of the aquifer. It is to the benefit of the individual landowner to extend the life of the aquifer, and also to the benefit of the present and future generations depending on the water supply.

Tailwater Inexpensive to Pump

As interesting as the philosophical reasons for conservation can be, a more practical reason to re-use tailwater is the fact that it is often a less expensive source of water for irrigation than pumping water from below the surface.

Re-use of surface water is less expensive than pumping water from great depths (approaching or exceeding 200 feet in many areas of Castro County).

A side benefit of reduced cost is the decrease in the need to waste energy by inefficient consumption of fuels. As is currently being pointed out in all phases of our lives, our fuel supplies are not inexhaustible, and the increasing scarcity of fuel could raise its price.

Any such increase in the cost of a farming operation may be a factor which helps to determine whether or not that operation is a profitable endeavor.

Farmers Urged to Install Systems

With the benefits of re-use of tailwater for irrigation in mind, it is highly recommended that any farmer who feels that he may efficiently make use of tailwater on his farm, should investigate the possibility of installing a recovery system.

Since the function of the High Plains Water District is conservation of groundwater and the abatement of all waste water, we would recommend adoption of suitable methods of recovery and utilization of waste water. Our office is prepared to cooperate in any way that may assist a farmer to gain information that may aid in his decision to adopt this conservation practice.

Perhaps a visit to the site of one of these systems in Castro County and a discussion with the operator of the recovery system would be the greatest benefit to a person contemplating the establishment of his own recovery system.

Dr. Rex Johnston, left, presents an award honoring the late Dr. Bill Miller to his wife, Mrs. Ann Miller. Miller, killed in June, 1972, in the crash of a light airplane, was recognized posthumously by the West Texas Water Institute (which he chaired at his death) at the Eleventh Annual West Texas Water Conference held in Lubbock on March 23. Johnston was last year's award recipient.

RECOVERY . . . continued from page 1

gram will do so, but those borderline farmers will probably lose the incentive the program provided."

Schlabs, who has used REAP funds to install some of his underground pipeline, also said he did not foresee any slowing down in the digging of pits as compared to installing the expensive pipeline.

Concerning the possibility of a silt problem, Schlabs said he has never needed to clean out a pit because his land is extremely flat. Said Schlabs, "An entrance pit may be the answer for me if the problem arises, but grassed waterways have been proven to work on steeper slopes."

Considering this man's ambition to "save water for the next generation of farmers", Schlabs believes in the concept of minimum tillage or no-preplant irrigation.

Schlabs Will Not Pre-Irrigate

"With the present saturation of moisture in the soil, I plan to plant my entire farm without pre-irrigating." He said the only exception will be his 400 acres of sugar beets.

With six irrigation wells to the section, Schlabs never pumps under stress. He says he has found that watering on a three-week schedule rather than every two weeks, or whenever a crop shows stress, is more beneficial in the final results.

This opinion gained merit last year during an irrigation demonstration conducted by Schlabs in cooperation with Leon New, Area Extension Engineer, Texas Agricultural Extension Service.

Beets and Sorghum Tested

Forty-two acres of sugar beets and grain sorghum were placed under observation, beginning in early April, 1972, with the planting of the sugar beets.

Irrigation frequency was at two-, three- and four-week intervals. A flow meter measured the irrigation applications.

The three-week irrigation interval was found in both experiments to produce more tons or pounds per acre and brought in more income per acre.

Schlabs also discovered that sugar beets have a higher sugar content under stress than "when they look pretty".

In the grain sorghum experiment, the maize on the upper end of the field fell under stress faster than that on the lower end of the field.

Can Irrigate Less Frequently

"Therefore," says Schlabs, "I have found we don't need to irrigate as often as we used to think we did."

The Water District wishes to thank Schlabs for his unselfish efforts towards water conservation. By helping protect the future of others, he, himself, has profitted. By constantly searching out ways to take advantage of the resources at hand in order to protect those in short reserve, he has been a good example to those around him.

The Cross Section urges all irrigation farmers to find out the kind of pleasure a farmer such as Charles Schlabs gains by participating in water conservation efforts. As Schlabs can tell you, the results are rewarding.

DISTRICT SURVEYS AREA OIL FIELDS

In January, 1973, the District's Manager, Frank Rayner, flew a light airplane over a small part of the District to observe oil fields in the area.

This survey was made after a recently-fallen snow in order to facilitate the location of salt water and other waste disposal operations within three small oil fields in Lubbock County. The snow-melting heat given off by produced oil and water, and the color contrast provided by the snow cover, greatly aided sighting during this aerial survey.

Rayner stated he did not locate any active salt water disposal pits, but did sight several gathering line leaks. He noted that the heat dissipated by the shallow-buried gathering and tank battery lines melted the snow and made possible their easy sighting.

Rule 2, Section C, of the *Rules of the High Plains Underground Water Conservation District No. 1,* effective under the District's jurisdiction since September 5, 1957, prohibits the maintaining of salt water disposal pits. The rule states:

"No person shall pollute or harmfully alter the character of the underground water reservoir of the District by means of salt water or other deleterious matter admitted from some other stratum or strata or from the surface of the ground."

Nearly 12 years after the adoption by the District of its no-pit rule, the Texas Railroad Commission ordered a Statewide ban on such oil field pits; however, experience has shown that compliance with such rules can only be gained by an active and repetative program of surveillance. The Railroad Commission does not make such periodic surveys; hence the District's continuous water quality monitoring program.

A Tailwater Return System is a Good Investment In YOUR Future

Dan Seale, District Field Representative, and Charles Schlabs discuss the benefits of a tailwater return system. Schlabs maintains six such systems on his 1,800 acres.

Schlabs and Seale observe another of the tailwater return systems maintained by Schlabs. The farmer equips all of his tailwater pits with floating pumps.

Pictured above is the modified playa lake on Schlabs' farm. The lake can hold 30 acre-feet of water at capacity.

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 4 "THERE IS NO SUBSTITUTE FOR WATER" *April, 1973*

Norman Flaigg, Planning Officer of the Austin area office of the Bureau of Reclamation, presents the findings of the study analyzing the feasibility of importing water from the Mississippi River to the High Plains of Texas and New Mexico.

AGRICULTURE MAY RESCUE U.S. DOLLAR

American agriculture is a bright star on today's economic scene — it may even be the savior of America's international trade ranking.

With the high rate at which America is burning imported oil, many economists feel manufactured farm goods may balance the United States' international trade deficit.

According to an article entitled "Can Agriculture Save the Dollar?", published in the March 15, 1973, issue of *Forbes Magazine,* "The U.S. is fast exhausting its once-plentiful natural resources. But there is one natural resource that, if cared for, never becomes exhausted: farmland."

U.S. agricultural exports for fiscal 1973 (ending June 30) are predicted to total $11.1 billion. More than $4 billion of the 1972 balance-of-trade deficit of $6.8 billion was attributed to imported oil. Therefore, based on 1972 figures and projected 1973 estimates, this year's agricultural exports could largely balance the oil deficit.

The article goes on to explain why American agriculture has such a bright future. "Our farmers are educated. The infrastructure — the roads, railroads, irrigation systems — are all there. We have an organized market and an industrial complex that supports the farmer."

Rayner Refers to Subject

In his recent report to the National Water Commission (NWC), High Plains Water District Manager Frank Rayner made reference to the subject of America's superior agricultural system.

Basing his testimony on his belief that the Commission, in its "Proposed Report of the National Water Commission", projected a bias against further water development "particularly for the purposes of irrigated agriculture", Rayner states, "It seems unreasonable to adopt a national water policy that would experiment with that one fiber of our national economic strength — our superior agricultural capabilities — that affords this

—cont. on page 4 . . . AGRICULTURE

Texas Crop Reports Needed

During the last of May, some 24,000 Texas farmers will receive a crop acreage questionnaire from Charles E. Caudill, Agricultural Statistician In Charge of the Texas Crop and Livestock Reporting Service, Austin.

The information will be the basis for determining the planted acreage for the State of Texas and for each county. There are 254 counties in Texas, and reports are needed from many farmers so that each county will be well represented.

Accurate estimates are of great importance to farmers in planning production and marketings and in providing an unbiased picture of Texas agriculture.

The Texas Legislature has provided a program of estimates for each county. Texas covers such a wide area that State totals alone do not provide adequate information on Texas' most basic industry—agriculture.

This is a cooperative effort of the U.S. Department of Agriculture's Statistical Reporting Service and the Texas Department of Agriculture.

"ECONOMICALLY INFEASIBLE"

Import Backers Still Optimistic

The results of a study analyzing the feasibility of importing surplus water from the Mississippi River westward to the High Plains area of West Texas and Eastern New Mexico were presented April 12 at a Lubbock meeting of Water, Inc., a Lubbock-based non-profit organization dedicated to importation.

Approximately 500 water leaders, irrigation farmers, legislators, government employees and concerned citizens gathered to witness the revealing of the results, with the final report due to be released in July, following review.

Norman Flaigg, Planning Officer of the Austin area office of the Bureau of Reclamation, presented the findings of the Bureau, the Army Corps of Engineers and the Mississippi River Commission. The presentation by Flaigg began the completion of an investigation authorized by the U. S. Congress in 1967, with a $9 million budget with which to appropriate the endeavor.

The backers of importation contend that the six million-acre agricultural-rich area of the High Plains is becoming increasingly deficient in its water supply, that irrigation is the single-most determining factor in the level of food and fibre output, that the nation depends on the economic output of the area and that water must be imported so as to maintain that level of production.

Direct Benefits Considered

However, this premise, according to the report, is considered to go beyond direct benefits which would be received by such a project. And the U. S. Congress, said Flaigg, never considers anything beyond direct benefits in authorizing appropriations for reclamation projects.

Therefore, the present findings indicate that the importation plan is not "economically feasible".

However, in spite of the negative aspect of these findings, import backers are still optimistic. A. L. Black of Friona, President of Water, Inc., concluded the public briefing by overruling the idea that the import plan is dead.

"Nothing could be farther from the truth. Now, for the first time, we have something concrete we can get our teeth into. We have a blueprint for the direction our activities should turn."

He continued, "Today we have been told we can have water, but that we can't afford it. In my books, this is progress."

According to the report, the total cost of the project is estimated to be $20.5 billion, based on January, 1972, prices. This figure includes $3.9 billion for electrical power facilities to lift the water and move it westward. The annual cost of operation is projected to be $1.9 billion.

In emphasizing the negative attitude he felt Congress would have toward the project, using Bureau standards, Flaigg noted that the combined 1973 construction appropriations for the Bureau and the Corps of Engineers amount to only $1.5 billion and that the nation spent $30 billion in 10 years to put a man on the moon and $135 billion in 12 years in Vietnam.

Flaigg impressed upon his listeners the enormity of the annual cost of the

—continued on page 3 . . . IMPORT

District Welcomes Newest Member

On April 16 the High Plains Underground Water Conservation District No. 1 employed the newest member of its staff, Kenneth Carver. Carver, a 1967 graduate of Texas Tech University with a degree in Agricultural Education, will serve the District as a Field Representative.

Born in Mineral Wells, Carver was raised on a dry-land farm in the Fort Worth suburb of Poolville. He was employed in Lubbock by Chuck's Mobile Homes prior to working for the District.

Carver and his wife, Sandra, and their one-year-old son, Chris, are members of the College Avenue Baptist Church in Lubbock.

The Cross Section, on behalf of the staff, welcomes Kenneth Carver to the Water District.

KENNETH CARVER

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

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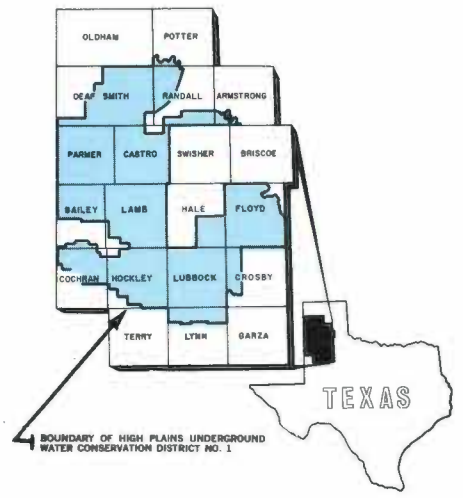


NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

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 W. J. Hill, respectively.

Farm Cost Projected -- Without The Use of Pesticides*

Your city friends would scream loud and long if their food market posted prices like $14 a pound for broccoli, 68 pents a pound for tomatoes, or 60 cents a head for cabbage. But this could happen if a few highly vocal, crusading "ecologists" succeed in getting all pesticides banned.

These price figures were not pulled out of the air. They are based on production cost data from Illinois' "Polution Solution Plots". The dramatic results of these tests provide the ammunition needed in fighting for *reasonable* regulations governing agricultural chemical use. Many people saw first hand the value of modern agriculture through pesticides and fertilizers by viewing the Arcola, Illinois, test plots over the last two years. Millions more need to hear the findings.

The three-acre "Pollution Solution" test plot is located at Rockome Gardens, a tourist attraction near Arcola, Illinois. Results with nine different crops were compared under three management systems: (1) no weed or insect control, (2) mechanical cultivation for weed control with no chemical applications, and (3) modern production using herbicides, fungicides, and insecticides. Twelve rows each of soybeans, cabbage, broccoli, tomatoes, melons, sunflowers, potatoes, sweet corn, and field corn were planted on fertilized ground. Four-row plots of each type of management system were planted side by side so visitors could easily judge the results. Each plot was duplicated without the use of fertilizer.

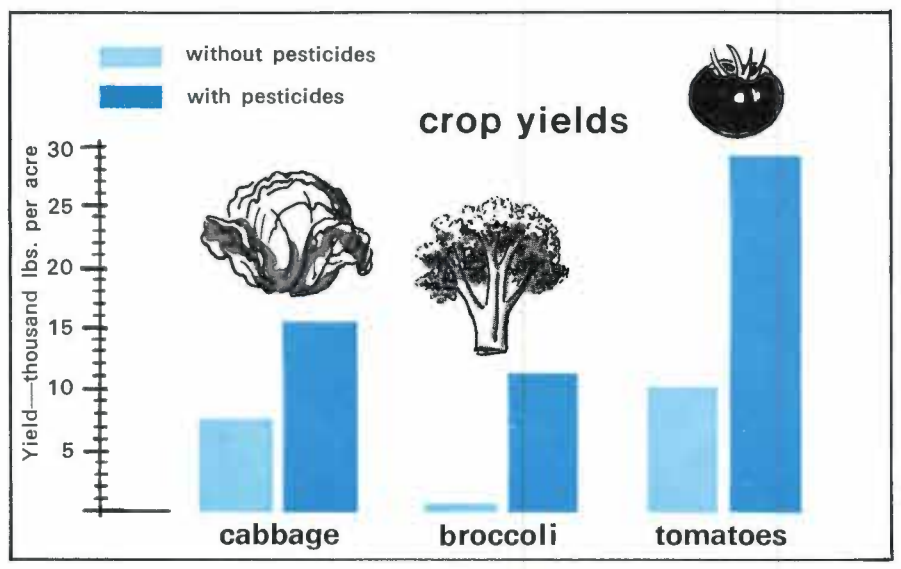
No-treatment Plots Failed

The no-treatment plots were complete failures. Even if some crops could have been found among the weeds, they would not have been worth harvesting.

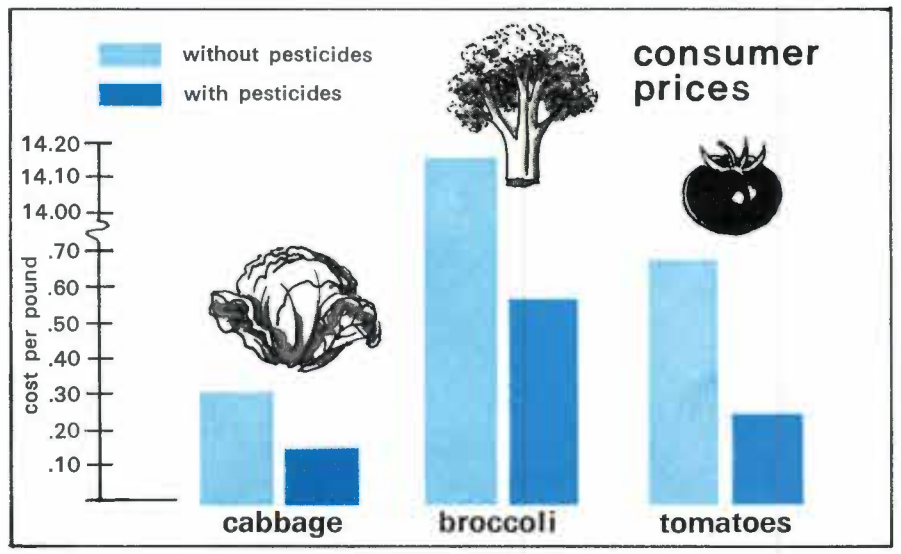
The mechanically cultivated plots were a disaster also. More than 17 inches of rain fell during June and July, making normal cultivation impossible. The only way to salvage the crops was by hand weeding, driving labor costs out of sight. Despite all efforts, many weeds remained in the plots with the scrawny plants. Nature's own insect control — birds, and bugs eating other bugs — failed miserably, so what was harvested was of poor quality. Food shortages, poor quality crops, and high prices were obvious results of this farming method.

The project was sponsored by the Arcola Chamber of Commerce, along with the University of Illinois Extension Service and Illinois Department of Agriculture. The modern production treatment using pesticides was a success, as anticipated by Bill Conterio, agricultural expert who originated the idea for the project as a member of the Arcola Chamber of

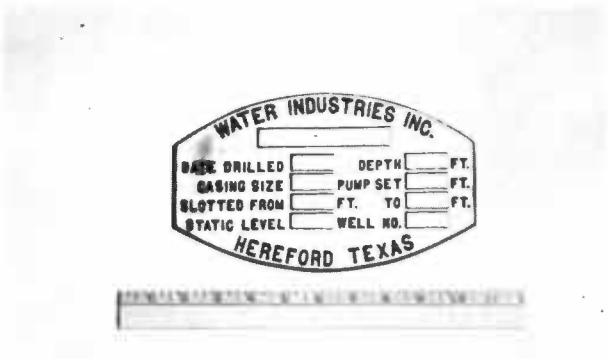
—continued on page 4 . . . FARM



YIELD PER ACRE



COST PER POUND



The aluminum tag pictured above is being placed on the pump base of newly-drilled water wells by Water Industries, Inc., of Hereford. The plaque, placed flush with the pump base before the concrete dries, reveals vital information concerning the well. (See story on this page.)

IMPORT . . . continued from page 1

project by revealing the percentage of the cost he figured irrigators could pay for the imported water.

Payment capacity in a year is estimated at $108.5 million for 3½ million acres of Texas irrigation and $16.3 million for 481,000 acres of New Mexico irrigation.

$486 Million Left Unpaid

These payments are equivalent to 18 percent and 16 percent of annual project payment requirements, leaving $486 million to be paid by people other than the irrigators.

Flaigg used these figures to emphasize the financial infeasibility of the project. He said, "The project is financially infeasible unless interests other than irrigators would be willing to pay the difference of annual payment requirements and the payment capability of the irrigators."

Flaigg went into great detail with the presentation of cost-benefit ratios. Water, Inc., officials and supporters of the plan feel that more than direct or primary benefits should be considered by Congress.

Primary benefits are increases in net farm income attributable to irrigation. Those figures were derived by comparing crop distribution and production, farm costs and farm income with the same items as would occur on the same land without irrigation.

Primary benefits figured in the study totaled $264.7 million annually. This, compared to the annual cost of $1.9 billion, would equal a direct benefit ratio of 0.14 to 1.00.

Secondary Benefits Added

Flaigg said that if secondary benefits were added to primary benefits, the total qualified benefits would be raised to $519.8 million annually. The ratio of these benefits to the annual cost of the project would then be 0.27 to 1.00.

"Under Bureau procedures," said Flaigg, "the estimate of secondary benefits reflects a profit to enterprises engaged in transporting, processing and marketing increases in irrigation-produced farm sales between the farm and final consumer."

By applying secondary benefit factors to increases in farm sales of each crop due to irrigation, the project feasibility is raised, but not enough to justify it to its appropriators.

Flaigg mentioned a discrepancy with the total (primary and secondary) benefits arrived at under Bureau standards, and those arrived at by the Texas Water Development Board (TWDB) and by the Water Resources Council in a report entitled "Proposed Standards and Procedures".

TWDB Estimates Higher

Using secondary benefits as codified by the TWDB, total benefits amount to $2.1 billion, boasting a ratio of 1.09 to 1.00. Flaigg said that on that basis the project would be considered "marginally justified".

The TWDB statistics are representative of the philosophy of the Water Resources Council in their regional development account. They take into account secondary and tertiary (regional and national) benefits, and even ecological and environmental standards, in justifying the project.

During a question-answer period following his presentation, Flaigg recommended more extensive examination of underground recharge and cloud seeding and more widespread use of tailwater pits and playa lakes as alternatives to import.

Tags Identify Irrigation Wells

Water Industries, Inc., of Hereford, for the past three years has carried on the practice of providing the owner of the wells they drill with a record of the well's vital statistics.

A gold-finished aluminum cast, approximately nine inches long by five inches wide, is placed flush with the pump base of a newly-drilled well before the concrete dries.

Information deemed vital to the well owner is rendered constantly available by this type cast. Displayed under all weather conditions are details such as depth to water, date drilled, size of casing, etc.

Steve Conway, Secretary-Treasurer of Water Industries, said his company only places these tags on new wells they drill or wells on which they pour a new concrete pump base.

The drillers have also made provisions for updating of the information. "A grinder is used to re-stamp the cast when there are changes in the water level, depth to pump and other flexible statistics," said Conway.

The Water District commends Water Industries for providing this aid to the well owner. Not only does this service allow the drilling company to maintain its own reliable records—it also furnishes a valuable service to present and future well owners.

Nebraska Puts Tight Controls On Irrigation Runoff

By TOM MILLIGAN*

Irrigation runoff regulations recently adopted by four Nebraska groundwater control districts (GWCD) are being termed a landmark in the history of the state's irrigation.

Deon D. Axthelm, Extension Water Resources Specialist, Agricultural Engineering Department, University of Nebraska, Lincoln, Nebraska, explained the regulations in detail during the recent irrigator's shortcourse put on by the university.

In essence, the regulations provide: "Commencing on January 1, 1975, no groundwater irrigator . . . shall be allowed to irrigate without an adequate system to control his irrigation runoff water and no groundwater irrigator shall allow his irrigation runoff water outside the lands under his direct supervision and control without the written consent of the Ground Water Conservation District Board."

The four districts adopting the regulations to stem the tide of declining groundwater resources from heavy pumpage and waste, include the Clay County GWCD, Hamilton County, Seward County and York County.

This past January 1, three of the districts required landowners or tenants with irrigated lands to file informational reports with their GWCD. York County irrigators were given until March 1 of this year to file their reports because of a later hearing date on the regulations last year.

Excerpted from Axthelm's report are some of the reasons for the districts taking the historic step.

GWCD's First Attempt

"This is the first attempt in Nebraska by local government (GWCD's), rather than state government, to deal with the problem of groundwater declines. The decision to institute the regulation was made by local people. The regulation will not arrest the decline, but it should slow the rate of decline. Thus, the objective of lengthening the useful life of the groundwater supply may be attained in part," stated Axthelm.

The districts took action based on documented evidence of the effect of heavy pumpage. Studies were made jointly by the districts, the U.S. Geological Survey (USGS) and the Conservation and Survey Division of the University of Nebraska-Lincoln.

In Clay County, the total depletion of the stored groundwater supply was about 650,000 acre-feet, from time of establishment of irrigation well records through 1970. Estimates for the 1971 season were a depletion of 101,000 acre-feet, bringing the total to nearly 750,000 acre-feet.

About one-third of the total depletion occurred in Clay County in the last two years. Data for 1972 is not yet available. Clay County had 1,250 wells registered by February of 1972, York County had 1,708 registered wells and Hamilton County had 1,839 by January 1, 1972.

The depletion since irrigation began for York County through the 1971 season was 578,600 acre-feet and in Hamilton County about 696,400 acre-feet. Data for Seward County is being reviewed by the USGS for release.

No More Districts to be Formed

Groundwater decline problems also exist in Box Butte and Holt Counties. There is no groundwater conservation district in these counties and it is no longer possible to form one. Recent Natural Resource District legislation prohibited further formation of GWCD's. The directors of the Natural Resource District responsible in declining areas will, according to Axthelm, need to resolve the problem.

Axthelm said it is anticipated that this year and 1974 will be construction years in the districts with the new regulations. He emphasized that the regulation calls only for control and does not specify particular types of control systems.

"However, it is anticipated that it (the regulation) will trigger installation of more irrigation runoff reuse (tailwater) systems," he said.

The districts, before adopting the current regulations, considered other management methods to solve the problems of groundwater decline, but found them infeasible. Considered and rejected was a system of allocating groundwater, for example, limiting the number of inches or feet of water that can be applied per acre or the amount that can be pumped per well. And they considered and rejected applying a severance tax on some specified unit of water. They also considered some method of limiting the drilling of new wells.

The regulation provides that the irrigators (landowner or tenant with irrigated land) supply to the GWCD board a sketch showing what the situation is on those lands with respect to the disposition of irrigation water runoff. The sketches require certain other information and data.

Sketches Reviewed by Board

After the board gets the sketches, they are required to acknowledge receipt of the sketches. During this year, the board will review each sketch and place the land in an a, b or c classification as follows:

a. The groundwater irrigation runoff control is satisfactory for that particular situation.
b. The water leaves the farm but someone else uses it. This type of arrangement will require written consent of the board.
c. The situation is unsatisfactory. The boards anticipate working with persons having this classification to help them gain compliance.

Meanwhile, irrigators on the average are putting about two acre-feet of water per year on their crops. There is considerable research and education being carried on in Nebraska to show the economics of growing a crop with less water applied. And, of course, there is much encouragement to use all of the water which is pumped rather than permitting it to run off the field into a road ditch, with or without regulations.

*EDITOR'S NOTE: Managing Editor of *Irrigation Age*.

AGRICULTURE . . . cont. from page 1

nation its prestigious position on this planet."

He continued, "It is these capabilities that recently enabled the United States to forestall a mounting national crisis in the world's largest agrarian nation when we agreed to supply man's most basic agricultural commodity, wheat, to Russia.

"It is not presumptious to speculate that the recent friendliness extended to the United States by a former bitter enemy, and the world's most populous nation, Communist China, is nothing other than their need for our foodstuff commodities."

Rayner also pointed out that it appears illogical to "adopt a national water policy toward irrigated agriculture that would diminish our world dominance as a food and fiber producer, and, consequently, our main bargaining lever to maintain peaceful coexistence."

Considering the United States' dominance in world agricultural production, one wonders what crops might be able to balance the U.S. trade deficit, for what reasons and to what extent.

Meat Important to Diet

With the world's growing capacity to pay for foodstuffs, and America's ability to produce the products so cheaply, the world is becoming more aware of the importance of meat and protein in the diet. Many countries are also becoming better able to produce their own meat, but need America's feed grains with which to feed their animals.

"Just as the United States raises more meat animals than anyone else, it also raises more of the feed grains that fatten these animals," states the *Forbes* article.

"Who can raise corn like the U.S.? For the protein supplement, soybeans, the U.S. soil and climate are ideally suited, and the U.S. grows 70 percent of the world's supply. Wheat, which we think of as a food grain, is also a feed grain around the world, and the U.S. stands ready even now to export up to one billion bushels a year of it."

It takes eight pounds of feed to produce one pound of beef, and seven to produce one pound of pork—thus, the theory "it is foodstuffs for meat animals that is the U.S.' long suit in international trade."

At a time in this country's history when it must change its role from the charitable defender and feeder of the world's developing nations to a role of protecting those at home, the United States' turnabout runs parallel to the increasing ability of the world to pay for what they receive.

For example, quotes *Forbes,* "Russia and China are in. India is out." Another change is that the U.S. would not so much be selling grain as meat, but as that which can be converted into meat.

U.S. Must Protect Farmers

However, if this country wants to encourage agricultural expansion as a means of earning foreign exchange, "it will have to protect the farmers against undue price fluctuation."

"As granary to the world, too, the U.S. will have to protect its customers against shortages and wild price escalations."

One way this might be accomplished would be by government participation, such as stockpiling in off years or by working out long-term contracts by which major customers might agree to take regular amounts in return for an assured supply.

Rayner, in his report to the NWC, commented on a form of government participation — whereby the NWC contends that "arbitrarily reducing irrigation water supplies will only result in more idle land being placed into cultivation, with the resulting maintenance of a high level of production."

The Commission evidently feels that reducing irrigation water supplies would hold down food prices.

Groundwater Fights Drought

Rayner contends that the insurance against drought conditions provided by an adequate underground water supply for irrigation "permits us to enjoy high quality, low cost food and fibre products."

He also feels that it is the lack of such irrigation stability that now finds Russia and China in a bind.

Rayner cited a recent period of low rainfall on Texas rangeland and the stable cattle prices as an example. ". . . the cattle prices did not decline as they have historically, because of forced selling — the stability of irrigated pasture and the large feedlot capacity of the irrigated region of the High Plains could, and did, assimilate the cattle forced off the dry rangeland."

Another thing to be taken into the economic picture is the fact that Japan, Russia and other countries are becoming attracted by the idea of investing in growing feed grains in other countries with a more suitable climate, as well as trying to produce them at home.

Prices Must Remain Competitive

The U.S. government must keep the price of its grains competitive so as to hold the market and be ready to supply experimenting countries with the products when they suffer production shortfalls.

However, even with the trend of other countries producing more at home, they still cannot produce the feed grains at home as cheaply as they can import them from the United States. And soybeans hold the key.

According to *Forbes,* the problem with soybeans is supply rather than demand. And, nowhere in the world can soybeans be grown at the quality and capacity claimed by the states of Iowa and Illinois.

So, the United States' economic picture may not look so bleak for long. If the Federal government sees the light, agriculture (particularly foodstuffs for meat animals) could turn the tables on this country's deficit in the international trade books.

Does an improperly-covered abandoned well, similar to the one pictured above, exist on your property? If so, take the necessary measures TODAY to cover or seal it properly before YOU or a loved one become a casualty of your own neglect.

FARM . . . continued from page 2

Commerce. Yields were good, quality was high, and production costs were reasonable. All of these factors point to reasonable prices in the food market. The graphs on page 2 dramatically illustrate the findings.

Results of a test for chemical residues on the crops, conducted by the Illinois Natural History Survey, tell another important story. *They found no traces of residue on the crops from the modern treatment using pesticides.* The sponsors used this important information to prove to consumers that pesticides, used according to label instructions, pose absolutely no threat to food quality or the environment.

Using pesticides actually conserves the nation's natural resources, and this point should be brought home to critics of modern agriculture. Without the use of pesticides, millions of extra acres of land would have to be cultivated to produce the food and fiber required by Americans. Much of this land would have to come from forests and other non-cultivated hillsides, resulting in erosion and siltation of our streams. More machinery would be required which would burn more fuel and add more engine emissions to the air.

America's modern agricultural efficiency through pesticides is evident when cost of food is considered in relation to income. An average family in the United States today spends only 19 percent of its total expenditures for food. This is far lower than any other country and the lowest in the history of this nation. Contrast our 19 percent with the following percentages in other major nations:

INDIA	60 percent
USSR	58 percent
JAPAN	35 percent
W. GERMANY	32 percent
FRANCE	28 percent
ENGLAND	24 percent

All modern production tools contribute to keeping food costs low in relation to other family expenses. Without fertilizer, fungicides, herbicides and insecticides, food costs will go toward $14 a pound for broccoli, 68 cents a pound for tomatoes, and 60 cents a head for cabbage. It should be obvious that pesticides play a vital role in the world today. Let's make sure everyone knows this fact.

*EDITOR'S NOTE: The above article is reprinted from *Weeds Today,* the publication of the Weed Science Society of America. The article was prepared by W. A. Conterio of Arcola, Illinois; Dale Bateman, Douglas County, Illinois, Extension Advisor, and Louis Christen, Coles County, Illinois, Extension Advisor.

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 5 "THERE IS NO SUBSTITUTE FOR WATER" *May, 1973*

THE ANNUAL WATER STATEMENT, 1972-1973

By D. D. SMITH

During the month of January, 1973, personnel of the High Plains Underground Water Conservation District No. 1 and the Texas Water Development Board (TWDB) measured the depths-to-water in "observation" wells located in the 15 counties comprising the Water District.

An observation well is a well that has been selected for inclusion in the annual water level measuring program. All of the wells are privately owned—none of the wells in this program are owned by the District. They are selected at spaced intervals in sufficient density to assure adequate coverage for the surrounding area.

Currently there are 799 wells in the program, of which 797 (99.7 percent) were measured. District personnel measured 529 wells in Bailey, Castro, Cochran, Deaf Smith, Floyd, Hockley, Parmer, Potter and Randall Counties and representatives of the TWDB measured 268 wells in Armstrong, Crosby, Hale, Lamb, Lubbock and Lynn Counties.

Adverse weather conditions throughout most of January hampered and frustrated field activity. Walks across muddy fields and turnrows became commonplace. The District, in behalf of the participants in this year's field work, would like to take this opportunity to publicly thank area residents who frequently rendered assistance to the field men by helping to pull their automobiles out of the mud.

More Useful Format Desired

In departing from the format established over the past few years for presentation of the annual water statement, the District hopes to reduce the volume of raw material from the 800+ observation wells maintained within the area and to assimilate the information into a more comprehensible and useable format.

Although statistics of an individual well might be of interest to the owner of said well, the year-to-year performance of any well must be viewed in context with the profile projected by the wells surrounding it.

For the benefit of each well owner, a vinyl tag with the recorded depth to water is affixed to the well head equipment of each well measured. Recording the year-to-year measurements would provide the land owner with a basis for judging the rate of change within his own well.

While the individual well measurements are not being reproduced in this year's assessment of the groundwater conditions, we would like to emphasize that the records are continuously maintained at the Lubbock office, and the District staff will be available to discuss the individual records with any interested persons.

Average Decline Calculated

The table, "Average Decline of Water Table", statistically tabulates the average decline by county for the period from January, 1972, to January, 1973, and the average annual decline for 1962 to 1973. The average annual decline value represents the 1962 depth-to-water measurement subtracted from the 1973 depth-to-water measurement, and the difference divided by the number of intervening years (11).

In Potter County the values commence with the year 1963. Plus signs (+) indicate a rise in the water level. The statistics are intended to cover only that portion of a county within the District.

The past Fall (1972) again recorded above average rainfall throughout the area, commencing in mid-August. The early curtailment of irrigation pumpage and delayed measurements during January, 1973, probably allowed for one of the longest rest periods in recent years.

As such, the depth-to-water measurements recorded during 1973 should depict true static water levels more accurately than is possible in those years wherein the average rest period of the wells might be several weeks shorter.

Within the context of the conditions previously stated, the 1973 average decline throughout the District is somewhat smaller than the long term average. Randall County is the only county wherein the 1972-1973 change was in close agreement with the 1962-1973 average decline. Four counties (Cochran, Crosby, Hockley and Lynn) have an apparent rise in their water table for the past year.

Adjustment Reflected

However, as noted in the 1972 water statement *(The Cross Section,* April, 1972), at least two of these counties posted declines for the 1971-1972 period far in excess of there-to-fore recorded statistical averages. Consequently, it might be assumed that the apparent rise in the water table for the 1972-1973 period reflects an adjustment for inaccurate measurements recorded in the previous year.

For example, the measurements for January, 1972, in Cochran County indicate 13 wells with a decline of more than five feet from the January, 1971, measurements. In these 13 wells, the January, 1973, measurements recorded, without exception, a rise in each of the wells and the net apparent rise is in close proximity to the posted decline for the preceding year.

The table, "Summary of Water Level Measurements", presents the minimum and maximum depths to water as measured in 1962 and 1973. Included also are values for the average depth to water in each county for the years 1962 and 1973 and the number of observation wells measured in the respective years.

It will be noted that each county has experienced a lowering of its water table. Those counties with the largest available supply, and, consequently, the largest pumpage, continue to experience the largest average decline of their water table.

On the following page, a hydrograph is presented with a curve (line) plotted for each county. The numerical values on the vertical portion of the graph represent the average depth to water in feet from the land surface. The horizontal portion of the graph represents time in one year increments, from 1962 to 1973.

An uptrend (rise) in the plotted curve does not necessarily reflect a rise in the water table for the year(s) involved. As previously mentioned, in a number of instances the apparent rise could reflect an adjustment in the measurements for some previous year, or it might also indicate some of the observation wells were not measured in a particular year.

AVERAGE DECLINE OF WATER TABLE

County	Average Decline ft. 1972-1973	Average Annual Decline ft. 1962-1973
Armstrong	1.24	1.81
Bailey	1.12	1.48
Castro	2.25	3.38
Cochran	+3.01	0.90
Crosby	+0.58	2.76
Deaf Smith	2.12	4.20
Floyd	0.46	3.76
Hale	0.76	2.82
Hockley	+1.07	1.18
Lamb	0.19	1.92
Lubbock	0.37	1.73
Lynn	+2.59	0.49
Parmer	1.78	3.39
Potter	0.50	1.91
Randall	1.74	1.99

In several instances, an observation well will be pumping (irrigation of winter wheat, for example) at the scheduled measurement time. Absence of these measurements would be reflected in the average value in proportion to the particular normal depth-to-water values under or above the county average.

The curves for the individual counties indicating the average static water level in January of each year (the line connecting the points is only an inferred line and not to be construed as an indicator of the water table during seasonal pumpage), could also serve as an indicator of the relationship of the pumping lift required in the various areas. The hydrograph *does not* indicate the depth to the base of the aquifer.

Slope Indicates Decline

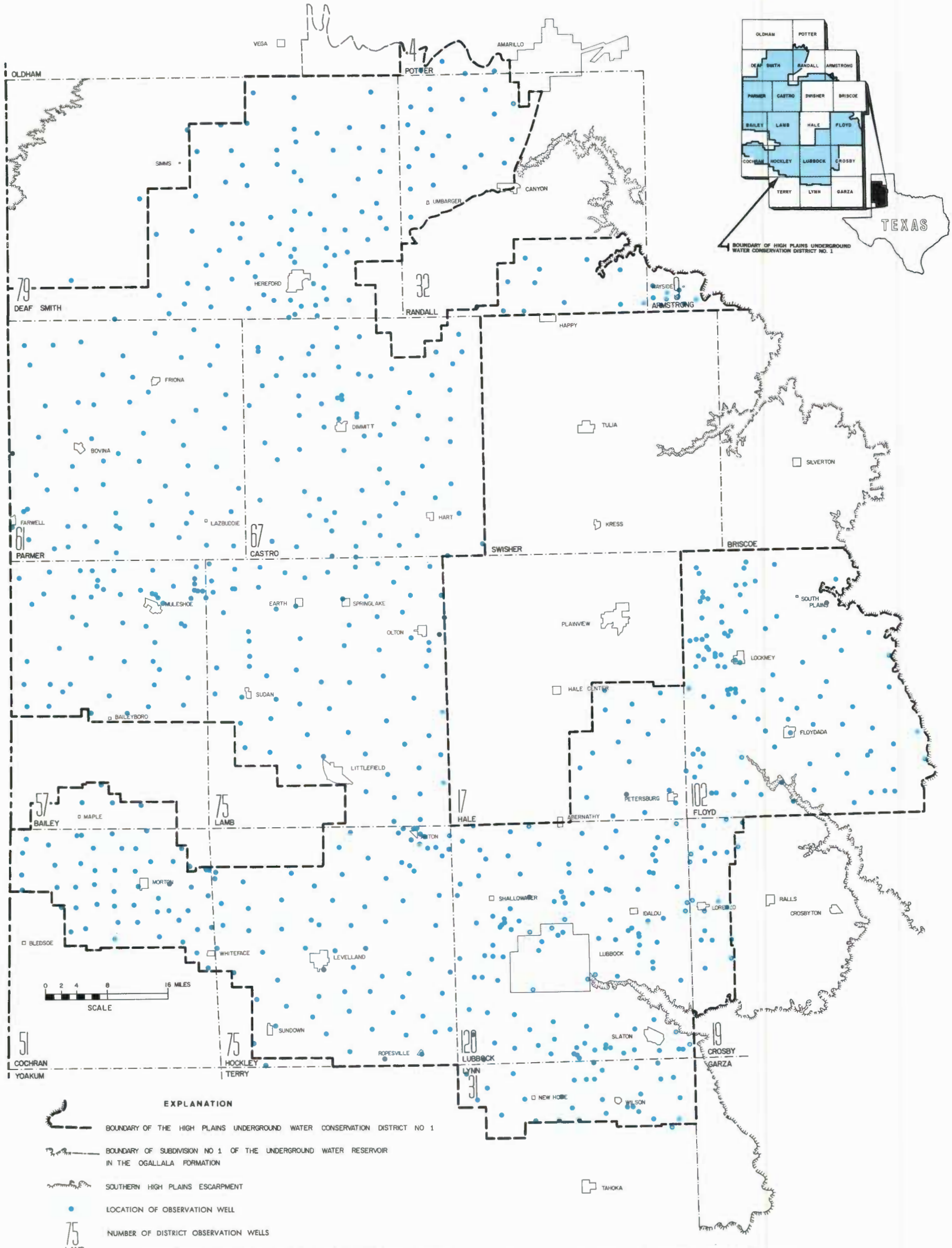
The overall downward trend of the curve is apparent in each county. The slope of the curves also is a good indicator of the rapidity of the decline of the water table for the various counties.

Even in those counties with an abundant reserve of water resources, the portion of the curves depicting conditions observed for the last few years indicates there is a noticeable decrease in the rate of decline of the water table. This is an encouraging sign that the various conservation measures advocated by the District and other interested groups are beginning to bear dividends.

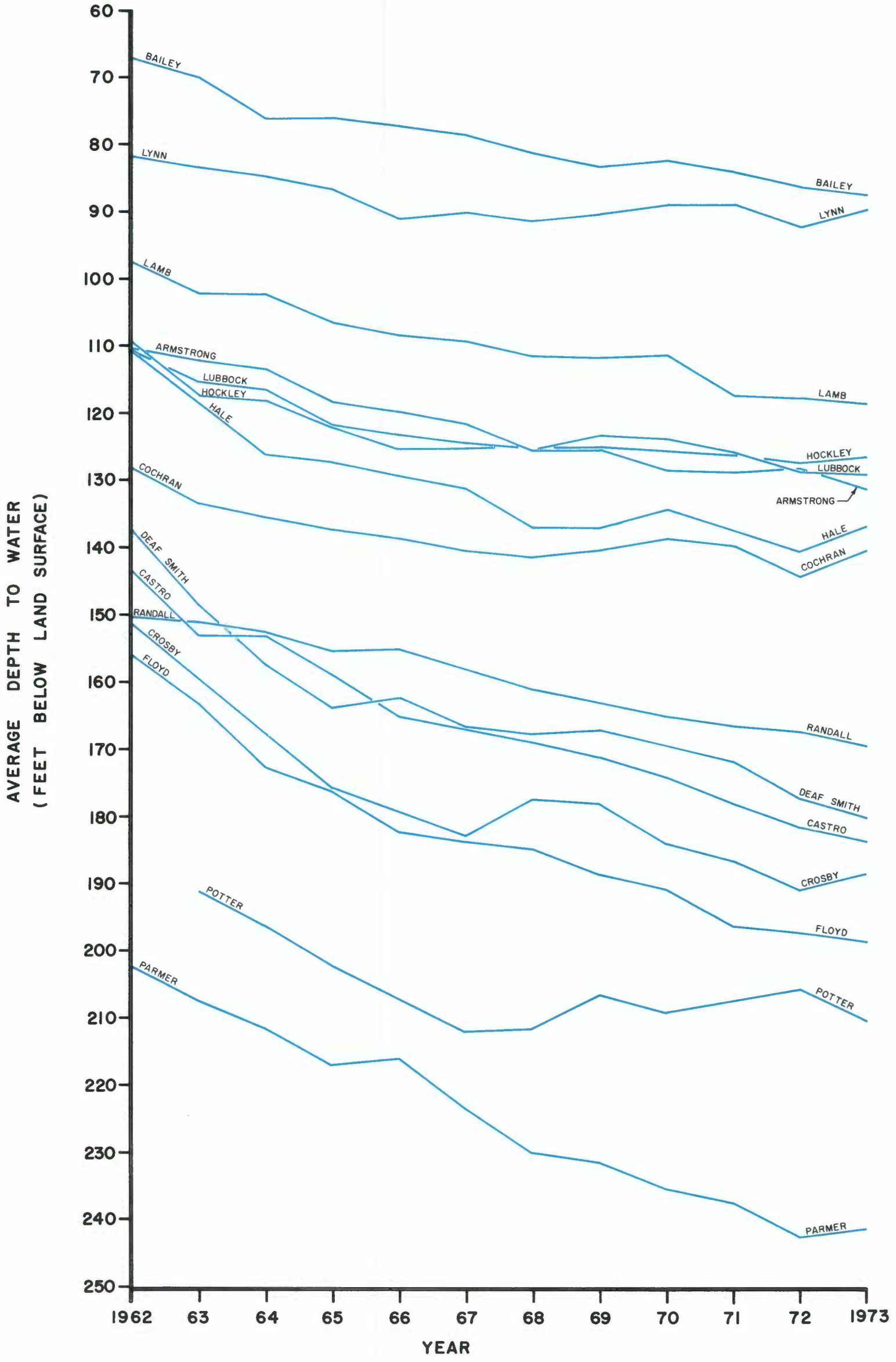
All of the farmers throughout the area engaged in such conservation practices are to be commended for assuming the responsibility to participate in programs designed to effectuate groundwater conservation.

SUMMARY OF WATER LEVEL MEASUREMENTS

	1962				1973			
	No. of Wells	Depth to Water (Feet)			No. of Wells	Depth to Water (Feet)		
County	Measured	Min.	Max.	Avg.	Measured	Min.	Max.	Avg.
Armstrong	8	95.48	124.90	110.50	9	110.59	154.17	131.66
Bailey	41	25.11	142.72	67.22	57	23.90	152.59	87.42
Castro	45	52.64	224.41	143.71	66	115.37	283.34	183.79
Cochran	45	55.40	176.66	128.32	52	74.85	195.97	140.70
Crosby	10	116.48	179.34	151.60	19	127.54	210.46	188.75
Deaf Smith	61	52.25	286.40	137.66	78	58.67	327.52	180.25
Floyd	89	37.29	264.96	156.08	102	56.49	306.65	198.85
Hale	16	69.70	151.60	110.79	17	83.38	197.83	137.08
Hockley	37	34.64	178.60	109.96	76	36.74	202.26	126.64
Lamb	36	28.13	147.10	97.76	72	34.60	197.94	118.73
Lubbock	100	12.82	194.70	111.86	120	11.62	220.69	129.11
Lynn	29	25.89	133.73	81.97	31	26.69	149.43	89.86
Parmer	48	123.35	306.14	202.89	61	159.43	335.07	241.63
Potter (1963)	4	176.57	204.76	191.36	4	193.43	222.88	210.47
Randall	12	123.30	187.97	156.53	33	100.95	234.37	169.60



LOCATION OF OBSERVATION WELLS WITHIN THE DISTRICT



AVERAGE HYDROGRAPH FOR EACH COUNTY WITHIN THE DISTRICT

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

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Mrs. Norma Fite	Secretary
Mrs. Rebecca Clinton	Public Education

According to a May, 1973, Gallup Poll, four out of 10 Americans say they would have no objection to drinking recycled sewage water.

Irrigation Wells Driven Out In Lamb County

Personnel of the High Plains Underground Water Conservation District No. 1 are currently engaged in a "drive-out" of Lamb County. The activity consists of driving to each well location (or former location of old wells), marking the site on a large scale topographic map of the area and recording the size, type and power source of the well head equipment.

The primary purposes of the inventory are to ascertain the number and location of existing wells, to determine if any safety hazards exist at abandoned well sites and to aid in a forthcoming hydrologic study of current groundwater conditions in Lamb County.

Participating in the survey are Obbie Goolsby, Dan Seale, Kenneth Carver and Don McReynolds.

Representatives of the Texas A&M Research and Extension Center and the Soil Conservation Service met with Frank Rayner, Manager of the District, at the District offices on May 15 to lay the final groundwork for publishing the **Irrigation Tailwater Return Systems Handbook.** Review drafts will be made available in mid-June to interested parties for their review and comment. Pictured from left to right are: Dr. George McBee, Resident Director of the Center; Dr. Otto Wilke, Assistant Professor of the Center's Soil and Water Division; Y. E. McAdams, Area Engineer for the SCS; Dr. Charles Wendt, Associate Professor of Soil and Water, and Rayner.

District Manager Frank Rayner testifies before the Texas Constitutional Revision Committee during their public hearing in Lubbock, April 26.

RAYNER TESTIFIES BEFORE COMMITTEE

Frank Rayner, Manager of the High Plains Underground Water Conservation District No. 1, presented testimony in behalf of the District to the Texas Constitutional Revision Committee in Lubbock on April 26.

The Committee, charged by the voters of Texas to hear proposals of interested citizens concerning what they feel to be the most important essentials of a new State constitution, heard eight hours of testimony from the Lubbock area citizenry.

Rayner directed the majority of his presentation toward water-oriented areas of the present document; however, he also made a few recommendations as to its general nature.

While noting that the "shall not" form of the present constitution should be retained because of its check on all branches of government, Rayner detailed some of the areas in which the document and its amendments are weak.

Original Document Superior

"The original document, although old and somewhat outdated, is far superior in quality to most of its amendments," the speaker noted.

He charged the present amending process with being erroneous many times in numbering and structure, redundant, too specific (this, in turn, leads to future amendments) and unnecessarily "replete with privileges for specific individuals, firms and other entities".

He recommended that revision eliminate special and local provisions such as would provide for specific county hospital districts, retirement systems and county road bonds.

Concerning water-oriented provisions, Rayner recommended that the new constitution retain the wording of Article III, Section 49-C, Texas Water Development Board Fund "except for providing for legislative expansion or extension with, say, 4/5ths concurrence of both Houses of the Legislature."

Should Retain Article III, Sec. 49-D

He also recommended the retaining of Article III, Section 49-D, Development and Conservation of Public Waters, except to eliminate specifics such as the 50-year limitation on the inter-basin transfer of water.

Concerning Article XVI, Section 59 (misnumbered Section 59-A), Conservation and Development of Natural Resources, Rayner proposed that it be kept as is with the possible addition of the 4/5ths provision, as set out previously.

Rayner concluded by stressing the right to free enterprise and private property, as set forth by Article XVI, Section 18, Vested Rights.

"The private ownership and economic development, within existing governmental restraints, facilitating proper conservation of natural resources such as oil and gas, sulphur, uranium, groundwater and other minerals, should be preserved. The economic strength of Texas and the Nation is predicated upon the preservation of private property rights."

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
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THE Cross SECTION

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

Volume 19—No. 6 "THERE IS NO SUBSTITUTE FOR WATER" *June, 1973*

PUT A BORDER ON TAILWATER

By F. A. RAYNER

The landowners and tenants that have received tailwater-waste cease and desist notices from the District, but have not installed a tailwater return system or made other land reclamation or water management changes, now find themselves well into another summer irrigation season with their old groundwater waste problems still facing them.

To install a permanent tailwater return system at this point in the growing season—although not impossible — is inconvenient and more costly than would be the installation of same during the winter months.

Temporary Return System

Some irrigators may find themselves faced with a need to take immediate steps to return their tailwater to their fields. In most cases it would be wise to go ahead with the installation of a permanent tailwater return system, irrespective of the seasonal problems associated therewith. However, a temporary tailwater return system may suffice for the season.

The temporary system usually consists of a portable pump, propelled by an internal combustion engine fueled by butane or propane gas, returning tailwater to the head of the field, or to the nearest outlet point in the underground distribution system, through aluminum pipe laid upon the top of the ground.

The pump of the temporary tailwater return system is usually placed in a small excavation at the lowest point of the irrigated field, near a tailwater-retaining border, or, when not associated with a public road, in the borrow ditch.

Most of the irrigators that have used a temporary tailwater return system have found that the labor, materials and fuel costs per unit of water salvaged exceed that of permanent tailwater return systems.

When readily available, some irrigators use electricity to drive their temporary tailwater return system pumps. The irrigator selecting a pump for this purpose would be advised to choose one that can also be used in an adequate permanent return system — in other words, the pump selected should be large enough to handle the peak tailwater load from all fields to be served by the anticipated permanent system. Floating pumps are ideal for the temporary, as well as the permanent, tailwater return system.

Waste Prohibited

The Texas law that obligates the District to prohibit tailwater waste states that groundwater waste includes ". . . the flowing or producing of wells from an underground water reservoir if the water produced is not used for a beneficial purpose", and "wilfully causing, suffering, or permitting underground water to escape into any river, creek, natural watercourse, depression, lake, reservoir, drain, sewer, street, highway, road, or road ditch, or onto any land other than that of the owner of the well".

Although the law appears to permit the District to extend its groundwater-waste abatement procedures to curtailing the many on-farm practices that allegedly waste groundwater, the former magnitude of groundwater waste through tailwater escaping from the land from whence produced has occupied the major part of the District's research, demonstration and public education programs, and all of its enforcement activities.

The nebulousness of identifying and categorizing alleged on-farm groundwater waste has prevented the development of equitable and workable programs for abating same. The District's approach to this problem has been through irrigation studies conducted by the District, or funded by the District through other research and development agencies, and the public designation of the results of on-farm water efficiency studies — particularly the research results released by the Texas Agricultural Experiment Stations, The Halfway Research Foundation and the many branches of the United States Department of Agriculture.

It has long been the District's policy to strive to eliminate off-farm groundwater waste and refrain from diluting its efforts by overextending its capabilities by trying to enforce possible on-farm water-use-efficiency programs.

The Border

In view of the District's policy regarding alleged on-farm waste of groundwater, and accepting its determination to abate off-farm tailwater waste, there is one other land reclamation and water management system that can be employed by the irrigator, even this late in the season, to forego

--continued on page 4 . . . PUT A BORDER

Are you still using unlined distribution ditches, or have you installed underground pipe?

Pipeline on the edge of fields can be laid during any season, and the pipeline companies usually do not have a backlog of orders to fill during the growing season, so this is a good time to get after it.

A border is never the answer to the need for a permanent tailwater return system. This photograph shows a border that is retaining the tailwater from the irrigated cornfield, **on the farmer's land,** and is, therefore, in technical compliance with the District's waste abatement policies. However, the loss of groundwater through percolation and evaporation is excessive. The magnitude of this tailwater runoff, and the physical conditions on this field, are readily adaptable to groundwater conservation through a permanent tailwater return system. The land recovered for additional crop or cattle production would more than defray the costs of a tailwater return system. This is the only condition of gross flooding of land by tailwater runoff observed during a recent aerial tour of the northeastern part of the District.

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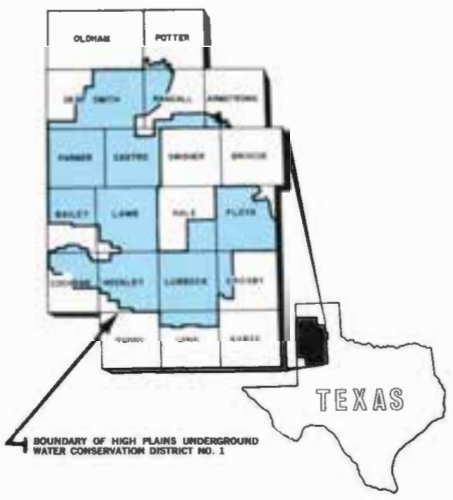
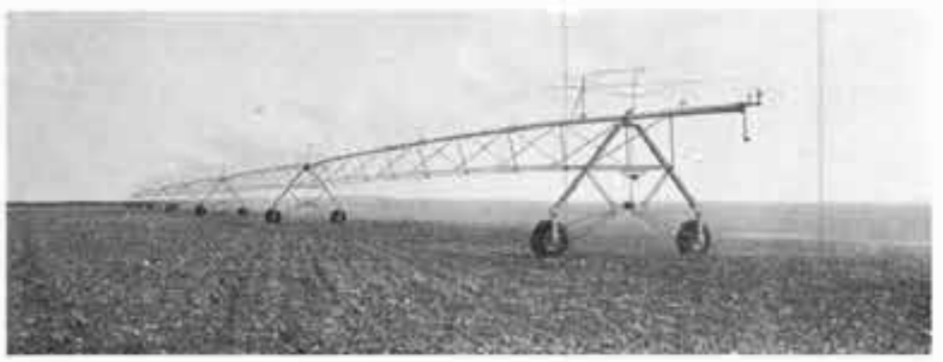


NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

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 W. J. Hill, respectively.

Most irrigation farmers do not set aside enough of their fields to provide adequate borrow areas for border construction and maintenance. Many of the borrow areas, and even some of the borders, extend onto public lands, as in the four pictures above and below.

Perhaps you are one of the irrigators that have completely bypassed the installation, operation and maintenance expense of a tailwater return system and/or borders, by the use of sprinkler systems. The automatic application of the right amount of water with a minimum of attention is making the automatic sprinkler systems very popular with the irrigation farmer. Most of the manufacturers of the automatic, center pivot, sprinkler system now have a backlog of orders. Unfortunately, the use of sprinkler systems is not as widespread in the Southern High Plains of Texas as in the Northern High Plains of Texas, the Eastern Plains of New Mexico and, in particular, Idaho, Kansas, Nebraska, and some other Western states.



QUESTIONNAIRES SENT TO FARMERS

In early July, more than 23,000 Texas farmers will receive an acreage and production questionnaire from Charles E. Caudill, Agricultural Statistician for the Texas Crop and Livestock Reporting Service, Austin, Texas.

Information from this survey will be used to determine harvested acreage and production of early harvested crops for the State of Texas and for each county. There are 254 counties in Texas, and reports are needed from many farmers so that each county will be well represented.

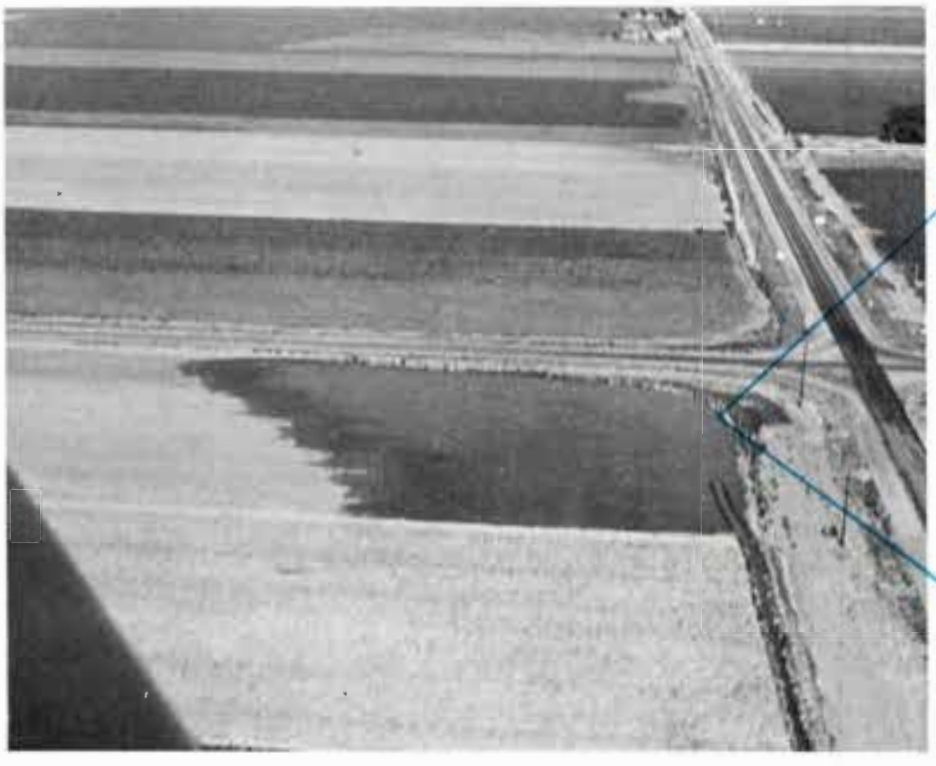
Accurate estimates are of great importance to farmers in planning production and marketings and in providing an unbiased picture of Texas agriculture.

The Texas Legislature has provided a program of estimates for each county. Texas covers such a wide area that State totals alone do not provide adequate information on Texas' most basic industry—agriculture.

This is a cooperative effort of the U.S. Department of Agriculture's Statistical Reporting Service and the Texas Department of Agriculture.

In addition to preventing tailwater waste, borders can also prevent your (water) trespassing on your neighbor's farm, thereby restricting and even denying him the privilege of exercising his right to pursue his farming operations at the time and in the manner he chooses. A tailwater-wet field is just as hard to plow, or otherwise work by tractor, as is a field wet by rainfall. In this photograph, the large border at the forefront of field A is prevented from escaping into the highway borrow ditch and onto the neighboring field B. The light shaded area in the grain sorghum field, A, is being irrigated. Reflected light from the irrigation water causes the lighter toning in this photograph. The farmer irrigating corn in field C is using another (illegal) method of preventing his tailwater from escaping onto field D. He has dug a ditch all along the low end of field C and is discharging his tailwater directly into the highway borrow ditch (the light shaded area at the near corner of field C).

The land area required to construct an adequate border, and to provide the borrow area for same, most often exceeds the space required by a permanent tailwater return system. These photographs show the relatively large borrow area necessary to construct this large cornfield border.



Corner borders are no substitute for a tailwater return system. These photographs show a shallow corner border filled to capacity. This border was seeping and on the verge of spilling when these photographs were taken.

PUT A BORDER . . . continued from page 1

running afoul of the District's tailwater - waste abatement enforcement program; and to possibly prevent being sued for damages by a neighbor, or by someone suffering injury or loss while using a public road damaged by tailwater.

This temporary, or, in most cases, emergency measure is to construct a large earthern border along the low side of the irrigated field.

Although the border is the near perfect means of preventing the loss of tailwater from many farms—whereon the soil, row lengths, land slope, crops grown, well capacities, and other physical and management conditions are conducive — for the many farms in need of a permanent tailwater return system, the border should only be considered an emergency measure. However, whether it be a permanent, temporary or an emergency measure, if properly and adequately constructed and used and maintained in accordance with its capabilities to retain tailwater, the border may *now be your answer* to preventing tailwater waste this summer.

A recent ground and aerial tour of a large area in the northwest part of the District revealed conditions very complimentary to the irrigation farming efficiency and groundwater conservation efforts of the area's farmers. The increased use of borders was particularly evident, and the fast-growing number of tailwater return systems was very encouraging.

However, all this progress is stained here and there by some irrigators adhering to old water wasting habits. The least acceptable, particularly to their neighbors, are the few unwieldy "pioneers" insisting on exercising their "right" to reject the proven efficiency, economics, and other conservation benefits of on-farm groundwater conservation practices, particularly the use of tailwater return systems.

Tailwater return systems are not being represented as the ultimate solution to groundwater conservation. They are only an interim solution for the type of row crop irrigation common to the High Plains area. Their usefulness will exist only as long as the aquifer is capable of sustaining large capacity wells.

In short, the groundwater they conserve perpetuates their existence.

Another border does the job. Without this border the water in this "first row out" would be spilling into the roadway ditch.

Borders, borders everywhere. Remember, to your neighbor, **happiness may be a border — on your farm.**

A border is only as adequate as its weakest (lowest) point, as is illustrated by the breach in this large border on an onion field. The use of a border to retain tailwater on high water-demanding crops, such as onions, requires constant attention to prevent its exceeding the border's capacity.

TWQB Chairman Dies of Heart Attack

Gordon Fulcher, 64, Chairman of the Texas Water Quality Board (TWQB), died in Austin June 24 of a heart attack. He is survived by his wife, a daughter, Mrs. J. L. Biggers of Lubbock, and three grandchildren.

GORDON FULCHER

A native of Naples, Texas, Fulcher was also a prominent Texas newspaperman. At the time of his death, Fulcher was Publisher and President of the Sunday newspaper supplement, Texas Star, and until last year was Publisher and Editor of the Atlanta Citizen (Atlanta, Texas).

Fulcher served as a Member of the TWQB for five years, having been first appointed in June of 1968 by Governor John Connally. He was elected Chairman in 1969 by the Board Members and was re-appointed to his second two-year term in March of 1971.

Mr. Fulcher devoted much time to the work of the TWQB. His interest in the quality of Texas' water was unlimited and the Water District extends to the TWQB and Mr. Fulcher's family sincere sympathy for his loss and appreciation for his work for Texas.

AUBREY BROCK

Aubrey Brock Retires After 18 Years

Aubrey Brock, Parmer County Secretary for 18 years, resigned that position with the Water District effective June 30, 1973. Brock has also closed his insurance business, Wilson and Brock Insurance Co., in Bovina.

Johnie D. Horn of Horn Insurance Agency, 332 North, Bovina, will serve the District as the new County Secretary for Parmer County.

The District is hesitant to lose Mr. Brock. He has served the District faithfully for many years. Brock's record of having issued more than 3,200 well permits in his years as a County Secretary is evidence of his active service.

The Cross Section speaks for the District's Board and staff in wishing Mr. Brock a successful future and in thanking him for a job well done.

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 7 "THERE IS NO SUBSTITUTE FOR WATER" *July, 1973*

A. L. Reznik, Friona farmer, is shown in 1956 as he stands beside his first tailwater pit. The pit, believed to be the first in Parmer County, was only five feet deep and was powered by a 14-horse-power gasoline engine that had to be stopped and started by hand. (See related pictures on page 2.)

GROUNDWATER PRECIOUS TO FRIONA FARMER

Water is precious to A. L. Reznik of Friona because he has seen good wells "fizzle out" in a short time. Because of this, he is constantly taking steps to insure the life of the water supply beneath his land.

In 1956 Reznik dug his first tailwater pit (the first pit designed by Gifford-Hill and possibly the first pit in Parmer County). Reznik said he dug the pit because he had seen his dad's two 10-inch wells on his Littlefield farm dwindle to two-inch submersibles by 1956. Reznik began farming on his own north of Friona in 1951.

In 1956 Reznik's original pit was pictured in a local newspaper. The first pit, only five feet deep, had a pump powered by a 14-horse-power gasoline engine that had to be stopped and started by hand.

Value Of Re-use

Concerning the value of re-using tailwater, Reznik said in the article that "top soil in the water makes crops getting the 'second-hand' water produce more." He went on, "This block (14 acres) cuts more grain than the one next to it since it started getting the tailwater."

Reznik has long since filled in the original pit and has dug a new one (more than five years ago) that is approximately 15 feet deep and holds three acre-feet of water. This pit helps water one section of corn and milo.

The farmer keeps records on this pit, as well as his irrigation wells, that show that his pit reclaims 15 percent of the total water pumped and that he can recover about 12 percent of that.

Pit Equals One Well

The pit, designed to pump tailwater 24 hours a day, pumps 500 gallons per minute and "is the equivalent of one well."

Reznik has tied his pit into his entire irrigation system and says it, along with his five wells, can put 3,000 gallons of water per minute on one section of land.

"Engineering your system and planning ahead are a vital part of putting in an adequate tailwater return system," says Reznik.

Reznik designed what he feels is an adequate silting process for his pit. After obtaining the advice of pump and soil conservation specialists, he designed an inlet in the bottom of a pre-silting pit with a screen over it that filters the silt out before it enters the pit itself.

Reznik says the original cost of digging and designing the pit and pre-silting pit was around $3,200, but that it was worth it and that there is not much maintenance expense involved.

"I clean the pre-silting pit out every year with a backhoe for $100." He does this to avoid having to remove

—cont. on page 2 . . . GROUNDWATER

Richardson Appointed Executive Director of TWRC

The three-member Texas Water Rights Commission (TWRC) appointed A. E. (Gene) Richardson, 37, its Executive Director on July 9, 1973. He fills the position vacated June 30 by Louis L. McDaniels, who resigned due to poor health.

A native of Circle Back in Bailey County and a graduate of Sudan High School, Richardson served the TWRC as Chief Engineer from 1970 until his appointment as Executive Director.

A. E. RICHARDSON

Richardson began employment with the Commission in 1959 following his graduation from Texas Tech University with a degree in Civil Engineering. He joined the TWRC as a Junior Engineer when the Commission was called the Texas Board of Water Engineers.

Richardson served in various engineering capacities until 1966, when he joined a consulting engineer firm. He returned to the TWRC in 1967, however, as Director of the Application Division. He held that position until his appointment as Chief Engineer in 1970.

A Registered Professional Engineer in Texas, the new Director is married to the former Bettie Collins of Muleshoe. They have one daughter, Lynne.

The Water District extends its congratulations to Mr. Richardson and wishes him the best of luck in his challenging position as Executive Director of the Texas Water Rights Commission.

Water Samples Taken In "Sandhills" Area

During the month of July, personnel of the High Plains Underground Water Conservation District were busy gathering water samples from irrigation wells scattered throughout the "sandhills" areas of Bailey and Lamb Counties.

Approximately 200 samples were collected and forwarded to Austin for analysis by the Texas State Department of Health Laboratories. Sampling was conducted as a part of the continuing Quality of Water Monitoring Program conducted by the District. Cost of the analyses is being paid by the Texas Water Development Board.

The intensive check of the "sandhills" area was to provide quality of water information and to locate any degradation or contamination of the aquifer in the area.

Recent years have marked dramatic increases in farming operations throughout the area. Alfalfa and other forage crops are grown in sandy areas. The soil is very permeable with rapid infiltration rates, and most of the cropped lands receive from three to six acre-feet of water per acre during the growing season.

Additionally, significant volumes of fertilizer and other chemical additives are applied by injecting them into the water at the well as it is being pumped.

The above factors, in combination with a relatively shallow depth-to-water area, create a situation where contamination of the aquifer is possible. While no specific instances of water quality deterioration have been noted, the potential is present and it will require proper management on the part of all users to avoid such a condition.

After the results of the analysis are returned and studied, troublesome areas (if such exist) might be pinpointed and a more comprehensive analysis made for pesticide and herbicide residue.

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

REBECCA CLINTON, Editor

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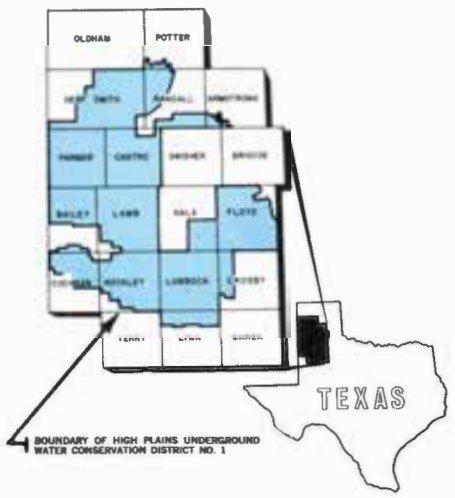

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NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

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 W. J. Hill, respectively.

GROUNDWATER . . . cont. from page 1

silt from the pit itself more than every two or three years "because a dragline really costs."

Another bonus to having a tailwater pit, says Reznik, is that you can perform several farming operations with them. His new pit, powered by a six-cylinder butane engine, is used to water stock during the winter months. "The butane engine on the pit does not freeze during the winter as do irrigation wells, and this is a bonus."

The Water District is proud to know a man of A. L. Reznik's caliber is working so hard to better his own farming operations—for his efforts benefit not only himself but every other resident of the Water District.

Reznik and Obbie Goolsby, District Field Representative, are shown standing beside Reznik's newest tailwater pit, dug in 1968. Reznik has the tailwater tied, with his five wells, into his entire irrigation system. He says a tailwater pit equals the same irrigation capacity as one eight-inch well.

Reznik says his pit pumps 500 gallons per minute and, along with his irrigation wells, can pump at a rate of 3,000 gallons per minute per setting.

The new tailwater return system is powered by a six-cylinder butane engine. Reznik says this engine is good in that it does not freeze up in the winter. He waters stock during the winter months with tailwater from this pit.

Groundwater Believed To Be Unlimited In 1937

EDITOR'S NOTE: The following article is reprinted in part from the April 2, 1937, issue of *The Fort Worth Star-Telegram* and a recent reprint from *The Lockney Beacon*, Lockney, Texas.

Real estate men here report a flourishing business, bordering on a boom, caused by the unparalleled success of irrigation. Approximately 375 wells are in operation, watering wheat and barley for a winter season.

The Lockney shallow-water belt contains 180,000 acres of proven territory and, within two years, pump dealers estimate more than 900 wells will be used to irrigate the entire acreage.

The crop yield of 1936 is a fair example of what is being done with irrigation. Farmers, producing only eight bushels of wheat on dry land in 1935, turned out a yield of 20 to 35 bushels last season on irrigated tracts. Cotton made three-quarters to over a bale to the acre, as compared to 125 pounds of lint cotton on dry land.

Irrigation here dates back to 1912 when the Texas Land and Development Company put down the first wells. The company purchased a large tract of land west of town in the Aiken and Irick communities and put down 25 to 30 wells on 80- to 160-acre tracts.

Engines Proved Expensive

These improved farms were sold to farmers from the northern and eastern states who were not experienced irrigators. The big engines for motive power to lift water to the surface proved expensive. Fuel oil had to be hauled in tanks to the farm and extra men employed.

The pioneers of irrigation believed alfalfa the only successful crop. The experiment did not prove a financial success, but did pay off better than other crops as they were handled then. Irrigation came to a standstill and most of the farms were turned back to the development company.

In 1930, after a lapse of 18 years, A. R. Meriwether renewed interest in irrigation by offering to sell farmers the pumps at cost if they would drill the wells. He was successful with Claude Harris, George T. Meriwether, T. B. Mitchell, Jack Dollar and Olin Fry. He bought one himself, making a short carload. But this movement was thwarted by the depression, which sent farm prices down. Irrigation was forgotten again.

In the Fall of 1934, Artie Baker, son of the late J. A. Baker, who established the first store here in 1894, launched another irrigation program. Farmers again turned their attention toward the possibility of irrigation.

Three years previous to 1934 very little rainfall was recorded in this section and crops failed.

More Wells Sunk

More wells have been put down in the last year than in the history of irrigation. At a depth of 200 to 250 feet, an abundance of water underlies the surface of the land to the north, south and west of Lockney. It is inexhaustible, as has been proven by the wells drilled 25 years ago. The water level is the same today as it was in the first wells, which have been operated continuously for a quarter of a century, with an additional 250 in the last two and a half years. The exact source of the water has not been determined, but it is believed the supply comes from the Rocky Mountains.

Modern, light - running turbine pumps used now are powered by small automobile motors. Electricity is used in some cases and recently John Hodel, who lives two miles northwest of here, installed a pump and is using natural gas fuel.

At present there are 26 drilling rigs in the territory running night and day, and there are over 50 wells behind schedule.

Will Average 200 Acres

Each well will average 200 acres under the irrigation ditch. In a few cases a well is used to water 600 acres. A well will pump from 800 to 1,200 gallons of water per minute.

Cost of a complete well ranges from $1,800 to $2,100 and, in many instances, is paid for by farmers with one crop.

An average cost per acre for pumping the water and labor required is $4.50 for the entire season. Some do the work cheaper where family labor is used. The watering season is of a seven month duration on an average.

Floyd County Landowners Capping Abandoned Wells

In July, the High Plains Underground Water Conservation District No. 1, as a result of an earlier field survey, sent out 37 notices of open or uncovered wells to Floyd County landowners.

A press release sent by the District to Floyd County newspapers concerning the notices has triggered some commendable activity in the county.

Water District Board President Chester Mitchell of Lockney said he had received a great number of phone calls within one day of the story's appearance in the Lockney paper. "Landowners and tenants are calling me wanting to know what they can do about closing abandoned wells on their own property or wells that they have seen elsewhere," said Mitchell.

Abandoned Well Defined

According to Texas law, Article 7880-3cB (11) of the Revised Civil Statutes of Texas, and in Rule 1 (j) of the Water District, an "open or uncovered well" is any artificial excavation drilled or dug for the purpose of producing water from the underground reservoir, not capped or covered as required by these rules, which is as much as ten (10) feet deep, and not less than ten (10) inches, nor more than six (6) feet in diameter.

The same Texas Statute and Rule 16 of the Water District explain the requirements of capping a well and the penalties imposed for not so doing.

"Every owner or operator of any land within the District upon which is located any open or uncovered well is, and shall be, required to close or cap the same permanently with a covering capable of sustaining weight of not less than four hundred (400) pounds, except when said well is in actual use by the owner or operator thereof . . .", quotes Rule 16.

The Rule also states that the District is authorized to serve written notice to any owner or operator of a well in violation of this rule, and if he fails to comply with the request within ten days, ". . . any officer, agent, or employee of the District may go upon said land and close or cap said well in a manner complying with this rule and all expenditures thereby incurred shall constitute a lien upon the land where such well is located, provided, however, no such lien shall exceed the sum of One Hundred Dollars ($100) for any single closing."

In the past, *The Cross Section* has contained articles explaining successful methods for closing and capping open wells. Anyone interested in learning more specifics about these methods or anyone who knows of an abandoned well that has not been covered, please contact the District.

The Water District is proud of the fact that, considering the irrigation well density of the area as compared to the remainder of the country, no one has fallen into a well and there have been no deaths within the Water District as a result of an uncovered abandoned well.

This can be attributed to the fact that area farmers sense their own responsibility to make their land safe for themselves and others, and, if they receive a notice from the District, they most often fulfill this moral obligation immediately.

The successful maintenance of the abandoned well program is of great importance to the Water District and the landowners acting in compliance with the program should be commended.

The District urges all landowners to take an active part to make your property safe for your loved ones.

Planning and innovation are the keys to economic tailwater reclamation. This unique tailwater return system employs a small centrifugal pump belt driven from the well's drive shaft. A small pipe with a valve connected to the well pump discharge line supplies water for priming the tailwater pump. The tailwater is pumped directly into the underground distribution system at the well site. The location of this well at the low point on this farm eliminates the need for additional underground pipeline for the tailwater return system. This tailwater pit is located in the ditch (enlarged) along a turnrow separating two farms. This irrigator can also divert water from the road ditch (to the left of the right-hand photograph) into his tailwater pit. Is this innovating farmer making money with the water escaping from your farm?

Pictured to the left is a tailwater pit with which Dale Vise waters corn. Obbie Goolsby and Dale Vise are shown in the middle frame standing beside the corn Vise waters solely with tailwater. The picture to the right is another view of some of the 100 acres of corn. Vise feels irrigating with tailwater is good for the crop as well as being a good conservation practice.

Corn Crop Watered Solely With Tailwater

Reclaiming tailwater for irrigation can be considered a public service, and Dale Vise likes playing the role of the public servant.

Vise, who operates his own farm near Farwell and helps his father, M. W. Vise, farm his land near Muleshoe, waters 100 acres of corn on his father's place solely with tailwater. And he feels it is a good water conservation practice that he plans to continue every year.

Vise said he has temporarily replaced one well with his pit and that the cost of operating the pit (including the cost of cleaning the settling pit every year) is "one-half the cost of operating an eight-inch irrigation well".

The farmer figured the initial cost of his four-acre-feet tailwater pit to have been $1,200. He said he spent $800 on the pump and motor and $2,500 to lay one-half mile of underground pipeline.

Will Install Sprinkler

Considering the water and money he saved by not pre-watering this year, Vise plans to put another pump on the pit next year and will install a sprinkler system with which to water the grass used to graze cattle.

Vise said the fact that no one in the area pre-watered this year confirmed his belief that farmers are becoming increasingly concerned about the future of irrigation on the Texas High Plains.

Having continually irrigated with tailwater for three irrigation seasons, Vise has a good idea as to the success of his operation. He figures that, at 1,000 gallons per minute, he can water 30 two-and-one-half-inch outlets of gated pipe at one-half-mile rows, or six acres every 12 hours.

Can Use Water Twice

"To me, irrigating with tailwater is a good idea because it allows you to use your water twice as long and it has already been proven that tailwater contains chemicals that are good for a crop," said Vise.

Dale Vise and his father, like a growing number of other irrigation farmers, have placed their faith in tailwater reclamation by use of tailwater return systems. As the younger Vise said, "The pit is the last thing we turn off every year."

The Vise's have found their tailwater return system to be a good investment. Why don't you take the time to find out for yourself — and save some water in the process?

In the photo to the left is the engine that pumps 1,000 gallons per minute and irrigates six acres every 12 hours. The middle frame pictures a two-acre-feet settling pond Vise designed to trap silt before it enters the four-acre-feet pit. In the third picture is shown some of the cattle Vise grazes on the land over which he runs tailwater. He says the tailwater pit is very useful and that it is the last thing he turns off every year.

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SECOND CLASS PERMIT

THE Cross SECTION

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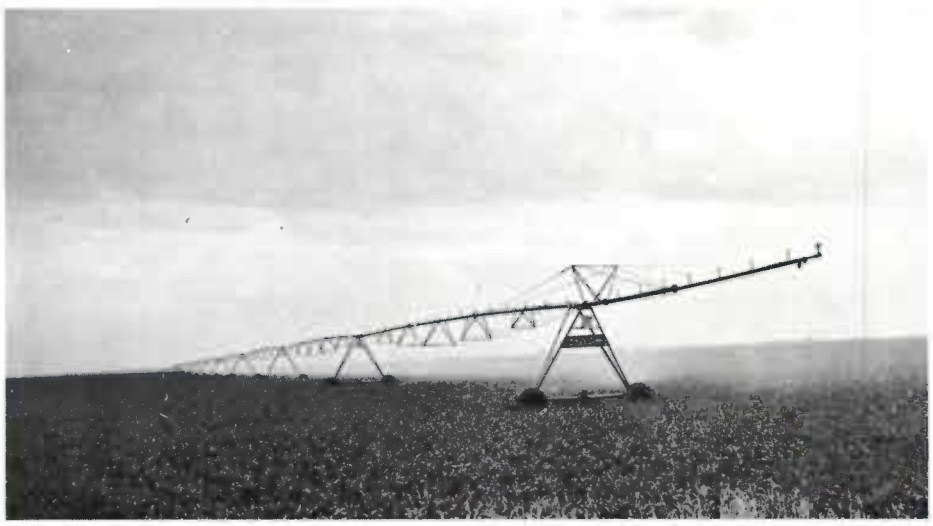
Volume 19—No. 8 "THERE IS NO SUBSTITUTE FOR WATER" *August, 1973*



Automatic center pivot sprinkler systems are coming of age in the Southern High Plains of Texas. The trend to nearly complete automation of such systems incorporates many electrical devices. The mixture of water and electricity requires special consideration for human and animal safety.

Sprinkler Safety Devices

In the ever-advancing world of today, a world achieving greater and greater technological skills, safety is sometimes overlooked as a matter of economics. However, to Gene Nelson, owner and manager of Irrigation Electric Co. of Lubbock, safety precautions save lives, time *and* money.

Nelson, in business for himself for the past year and a half, contracts over a five-state area to run underground power lines to electrically-operated pivotal sprinkler systems, mostly for Gifford-Hill and Company, Inc. As a safety precaution, Nelson runs four conductors to the system, the fourth wire being a safety device only.

"The code requires the system to be grounded," says Nelson. "An electric system only requires three conductors, but I add a fourth to insure that the system is perfectly grounded and safe from causing electric shock."

Wiring Practice Unique

According to Nelson, Gifford-Hill requires this safety-wire procedure now on all their systems, and many other sprinkler manufacturers are testing the safety measure.

Considering the experience he has gained in his extensive travels, *The Cross Section* questioned Nelson about sprinkler systems as a water conservation practice, as well as other more widely-accepted practices on the Texas High Plains.

"More and more people are buying and maintaining sprinkler systems than before, especially in Colorado, Nebraska and Kansas," quotes Nelson.

He also noted that people who invest in sprinkler systems often use them in conjunction with existing tail-water recovery systems or dig a pit for that purpose. However, he added, many others will merely drill a new irrigation well in which to tie the sprinkler.

"I have also noticed that at least half the farmers who buy sprinkler systems put them on new land that

—continued on page 2 . . . NELSON

WATER IMPORT RESULTS REVIEWED

EDITOR'S NOTE: In response to numerous inquiries regarding the conclusions of the recently-completed reconnaissance study of the proposal to import surface water to the High Plains of Texas and New Mexico, the following article represents the report delivered by Norman Flaigg, Texas Area Engineer for the United States Bureau of Reclamation, at a public meeting in Lubbock, Texas, on April 12, 1973. This article is reprinted from the *Texas Water Report*, a publication of the Texas Water Development Board, which represents Flaigg's oral presentation of the five-page summary report, *West Texas and Eastern New Mexico Import Study Fact Sheet*, released on April 12, 1973. This article and the above-cited *Fact Sheet* were taken from the more detailed analysis of the findings of this long-term study as presented in the 202-page report, *West Texas and Eastern New Mexico Import Reconnaissance Report*. Printed in June, 1973, this final report is now awaiting release by the Commissioner of the Bureau of Reclamation. A summary of Mr. Flaigg's presentation of April 12 was also printed in the April, 1973, issue of *The Cross Section*.

Purpose

The purpose of this meeting is to make public the findings of the Mississippi River Commission, the Corps of Engineers, and the Bureau of Reclamation as they relate to the West Texas-Eastern New Mexico Import Project. Today the Mississippi River Commission is making public these findings at Memphis, Tennessee.

Introduction

It has been my privilege to speak to many of you at the fifth and sixth annual meetings of Water, Inc. Each year I have given you a progress report and have begged off providing any information on costs, benefit-cost ratio, and financial feasibility. Today we are prepared to furnish that information. At the conclusion of this meeting we will distribute copies of a summary of my report to you. The gentlemen from the Corps of Engineers will be happy to answer questions concerning the portion of the study they completed and we will be happy to answer questions on the work that we have done. The Texas Water Development Board provided input on irrigation benefits and on alternative plans for utilization of the water and its representatives will be happy to respond to questions on those items.

Division of Effort

Again, please remember that the project works from the Mississippi River to Twin Lakes was planned by the Mississippi River Commission and the Corps of Engineers and that portion of the plan from Twin Lakes westward was planned by the Bureau of Reclamation. All of the economic analysis for the report was prepared by the Bureau of Reclamation.

Project Works

I have described the project previously in some detail so I will discuss it only very briefly now. The plan we are reporting upon is one which is capable of moving 8.5 million acre-feet of water westward from Twin Lakes to the High Plains. As I reported before we knew this might not be exactly the right size or the right plan but there were too many problems to be solved before we could make those decisions.

In the plan we are reporting upon, the Mississippi River flows would be diverted at the Old River Control Structure which is just above the mouth of the Red River. The diverted flows would enter the Atchafalaya River and flow downstream for 123 miles to Morgan City, Louisiana. According to the Mississippi River Commission, excess flows at that point would be available about one-third of the time. However, this consideration does not make any al-

—continued on page 3 . . . WATER

Dana Wacasey Resigns Position With District

Dana Wacasey, Secretary and Bookkeeper for the Water District for eight years, resigned her position with the District, effective August 24. She and her family will follow her husband, Dale, to Bryan, Texas, where he will accept a position with the U. S. Army Reserves, Brigade Headquarters. Prior to his promotion, Sergeant Wacasey was Administrative Supply Technician with the Reserve unit in Lubbock.

DANA WACASEY

Dana worked as the District's secretary from 1957 until 1959, as bookkeeper from 1964 until January, 1967, and returned as Secretary-Bookkeeper in September of 1969.

The Wacaseys have two sons, Des, nine, and Dane, three.

Prior to her departure, Dana trained the District's Secretary, Norma Fite, to take over the bookkeeping chores. Due to Dana's ability to teach her and Norma's desire to learn quickly, the District feels Norma will be able to take over her new job very efficiently.

However, the District will miss Dana's many years of experience in all phases of the District's management as well as her pleasant attitude in her work.

The Cross Section speaks for the Board of Directors and staff in expressing sorrow at Dana's departure but every wish for success and happiness in her future.

THE Cross SECTION

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

REBECCA CLINTON, Editor

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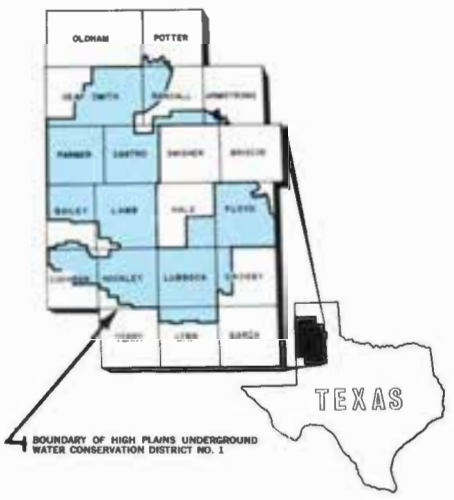


NOTICE: Information regarding times and places of the monthly County Committee meetings can be secured from the respective County Secretaries.

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

The special equipment shown in this picture is used to bury electrical cable serving sprinkler systems.

NELSON . . . continued from page 1

hasn't been farmed, while some farmers will convert an existing farming operation to a sprinkler setup," said Nelson.

Systems Pump Effluent Water

According to the electrician, systems are also being used to pump effluent water on crops not for human consumption, such as corn for grazing cattle.

Concerning a sprinkler system as a water - conservation practice, Nelson cited a case in Portales, New Mexico, where, on a quarter-section, eight wells were tied into a system with minimum pressure to put on three acre-feet of water. "With an electric pivotal sprinkler system, only eight inches were needed to produce 3,600 pounds of peanuts." Nelson said the county average was 2,100 pounds.

He said sprinkler systems are also being used in great numbers by farmers in states receiving abundant rainfall, such as Louisiana. "Some areas receive 60 inches of rainfall a year, but a drought hits and the farmer finds a sprinkler system brings him through the season," noted the electrician.

Systems Expensive

When asked what kind of farmer can afford a sprinkler system (beginning in cost at around $20,000), Nelson said any farmer who operates more than a quarter-section could profit by owning one. "Farmers buy systems by the hundreds in Washington state."

In citing more reasons for farmers on the High Plains to adapt their water conservation practices to sprinkler systems, Nelson noted that evaporation is minimal (sprinkler irrigation is considered 85 percent efficient), sprinkler irrigation creates an advantageous temperature change under a crop, runoff is minimal, and irrigation time can be easily controlled in order to prevent gross waste.

"The average rotation of a center pivot sprinkler system is 15 to 20 hours, but a farmer can slow it down to three to five days." Nelson also stressed the percentage timer at each pivot that allows the farmer to determine how many inches he wants to irrigate each rotation.

Sprinklers Becoming Popular

"I believe sprinkler irrigation, because of its efficient use of groundwater, will be adopted by High Plains farmers in the years to come," concludes Nelson.

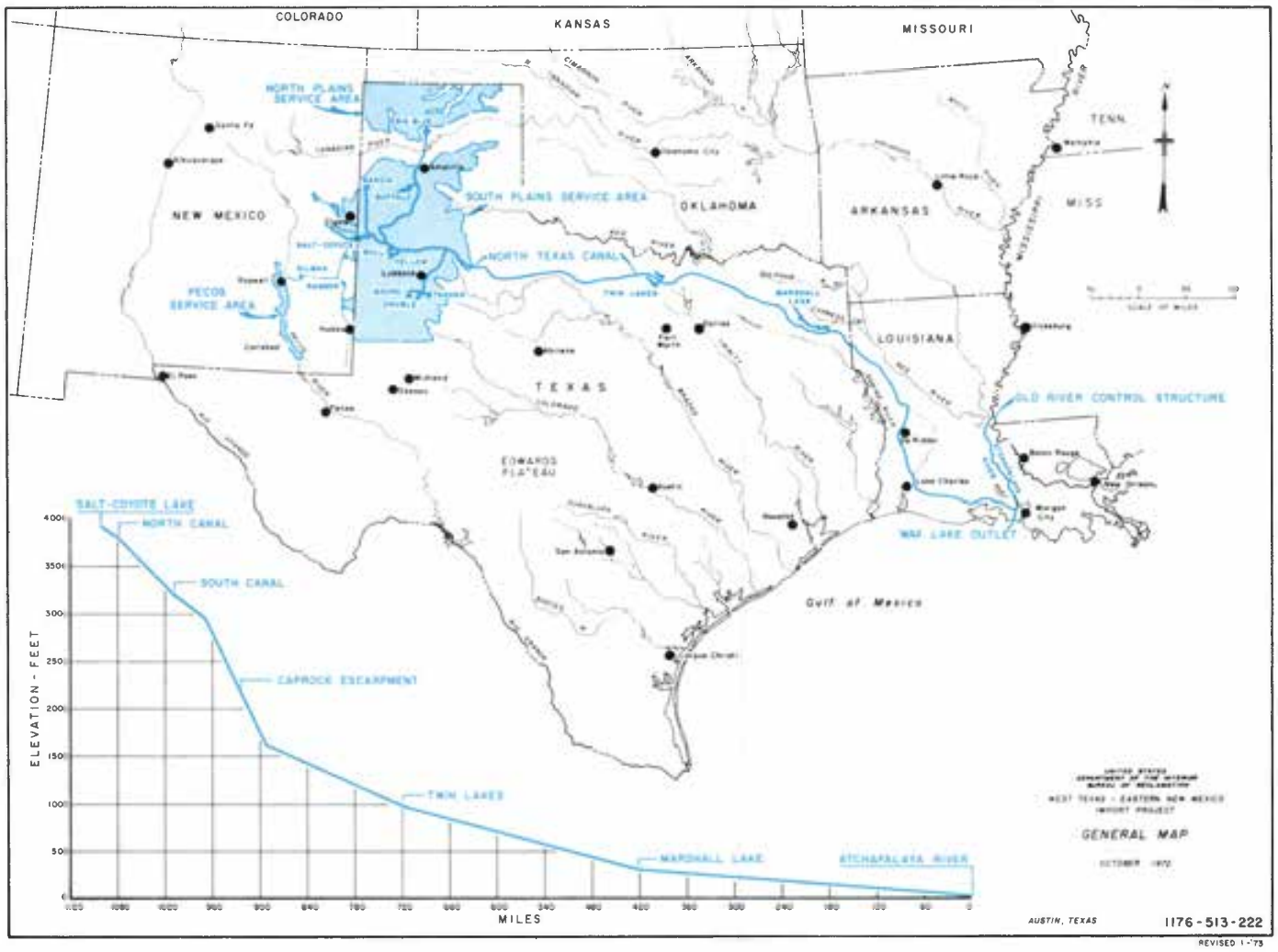
If sprinkler irrigation does come of age on the Texas High Plains, farmers that purchase and use these systems will need to become more concerned with safety devices.

Tailwater Handbook Review Draft Ready

"The Irrigation Tailwater Return Systems Handbook", prepared by the High Plains Underground Water Conservation District No. 1, the USDA Soil Conservation Service, the Texas Agricultural Extension Service and the Texas Agricultural Experiment Station, is presently available in the form of a review draft.

The handbook contains information on types of tailwater return systems, data requirements, design and construction, operation and maintenance, estimation of costs, eligibility for cost-sharing and the position of the Water District on tailwater waste abatement.

Copies of this handbook have been sent to numerous individuals and organizations for their review and comment. This type of review and the subsequent revision of the handbook is intended to make the handbook more complete and adaptable for use by the individual landowners, as well as the agricultural service industries and governmental entities.



West Texas - Eastern New Mexico Import Project — General Map

WATER . . . continued from page 1

lowance for flows necessary to maintain the estuaries and the gulf. Accommodation of those requirements might significantly limit any diversion. At Morgan City a huge canal would begin a 701-mile route to Twin Lakes. The system from Old River Control Structure to DeRidder, Louisiana (which is near Camp Polk) would cost about $2,771,000,000 based on January 1972 prices. The section from DeRidder to Twin Lakes would cost $5,022,000,000. Of this amount, $252 million would be for storage at Marshall Lake and $750 million for the storage at Twin Lakes.

The North Texas Canal system would carry the water from Twin Lakes to nine terminal reservoirs on the High Plains. It would consist of 705 miles of concrete-lined canals. This system would cost $2,705,000,000 and the terminal storage reservoirs would cost $196,000,000.

The facilities for distribution of the Texas portion of the water would carry 79 percent of the import supply to the South Plains and 21 percent to the North Plains. This system would cost $4,781,000,000.

The facilities in New Mexico would consist of concrete-lined canals and pipelines to serve 481,000 acres of irrigation and to carry water to nine towns in eastern New Mexico. This system would cost $1,135,000,000. The cost of the entire diversion, transport and distribution system is $16,610,000,000.

In addition to the works just described there would be a requirement for an enormous power facility to provide the energy necessary to lift the water and move it westward. In the section from Morgan City to DeRidder it was assumed the pumps would be driven by natural-gas turbines. The cost of these units was included in that I have already given for that reach. On the average, these pumps would operate 120 days per year and require the equivalent of 3-2/3 billion kilowatt hours of energy.

From DeRidder westward, all of the pumping plants would be driven by electrical energy. The electrical units would use 47 billion kilowatt hours of energy to move 8.5 million acre-feet of water. The generation and transmission facilities would cost $3,883,000,000.

Total Cost

The total cost of the project, including power facilities, is $20,493,000,000 based on January 1972 prices. Of this total, $16,801,000,000 would be allocated to Texas and $3,692,000,000 to New Mexico. To put this total cost in perspective, the combined annual construction appropriation for 1973 for the Corps of Engineers and the Bureau of Reclamation totaled about $1.5 billion. At this rate, 14 years would be required to finance construction of the project.

Repayment

For project construction and operation in accordance with the federal reclamation laws, reimbursable federal construction costs would be $16,490,000,000 of which $13,650,000,000 would be allocable to Texas irrigation and $2,840,000,000 allocable to New Mexico. Of the New Mexico share $2,321,000,000 would be allocable to irrigation, $516,000,000 to municipal and industrial water supply, and $3,000,000 to recreation and fish and wildlife. Annual payment requirements would total $741,200,000, including $595,000,000 for Texas irrigation and $146,200,000 for New Mexico, of which $100,200,000 would be for irrigation, $45,600,000 for municipal and industrial water supply and $400,000 for recreation and fish and wildlife.

Water Supply

Those of you who were at the annual meeting at Amarillo will remember that I went into considerable detail on the water supply studies. I reported that for the 1928-1968 period, under projected 2020 conditions, water would be available from the Mississippi River only about one-third of the time. As that supply is diverted, regulated, and distributed the average shortage would amount to about 16 percent of the proposed supply. An average shortage of 16 percent doesn't sound so bad, but there were two years in that period when no water was available from the Mississippi River and very little from storage. The significant figure on water supply is that, on the average, the plan would deliver about 5,794,000 acre-feet to the users; 4,740,000 acre-feet for Texas and 1,054,000 acre-feet for New Mexico.

Cost of Water

Annual reimbursable costs for Texas irrigation would amount to $170 per acre for 3,500,000 acres, $125 per acre-foot for annual delivery of 4,740,000 acre-feet, or 38.5 cents per 1,000 gallons. Annual reimbursable costs for New Mexico irrigation would amount to $208 per acre for 481,000 acres, $123 per acre-foot for annual delivery of 813,000 acre-feet, or 37.8 cents per 1,000 gallons. Annual reimbursable costs for New Mexico municipal and industrial water would amount to $233 per acre-foot for annual delivery of 196,000 acre-feet, or 71.4 cents per 1,000 gallons.

Primary Irrigation Benefits

The project would create irrigation benefits in the High Plains section of Texas and irrigation, recreation, and municipal and industrial water supply benefits in the New Mexico portions of the High Plains and the Pecos River Basin. Primary irrigation benefits consist of increases in net farm income attributable to irrigation. They are derived by comparing crop distribution, crop production, farm costs, and farm income under irrigation with the same items as they would occur on the same land without irrigation.

The primary benefits relating to the High Plains are based on studies made for the Bureau of Reclamation by the Texas Water Development Board, based on detailed crop-enterprise budgets by the Texas Agricultural Extension Service, adjusted as required to conform to Bureau of Reclamation procedures. These studies and budgets were made separately for the Texas North Plains and for three subdivisions of the Texas South Plains.

The primary benefits relating to the Pecos River Basin are based on farm budgets of 12 case study farms prepared by New Mexico State University. These budgets were modified to reflect changes in the cropping pattern for the year 2020, as projected in the proposed New Mexico State Water Plan. The budgets were further modified for consistency with the High Plains findings on the basis of Texas Water Development Board studies for the Texas portion of the Pecos River Basin.

The estimated primary irrigation benefits have been reduced to reflect the effect of water-supply shortages averaging 16 percent of annual requirements. These reductions were derived from a correlation between various degrees of shortage and resulting reductions in net farm income. In developing this correlation, it was assumed that each farmer would irrigate only the acreage that could be provided a full supply with the reduced supply available to him and that he would dry-farm other land that he would irrigate in a no-shortage year. Primary irrigation benefits total $230,200,000.

Secondary Irrigation Benefits

Increases in net farm income are only the most visible and easily defined benefits of irrigation. Other increases in returns accrue throughout economic channels far beyond the farm where crop production is increased by irrigation. Before the crop leaves the farm, employment and income are created by the farmer's payments to farm labor and his purchases of supplies and equipment needed to produce the crop. After the crop leaves the farm, employment and income are created for those who transport the crop, process it into various products, and distribute those products to consumers. Finally, employment and income are created in retail concerns by purchases of all sorts of consumer items by irrigators, by suppliers of agricultural labor, materials, and equipment and by transporters, processors, and marketers of farm prod-

—continued on page 4 . . . WATER

WATER . . . continued from page 3

ucts with increases in their incomes attributable to irrigation.

Under Bureau of Reclamation procedures, estimates of secondary irrigation benefits reflect profits to enterprises engaged in transporting, processing, and marketing increases in irrigation-produced farm sales between the farm and final consumers. To derive such estimates, secondary-benefit factors are applied to increases in farm sales of each crop due to irrigation. By applying these factors to irrigation-produced increases in farm sales, as estimated by the Texas Water Development Board and New Mexico State University, average annual secondary irrigation benefits attributable to the project are estimated as $220,800,000 for the Texas High Plains and $34,300,000 for New Mexico.

In its economic studies, the Texas Water Development Board estimated secondary irrigation benefits to be much greater than those derived in accordance with Bureau of Reclamation procedures. In these studies, the Board estimated the per-acre effect of irrigation on income within the Texas High Plains to (1) suppliers of agricultural labor, supplies, and equipment, based on the estimated value added by those suppliers, (2) handlers and processors of agricultural products by application of local-expansion coefficients to estimated increases in farm sales, and (3) retailers of consumer items based on the estimated value added to those items within the Texas High Plains. The Board also estimated the per-acre effect of irrigation on income to handlers and processors of agricultural products in the rest of the nation, outside the Texas High Plains, by applying national-expansion coefficients to estimated increases in farm sales.

Other Benefits

Provision of adequate water supplies for municipal and industrial use throughout the region was recognized as a problem. Both present and projected municipal and industrial uses, however, are relatively insignificant when compared with current irrigation use especially in Texas. Also, it was known that municipal and industrial water users could afford to pay much more than irrigators for their water supplies. Consequently, provisions for solution of the region's municipal and industrial water supply problems could be included without difficulty in any project plan that might be formulated for importation of a major irrigation water supply from outside the region. It would have simplified the project study to have had a single-purpose project for irrigation only. However, New Mexico wished to have its M & I needs included for its area.

Municipal and industrial water supply benefits were estimated as $167 per acre-foot based on the Bureau of Reclamation report on the Eastern New Mexico Water Supply Project.

Recreation benefits were estimated as $50 per acre of average water surface area in Salt, Ranger and Silman Lakes, as derived for Alamagordo and Brantley Reservoirs from the report of the Bureau of Reclamation on the Brantley project.

Fish and wildlife benefits have been estimated by the Bureau of Sport Fisheries and Wildlife on the basis of anticipated visitation to Salt, Ranger and Silman Lakes.

Economic Feasibility

Annual primary benefits of the project are estimated as $264,700,000, consisting of $230,200,000 for irrigation, $32,700,000 for municipal and industrial water supply, $1,000,000 for fish and wildlife, and $800,000 for recreation. Of these primary benefits, $199,000,000 for irrigation would occur in Texas and $65,700,000 would occur in New Mexico. The ratio of $264,700,000 of annual primary benefits to annual economic costs of $1,914,600,000 is 0.14 to 1. This is the benefit-cost ratio which Congress traditionally has used for the authorization of reclamation projects.

Secondary irrigation benefits, which would accrue to interests other than the irrigators in west Texas and eastern New Mexico and also to interests in other parts of these states and in other states, are estimated as $255,100,000 annually, in accordance with Bureau of Reclamation procedures, bringing total quantified project benefits to $519,800,000 annually. The ratio of these benefits to annual economic costs of the project is 0.27 to 1.

The project is economically infeasible on the basis of the ratio of primary benefits to costs and on the basis of the ratio of primary and secondary benefits to costs.

Using the secondary benefits as quantified by the Texas Water Development Board, the total benefits would amount to $2,092,700,000. The ratio of these benefits to the annual economic costs of the project is 1.09 to 1. On this basis, the project would be only marginally justified. Again, I should remind you that Congress has never recognized anything beyond primary benefits in authorizing Reclamation projects.

Financial Feasibility

Papment capacity, which is the amount available annually to irrigators from farm income under irrigation for payment of water costs, is estimated as $108,500,000 for 3,500,000 acres of Texas irrigation and $16,276,000 for 481,000 acres of New Mexico irrigation. These payment capacities are equivalent, respectively, to 18 and 16 percent of annual project payment requirements of $595,000,000 and $100,200,000 assignable to such irrigation. Payment capacities for the irrigators in both states are substantially less than their shares of annual project OM&R costs.

Consequently, the project must be regarded as financially infeasible unless it can be established that interests other than the irrigators would be willing to pay the difference between annual payment requirements assignable to project irrigation and the payment capacities of those irrigators. It is likely that the project plan could be modified in various respects so as to reduce the amount of project costs that would have to be borne by interests other than the irrigators. There is no reasonable prospect, however, that the irrigators could pay more than a minor portion of the reimbursable costs of any other plan for transporting Mississippi River water to west Texas and eastern New Mexico.

Summary and Conclusions

The lower Mississippi River is the most practicable source outside the High Plains for obtaining an irrigation water supply to replace the dwindling ground-water reserves still available in the Ogallala aquifer. The Mississippi River Commission indicates that excess flows during 1928-68 could be available at a diversion point on the Atchafalaya River near Morgan City in excess of water requirements in the lower Mississippi River region under projected 2020 development conditions. These flows could be made available for diversion out of the region, subject to future determination that such diversion would not adversely affect the Gulf of Mexico or estuarine resources of the Louisiana Gulf Coast.

The investigation shows that it would be physically possible to construct a project to transport water from the lower Mississippi River system to the High Plains and to distribute it to water users there and in the Pecos River Basin of New Mexico. The investigation has revealed no clear-cut physical limitations on the size of such project, other than the amount of excess water available for that system and the amount of land suitable for irrigation in the receiving areas.

Operation studies show that average annual deliveries during 1928 - 68 under the plan studied would be about 5,790,000 acre-feet. Texas irrigators would receive about 4,740,000 acre-feet, or about 85 percent of irrigation requirements for 3.5 million acres.

The total cost of the project would be $20,493,000,000 based on January 1972 prices. The reimbursable annual cost of water for irrigation would be about $125 per acre-foot, and about $233 per acre-foot for municipal and industrial water.

Irrigators have a payment capacity adequate to cover less than a fifth of the annual payment requirements.

Using primary benefits only, the project is only about one-seventh justified. With primary and secondary benefits derived according to Bureau of Reclamation procedures, the project is only about one-fourth justified.

Two Field Days Scheduled

Two field days will be conducted by area research and experiment stations during the month of September.

The 64th annual field day, sponsored by the Texas Agricultural Experiment Station at the Texas A&M University Agricultural Research and Extension Center, Lubbock, will be held September 11, beginning at 1 p.m. The High Plains Research Foundation, Halfway, Texas, will observe its 17th annual field day activities September 13 at Halfway from 1:30 p.m. until 5 p.m.

The High Plains Research Foundation announced one change in the tours from previous years. There will be only one stop on each tour to "allow staff members to explain more research programs being conducted by the Foundation".

The Lubbock station will offer several field stops at discussion sites. Visitors may disembark at the discussion site and catch a later shuttle to continue the tour.

The Water District urges all farmers and others interested in the results of experiments and research studies carried on by these two fine institutions to attend both field days. As in the past, they should be interesting and beneficial learning experiences for all attending.

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 9 "THERE IS NO SUBSTITUTE FOR WATER" *September, 1973*

Board Of Directors Tour San Antonio Water Districts

by F. A. Rayner

Four members of the Board of Directors of the High Plains Underground Water Conservation District No. 1 recently travelled to San Antonio (August 23 and 24) to tour the Edwards Underground Water District and the San Antonio Water Board. Colonel M. D. Weinert, General Manager of the Water District, and Bob Van Dyke, General Manager of the Board, arranged the tours.

Board members making the two-day tour were Chester Mitchell, President; Ray Kitten, Secretary-Treasurer; Selmer Schoenrock, Member, and Webb Gober, Member.

Directors View Film

While visiting the Edwards Water District, the Directors viewed a 14-minute color film of various aspects of the groundwater reservoir (Edwards Aquifer), entitled "The Edwards Story". After explaining the management and financing structures, Colonel Weinert took the Directors on a field tour of a part of the Edwards District.

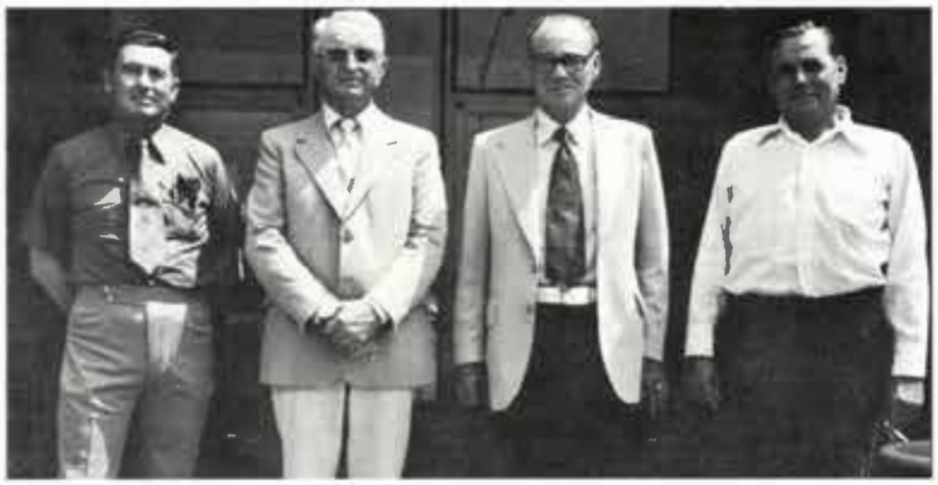
Their first stop on the field tour was the site of a large flowing well at Fort Sam Houston. This well was drilled in 1912 (see picture on page 2).

The group also visited Medina Lake. This lake, completed in 1913 as a water supply for downstream irrigation, was constructed over the faulted and porous recharge area of the Edwards Limestone, and, consequently, the lake is one of the major recharge points to the Edwards Aquifer. (See photograph on page 2).

The Edwards Aquifer, Weinert summed up, is 165 miles long, 500 feet thick and five to 15 miles wide.

The Edwards District was created by a special act of the Texas Legislature in 1959. In conformance with the limitations imposed by its creating law, the Edwards District's major concern has been with artificially recharging and protecting the quality of Edwards Aquifer. Since 1968, the Edwards District has expended over $821,000 for artificial recharge studies and construction of recharge facilities. Presently under consideration is an additional recharge dam expected to cost in excess of $200,000.

—continued on page 2 . . . BOARD



Webb Gober, Chester Mitchell, Ray Kitten and Selmer Schoenrock pause in front of the San Antonio Water Board facilities following a tour of the Edwards Underground Water District and the San Antonio Water Board.

Evelyn Darling hands out brochures dealing with the District's abandoned irrigation well program. The display and pamphlet were a part of the District's participation in the Panhandle South Plains Fair, September 22-29. (See story on page 3.)

WATER COUNCIL TO MEET IN LUBBOCK

At the request of Lieutenant Governor William P. Hobby, and sponsored by Senator Tom Creighton, D-Mineral Wells, and Senator Max Sherman, D-Amarillo, a resolution creating special interim advisory councils on water matters was adopted by the Texas Senate in August, 1973. The Senate resolution provides for the establishing of four regional advisory councils, representing four distinctly unique parts of Texas, responsible for determining what their individual regions must do to solve their individual water problems. Each council consists of two to three Senators and seven to thirteen other residents of their respective areas.

The West Texas Council, scheduled to meet in Lubbock at the museum on the Texas Tech campus, October 3 at 10 a.m., consists of two Senators and 13 area residents. Senator Jack Hightower, D-Vernon, will chair the council and Senator H. J. Blanchard, D-Lubbock, will serve as Vice-Chairman.

Citizen members are James A. Hedgecoke, Jr., Amarillo; K. Bert Watson, Amarillo; Troy McNeil, Dumas; John P. Ivey, El Paso; A. L. Black, Friona; Dr. Marvin Baker, Levelland; Kent Hance, Lubbock; George W. McCleskey, Lubbock; James B. McCray, Panhandle; Marshall Formby, Plainview; Charles W. Stewart, San Angelo; Mrs. B. M. Sims, Wellington, and R. E. Chambers, Wichita Falls.

The resolution reads as follows:

WHEREAS, The continuation of present trends would result in the dangerous depletion of the level of ground water in certain portions of the state; and

WHEREAS, This depletion endangers the social and economic well-being of the state by reducing water available for irrigation of agricultural land and by causing subsidence of large portions of the land; and

WHEREAS, Various state agencies and other interested parties have funds and expertise available that can be utilized by local governments and private parties to slow down the depletion of the ground water tables; and

WHEREAS, These local governments and private parties are not always aware of the available funds and expertise of these state bodies; and

WHEREAS, The Senate of the State of Texas has available the resources of the staff of the Natural Resources Committee; now, therefore, be it

RESOLVED, That the Senate hereby charges the Lieutenant Governor to appoint the members of the following entities:

The West Texas Citizens' Advisory Council on Water Resources;
The Central Texas Citizens' Advisory Council on Water Resources;
The East Texas Citizens' Advisory Council on Water Resources; and
The Gulf Coast Citizens' Advisory Council on Water Resources; and be it further

RESOLVED, That the members of the Senate Natural Resources Committee shall meet with the Citizens' Advisory Councils established herein to determine the specific water needs of the four separate sections of the state; and be it further

—continued on page 3 . . . WATER

THE Cross SECTION

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REBECCA CLINTON, Editor

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Don McReynolds	Geologist
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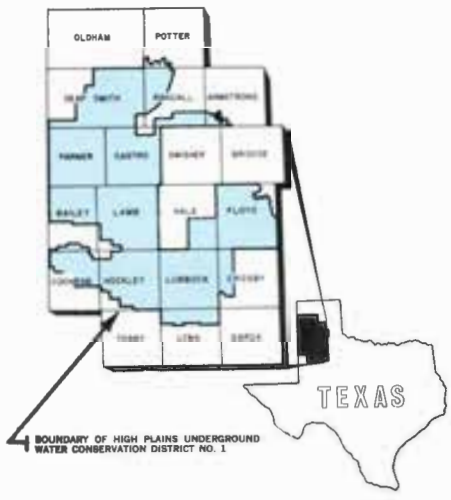
J. Dan Seale	Field Representative
Kenneth Carver	Field Representative
Clifford Thompson	Head, Permit Section
Mrs. Norma Fite	Secretary-Bookkeeper
Mrs. Rebecca Clinton	Public Education



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C. D. Rogers, 1977	Wayside
Bill Heisler, 1977	Wayside

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Henry Ins. Agency
217 East Ave. B, Muleshoe

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Eugene Shaw, 1977	Rt. 2, Muleshoe
Adolph Wittner, 1977	Star Rt., Baileyboro
Jessie Ray Carter, 1977	Rt. 5, Muleshoe

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City Hall, 120 Jones St., Dimmitt

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Jackie Clark, 1977	Rt. 1, Box 33, Dimmitt
Joe Nelson, 1977	Box 73, Dimmitt
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W. M. Butler, Jr., Secretary
Western Abstract Co., 108 N. Main Ave., Morton

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

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1628 15th Street, Lubbock

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

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County Courthouse, 2nd Floor, Hereford

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Harry Fuqua, 1975	Rt. 1, Hereford
James E. Higgins, 1977	200 Star St., Hereford
Garland Solomon, 1977	Rt. 5, Hereford
W. L. Davis, 1977	Box 312, Hereford

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Don Grantham, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

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

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Mayo Ins., 1617 Main, Petersburg

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

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609 Austin Street, Levelland

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

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620 Hall Avenue, Littlefield

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

Lubbock County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

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

Lynn County

Clifford Thompson, Secretary
1628 15th Street, Lubbock

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

Parmer County

Johnie D. Horn, Secretary
Horn Insurance Agency, Bovina

Guy Latta, 1975	1006 W. 5th, Friona
Edwin Slade, 1975	Rt. 1, Bovina
Troy Christian, 1977	Rt. 1, Farwell
Joe Moore, 1977	Box J, Lazbuddie
Dalton Caffey, 1977	15th St., Friona

Potter County

F. G. Collard, III, 1975	Rt. 1, Box 101, Amarillo
W. J. Hill, 1975	Bushland
Henry W. Gerber, 1977	Rt. 1, Amarillo
Jim Line, 1977	Box 87, Bushland
Albert Nichols, 1977	Rt. 1, Box 491, Amarillo

Randall County

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

John F. Robinson, 1975	1002 7th St., Canyon
Fred Begert, 1975	1422 Hillcrest, Canyon
Harry LeGrand, 1977	4700 S. Bowie, Amarillo
Joe Albracht, 1977	Box 81, Bushland
Leonard Batenhorst, 1977	Route 1, Canyon

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

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

Ray Kitten, Chester Mitchell, Webb Gober and Selmer Schoenrock pause beside the flow over the natural spillway at Medina Lake. This year's spill may prove to be the largest volume of water to ever flow over the natural spillway.

Ray Kitten, Chester Mitchell, Selmer Schoenrock, Colonel M. D. Weinert, General manager of the Edwards Underground Water District; Harold Harlos, Assistant Director of Water Facilities, San Antonio Water Board, and Webb Gober view the thousands of gallons of water per minute flowing from the large well at Fort Sam Houston. This well is not equipped with a pump.

BOARD . . . continued from page 1

The Board of Directors also visited the San Antonio Water Board. The General Manager of the San Antonio Water Board, Robert Van Dyke, noted that the Water Board's 60 wells supply the entire needs of San Antonio—the largest city in the Nation supplied entirely by groundwater.

Van Dyke also gave an account of future plans for the area, involving the building of lake sites, expansion of the city and the Water Board's interest in plans to augment the water supply in the Edwards Aquifer in order that the future needs of both municipal and irrigation can be satisfied by the area surface and groundwater supplies.

At the San Antonio Water Board the District Directors reviewed hydrographs of water-level measurements made in index (observation) wells completed in the Edwards Aquifer, that showed the all-time highest water levels in the recorded water-level history of the Edwards Aquifer occurred this year after the abnormally heavy rains of the spring and early summer.

The phenominally rapid recharging rate of the Edwards Aquifer was exemplified by the Water Board hydrographs. This recharge phenomena was also pointedly demonstrated when the water levels in the Edwards Aquifer reached the lowest levels in recorded history at the height of the 1950's drought in 1956. However, after the large spring rain of 1957, the highest water-levels of record were recorded.

Upon their return to the High Plains, the District's Board of Directors expressed a better understanding of the special problems of the San Antonio area, and the two water entities authorized with the development and recharging of the Edwards Aquifer.

As was learned during the tours, an aquifer of relatively limited extent but capable of great recharge ability, has unique problems of its own, vastly different from those experienced on the dry and windy High Plains of Texas.

TECH-DISTRICT STUDY

Final Aquifer Model Report Published

The final report for the final phase of the study entitled "Mathematical Management Model of Parts of the Ogallala Aquifer, Texas" has recently been published in book form. The research project and the publication itself were partially funded by the United States Department of the Interior as authorized under the Water Resources Act of 1964, as amended (Office of Water Resources Research Grant No. 14-31-0001-3363).

On September 18, 1973, Dr. Dan M. Wells, Director of the Texas Tech University Water Resources Center, received a letter from Warren A. Hall, Director, Office of Water Resources Research, stating in part, "This report is acceptable as the final technical completion report for subject grant and completes the reporting requirements of paragraph 5.A. (4) of the grant."

A cooperative effort between the High Plains Underground Water Conservation District No. 1 and Texas Tech University, the final report was published in July following six years of research. The Phase II project is a revision, expansion and partial continuation of the research commenced under Phase I, "Mathematical Management Model—Unconfined Aquifer".

District Participants

Chief investigator and coordinator of the project for the High Plains Water District was Frank A. Rayner, District Manager. Other District personnel who participated in the research project were Albert Sechrist, Graduate Engineer with the District from 1968 until March, 1973; Don Smith, Geologist; Don McReynolds, Geologist; Tony Schertz, Draftsman, and other District employees.

Chief investigator and coordinator of the project for Texas Tech was Dr. Wells. Other University personnel assisting in the research were Dr. Bill Claborn, Associate Professor, Civil Engineering, and Tommy Knowles, Research Assistant.

The objectives of the original research effort, referred to as Phase I, were to investigate the application of existing techniques for the development of a mathematical model to describe the flow of water in the Ogallala aquifer; to develop new or improved methods of mathematical modeling, and to initiate a limited amount of model testing.

During Phase I, a model was developed that would predict the response of the Ogallala aquifer on a gross scale. This model used the California Department of Water Resources (DWR) Model by Weber (1966) as a basis. The areas within any polygonal area were large and, therefore, the model was not adaptable to areas where the bottom of the aquifer was highly irregular or where the water table slope changed rapidly with distance.

Ogallala Formation

The unevenness of the base of the aquifer determines the extent of the thickness of the water saturated part of the Ogallala formation, the Ogallala aquifer.

During the Phase II research effort, an area was selected for modeling where a deep buried valley provides the primary source of water, while the area on either side of the buried valley yields only small amounts of water for irrigation.

Originally the water table was well above the buried valley and very little influence of the valley was observed; however, as the water table has declined and the saturated thickness of the water-bearing material has been reduced to only a few feet, the buried valley influence has become significant.

Aquifer Nearly Depleted

This represents a condition of near depletion of the aquifer, wherein the configuration of the base of the aquifer and its juxtoposition to the overlying water table became the controlling conditions for modeling.

Since the objective of the Phase II research was to construct a model that would predict the ultimate depletion of the aquifer when the configuration of the water table and the base of the aquifer are important features, the primary thrust of Phase II was to model this buried valley area (the Slaton Channel).

However, after the completion of a very comprehensive investigation and report on the groundwater conditions in Parmer County, in August, 1971, the availability of detailed hydrologic data for this county prompted the attempt to apply the model developed during Phase I research to Parmer County.

Although not included within the original project description for Phase II research, the investigation of model sensitivity to changes in aquifer parameters was also completed as part of Phase II because a knowledge of model sensitivity is essential to deciding the amount and accuracy of data necessary for model definition, and can provide guidelines for model validation.

Model Should Be Useful

The model as developed should prove to be a useful management tool when applied to all areas in the High Plains. However, because of the finiteness and detail of data necessary for the operation of the model, it is impossible to apply the model to other counties until detailed groundwater studies are available for them.

The presently indeterminable pumpage is one of the basic weaknesses of model input data. An irregular pattern of static water table conditions, including some water level rises which are not simulated by the model, are influenced by the time of measurements and do not actually represent the present trend of the water table. This inconsistency limits the model's application as a management tool until more detailed groundwater studies are made available.

WATER . . . continued from page 1

RESOLVED, That the Senate Natural Resources Committee shall arrange meetings of the Citizens' Advisory Councils with all related state agencies, including but not limited to the following:

The Texas Water Development Board;
The General Land Office;
The Department of Agriculture;
The Agricultural Extension Service and the Range Management Department of Texas A&M University;
The entire Water Oriented Data Group of the Inter Agency Council on Natural Resources and the Environment;

and be it further

RESOLVED, That the Senate Natural Resources Committee shall aid in all attempts by the Citizens' Advisory Councils to distribute information of existing state programs and/or information to the local governments and private citizens that could benefit thereof; and be it further

RESOLVED, That the Senate Natural Resources Committee shall propose any new legislation necessary for the proper development of the water resources of this state to the Regular Session of the 64th Legislature.

Abandoned Well Brochure Published

The High Plains Underground Water Conservation District No. 1 has published a four-page pamphlet in conjunction with its participation in the Panhandle South Plains Fair, September 22-29. The pamphlet, entitled "The Abandoned Irrigation Well", deals with the danger of the uncapped abandoned well or open hole and the procedures for making it safe for human and animal life.

Anyone interested in a more detailed explanation of procedures in compliance with State and District regulations should feel free to contact the Water District.

Copies of the pamphlet may be obtained at the District office, 1628-15th Street, Lubbock, Texas.

Obbie Goolsby, Field Representative, and Dale Vise of Farwell are pictured above (left photo) as they stand beside 100 acres of corn Vise irrigates solely with tailwater. The picture is reprinted from the July, 1973, issue of **The Cross Section.** A story accompanying the picture complimented Vise on his attempt at conserving irrigation water by re-using it on an entire crop.

In the right-hand photograph, Dan Seale, Field Representative, is pictured with Vise in early September, 1973, as they stand at approximately the same location. Vise noted at the time of the later picture that he was very pleased with the results of his corn crop yield and the small number of waterings, and that he planned to plant more acreage in 1974.

Innovative Farmer Adapts Canyon To Productive Farm

Jack O'Briant, who farms north of Lubbock on Blackwater Draw, has a unique modification setup on 607 acres of hill-side farm land, 566 acres of which are under cultivation.

Having added constantly to the underground pipeline system in existence on his farm since he leased it in 1955, O'Briant devoted much time to a long-term study of the 11,920-foot pipe layout.

From this study he devised a way to avoid letting water fill his playa lake and overflow into the canyon following a heavy rain.

In 1963, O'Briant leased an earth scraper to modify the small lake that washed away his crops into the draw when it overflowed. He constructed an S-shaped dam or diversion terrace on a contour around the west side of the lake area.

"This diversion alleviates the erosion problem by holding the water on a 12-acre area presently allotted for the lake," said O'Briant.

Retains Rainwater

By installing a valve alongside the lake and tying it into the existing underground line, the innovative farmer is able to retain rainwater on this smaller area until such time as he desires to use it for irrigation.

When using the lake water for irrigation, O'Briant shuts off his five irrigation wells and opens the valve to allow the water to gravity flow over 160 acres of farm land along the bottom of the draw. He says he can flow 1,500 gallons per minute with this setup.

"A unique feature of this type setup," says the farmer, "is that I conserve on fuel, along with preserving my crops, by making use of available rainwater." The modification uses *no* power—it flows by the pull of gravity.

The project took two weeks to complete, at a cost of $2,500 for fuel, labor and the lease of the machinery.

Waters Grain Sorghum

To emphasize the effectiveness of his setup, O'Briant said, "I can catch enough rain to water 60 acres of grain sorghum. "Besides grain sorghum, O'Briant also farms cotton and wheat.

Considering his knowledge of water conservation as evidenced by his farming operation, O'Briant was asked to give his ideas on how to conserve water or prevent waste of water. "I recommend running more four-hour sets than eight-hour sets, and I never water a 12-hour set." He also suggested watering alternate rows rather than "flooding every row".

O'Briant concluded by saying his future plans included tying a side-roll sprinkler system into the underground setup.

Jack O'Briant, Lubbock County farmer, opens the valve at his playa modification and allows the water to fill the playa bed. When he irrigates, the opened valve allows the water to gravity flow over 160 acres of farm land along the bottom of a draw.

A. A. (Bus) Wimmer of Slaton, recent winner of two "Outstanding Farmer" awards, and his son, Chris, proudly display their playa lake modification which holds rainwater for future irrigation needs.

"Outstanding Conservation Farmer" Makes Use of ALL Available Water

A. A. (Bus) Wimmer of Slaton, recently named the Outstanding Conservation Farmer of the Year by the Lubbock County Soil and Water Conservation District and Outstanding Farmer of the Slaton Area for 1973 at the 16th Annual Farmer-Merchant Barbeque, is basically a dry-land farmer, but his 680-acre farm boasts parallel terraces, two modified playa lakes, a grassed waterway and only two small irrigation wells.

Wimmer's one- and three-inch irrigation wells can irrigate 160 acres, but it is primarily for holding rainwater that he has modified two playa lakes.

Dug in 1965, the largest lake modification, says Wimmer, has already paid for itself. At a cost of around $3,200, the pit holds approximately 10 acre-feet of water—both rainwater runoff and any irrigation water that may escape his fields during heavy pumping.

Did Modification Himself

Wimmer did the playa modification work himself, using a four-yard elevating dirt scraper. Since 1964, the farmer has also installed 5,000 feet of underground pipeline, both plastic and concrete, in order to prevent seepage and evaporation losses in open carrier ditches.

Before the largest playa was modified, Wimmer said the lake area covered seven acres and water often stood more than a foot deep over almost the entire lake bed after a heavy rain.

"By draining the lake rapidly into the pit, I can reduce flooding and damage to my crops," says Wimmer.

The Lubbock County farmer also testifies to have 448 acres devoted to a conservation cropping system, practices crop residue utilization on 379 acres, contour farms on 327 acres and maintains a two-acre grassed waterway.

Rain Spread Evenly

A native of Archer County and a Slaton resident since 1946, Wimmer says the 56,000 feet of parallel terraces spread rain water evenly over an entire field, whereas "water would run off the ends of the field following heavy rains or puddle in low places", before he terraced a half section.

The cost of constructing the terraces was nearly $7,000, half of which was provided by cost-share funds under the now defunct Rural Environmental Assistance Program.

Uses ALL Water

Bus Wimmer is a fine example of a conservation-conscious farmer. However, he is not concerned so much with merely saving irrigation groundwater as much as making use of *all* the water made available to him.

For this display of concern and for taking the necessary steps to promote good conservation practices on his own farm, Bus Wimmer is a credit to his community and to the Water District.

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 10 "THERE IS NO SUBSTITUTE FOR WATER" *October, 1973*

Cross Section Editor Rebecca Clinton holds the award presented to her in behalf of the Water District at the Women in Communications, Inc., Annual National Meeting in Portland, Oregon, October 4. Twelve issues of **The Cross Section** were honored by the communications organization in its first annual National Awards Program.

Cross Section Honored By National Organization

The Water District is pleased to announce that *The Cross Section* has been named a winner in the "Communicating for a Better Tomorrow" 1973 National Awards Program, sponsored by Women in Communications, Inc. (WICI).

Cross Section Editor Rebecca Clinton entered 12 issues of the publication (June, 1972, through June, 1973) in the organization's first annual awards program. Mrs. Clinton is a member of WICI, a national organization composed of professional men and women communicators.

Three Categories

Three categories of entry were named, each subdivided into four or five separate divisions. A first place and honorable mention were awarded in each subdivision "judged worthy of national recognition".

Seventeen awards were presented in the three categories. The three major categories were in areas of "wide public concern": (1) Communicating for and About Environmental Concerns, (2) Communicating in Support of Community Service and (3) Communicating For and About Women's Rights.

The Cross Section was awarded an honorable mention in the category Communicating in Support of Community Service — Continuing Educational Campaign.

Entries Judged on Content

According to contest judging material, "Awards were judged on educational and informational content, effectiveness, credibility, depth and use of research, relation to desired audience, freshness of approach, use of graphics and audio-visual techniques where necessary and general excellence."

The Water District is very proud that WICI has chosen to nationally recognize *The Cross Section* and wishes to thank the judges and the organization for the honor.

West Texas Water Council Holds First Meeting In Lubbock

The West Texas Council on Water Resources opened its initial planning meeting in Lubbock October 3 with a number of the State's water experts making presentations touching on such important topics as the decline of the area's groundwater supply and importation of water to West Texas and Eastern New Mexico.

As a result of the meeting, the 16-member council unanimously voted to present to the President of the United States, prior to October 25, 1973, a statement expressing their concern (along with that of the three other Regional Water Councils) over the results of the National Water Resources Council's Principles and Standards.

On October 25, 1973, the Principles and Standards officially eliminated the Federal Government's funding of future water projects.

Statement Presented Nixon

According to the statement presented Nixon, the Regional Water Resources Councils feel the Principles and Standards are "an abdication of the Federal Government of its responsibility . . . and preclude achievement of your recently stated goal of increased agricultural production as well as foreclose development of water resources to meet our nation's other long-range goals and objectives."

Working toward continued Federal-State funding of and participation in water projects being their major objective, the four Regional Councils are also concerned with determining their unique water problems for their individual areas of the State.

At the end of several meetings (of which the Lubbock meeting was the first), the councils will prepare and present their findings to the State Legislature.

Resolution Establishes Councils

The councils were established by a Senate resolution in August, 1973, at the request of Lieutenant Governor William P. Hobby. The resolution (which appeared in full in the September issue of *The Cross Section)* was co-sponsored by Senator Tom Creighton, D-Mineral Wells, and Senator Max Sherman, D-Amarillo. Senator Jack Hightower, D-Vernon, and Senator H. J. Blanchard, D-Lubbock, chaired and co-chaired the West Texas Council.

Testifying before the Council were Howard L. Cook, past Deputy Director of the National Water Commission; Harry Burleigh, Executive Director of the Texas Water Development Board; Frank Rayner, Manager of the High Plains Water District; Dr. James Osborn, Economist, Texas Tech University; Dr. George McBee, Resident Director, Texas Agricultural Experiment Station; Colonel Walter J. Wells, Executive Director, Brazos River Authority; Arthur Duggan, West Texas Chamber of Commerce, and Duncan Ellison, Executive Director of Water, Inc.

Presentations Given

Some of the presentations finitely detailed the rate of the depletion of the Ogallala aquifer and emphasized the future need for a supplemental

—continued on page 2 . . . WEST

West Texas Council on Water Resources members are, left to right, George W. McCleskey, John P. Ivey, K. B. Watson, Mrs. B. M. Sims, Lieutenant Governor William P. Hobby, Senator Max Sherman, Senator Jack Hightower, Senator H. J. Blanchard, Bill Jenkins (Administrative Assistant to Hobby) and Kent Hance. Not pictured, but at the meeting, were James Hedgecoke, Jr., Troy McNeil, A. L. Black, Dr. Marvin Baker, James B. McCray, Marshall Formby, Charles W. Stewart and R. E. Chambers.

THE Cross SECTION

A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
1628 15th Street, Lubbock, Texas 79401
Telephone 762-0181
REBECCA CLINTON, Editor
Second Class Postage Paid at Lubbock, Texas
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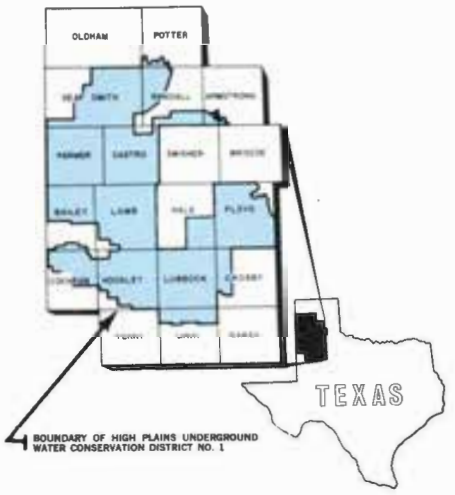

BOARD OF DIRECTORS

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)
A. W. Gober ..... Farwell

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

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

COUNTY COMITTEEMEN

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Cordell Mahler, 1975 ..... Wayside
Guy Watson, 1977 ..... Wayside
C. D. Rogers, 1977 ..... Wayside
Bill Heisler, 1977 ..... Wayside

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Henry Ins. Agency
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Lloyd D. Throckmorton, 1975 ... Rt. 1, Muleshoe
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Eugene Shaw, 1977 ..... Rt. 2, Muleshoe
Adolph Wittner, 1977 ..... Star Rt., Baileyboro
Jessie Ray Carter, 1977 ..... Rt. 5, Muleshoe

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Glenn Odom, 1975 ..... Rt. 4, Box 136, Dimmitt
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Jackie Clark, 1977 ..... Rt. 1, Box 33, Dimmitt
Joe Nelson, 1977 ..... Box 73, Dimmitt
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Jessie Clayton, 1974 ..... 706 S. Main Ave., Morton
Hugh Hansen, 1974 ..... Route 2, Morton
Dan Keith, 1976 ..... Route 1, Morton
H. H. Rosson, 1976 ..... Route 1, Morton
Danny Key, 1976 ..... Star Route 2, Morton

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1628 15th Street, Lubbock
Donald Aycock, 1974 ..... Lorenzo
Kenneth Gray, 1974, ... Lorenzo
W. O. Cherry, 1976 ..... Lorenzo
E. B. Fullingim, 1976 ..... Lorenzo
M. T. Darden, 1976 ..... Lorenzo

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County Courthouse, 2nd Floor, Hereford
George Ritter, 1975 ..... Rt. 5, Hereford
Harry Fuqua, 1975 ..... Rt. 1, Hereford
James E. Higgins, 1977 .... 200 Star St., Hereford
Garland Solomon, 1977 ..... Rt. 5, Hereford
W. L. Davis, 1977 ..... Box 312, Hereford

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

Hale County
J. B. Mayo, Secretary
Mayo Ins., 1617 Main, Petersburg
Don Hegi, 1974 ..... Box 179, Petersburg
Henry Kveton, 1974 ..... Route 2, Petersburg
Clint Gregory, Jr., 1976 ..... Box 98, Petersburg
Henry Scarborough ,1976 ..... Route 2, Petersburg
Homer Roberson, 1976 ..... Box 250, Petersburg

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

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

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

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W. R. Steen, 1976 ..... Route 2, Wilson

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Troy Christian, 1977 ..... Rt. 1, Farwell
Joe Moore, 1977 ..... Box J, Lazbuddie
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Henry W. Gerber, 1977 ..... Rt. 1, Amarillo
Jim Line, 1977 ..... Box 87, Bushland
Albert Nichols, 1977 ..... Rt. 1, Box 491, Amarillo

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Fred Begert, 1975 ..... 1422 Hillcrest, Canyon
Harry LeGrand, 1977 ..... 4700 S. Bowie, Amarillo
Joe Albracht, 1977 ..... Box 81, Bushland
Leonard Batenhorst, 1977 ..... Route 1, Canyon

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

Board of Directors Ray Kitten, Chester Mitchell and Selmer Schoenrock pause for a discussion with Senator Jack Hightower, D-Vernon, during a break in the first meeting of the West Texas Council on Water Resources, held in the Texas Tech Museum, Lubbock. Hightower, second from left, is Chairman of the Council.

WEST . . . continued from page 1

source of water. Others cited ways to prolong the existing water supply, while still other speakers argued the "feasibility" of the water importation proposal.

Cook, the agent speaking in behalf of the Federal Government, detailed the reasons for the Government's backing off from funding of future water projects.

Removal of Word Asked

Testifying in behalf of the Water District, Rayner presented several reports to the committee members. One paper, entitled, "Taking a New Look at the Demise of the Ogallala Aquifer", gave an enlightening re-appraisal of the rate of decline of the water table in the Ogallala formation.

He also asked that the Council recommend to the State Legislature that the word "willfully" be removed from the definition of groundwater waste.

As it reads now, a definition of waste of groundwater is, "Willfully causing, suffering, or permitting underground water produced for irrigation or agricultural purposes to escape into any river, creek, or other natural watercourse, depression, or lake, street, highway, road, road ditch, or reservoir, drain, or into any sewer, upon the land of any other person than the owner of such well, or upon public land."

Rayner also explained the workings of the Water District, its boundaries, powers and functions, and noted ways the District and its residents are approaching water depletion and energy conservation problems.

Frank A. Rayner, Manager of the High Plains Water District, testifies before the West Texas Council on Water Resources. He submitted several reports and gave a slide presentation before the Council.

CROP AND LIVESTOCK REPORTS NEEDED

Some 75,000 Texas farmers and ranchers will receive a crop or livestock questionnaire during the period from mid-November to early January, 1974.

This roundup survey of crop production and livestock numbers is made annually by the Texas Crop and Livestock Reporting Service. The Texas Department of Agriculture and the Statistical Reporting Service, U.S. Department of Agriculture, work together to provide comprehensive information on Texas agriculture.

Producers from each of the 254 counties in Texas are selected proportional to size of operation. The small producer sampled represents many others of comparable size, while the very largest producers will represent only themselves.

It is equally important for all farmers and ranchers receiving a questionnaire to complete and return it promptly. The individual report is confidential—available to no other Government agency or anyone except the few persons required to process the data. The state and county estimates published are available for everyone at the same time.

County statistics for 1972 and January 1, 1973, are available on Livestock, Poultry, Dairy, Field Crops, Small Grains, Cotton, Vegetables, Fruits and Pecans, and Cash Receipts from the Sale of Texas Farm Commodities.

Bulletins can be obtained from the Texas Crop and Livestock Reporting Service, P. O. Box 70, Austin 78767, or by writing John C. White, Commissioner of Agriculture, P. O. Box 12847, Capitol Station, Austin 78711.

High Plains Farmers Testing New Short-Season Crop

New crops are constantly being tested and often found adaptable to the climate and soil conditions of the Texas High Plains. This is one of the reasons the agricultural output of the area is so enormous in its contribution to the world's food supply.

A nationally-known bean manufacturer has realized the productivity of High Plains farm land and is cooperating in a pilot program with a Muleshoe contracting firm to grow on West Texas farms a tiny white bean of the navy bean family.

Jess Bryant, Operations Manager of Texas Sesame of Muleshoe, says the program was begun two years ago on a "limited and experimental" basis. Now in its third year, the bean program encompasses more than 3,000 acres in three counties, with 37 growers participating.

Acreage Increased

"The number of acres is substantial when you consider that only 250 acres were under production last year," said Bryant.

According to Bill Wimberly, Executive Vice President of the firm, beans are a good crop from the water conservation angle because of the short growing period and the small amount of water needed for germination. "The bean is planted from May 25 until June 25 and harvested around the 15th of August," noted Wimberly.

No preplant irrigation is required for the crop and two to three irrigations are the general rule. "The small number of irrigations is light as compared to that required for milo or corn; it is more equivalent to irrigation of cotton," said Wimberly.

"And, besides all that, the bean plant will die if you stand water on it," he added.

When asked about the problems experienced in growing the bean, Bryant said the plant, susceptible to blight problems and zinc deficiencies, must be sprayed once or twice with zinc. He also noted that little fertilizer is required.

Concerning the economic value of the crop, Bryant claimed, "There is now more money in beans than in cotton."

Capable of making 30 to 60 bushels per acre under good weather conditions, or around 2,000 pounds per acre, the contractors say the average crop brings in 20 cents a pound. Bryant said it would take several years to increase the production to 2,500 pounds per acre.

Peak Water Use

Clarence Christian, agronomist, said that peak daily consumptive use of groundwater for irrigating the bean plant totals .2 inch per day or 14 inches during the growing season.

"In our area we grow mostly grain sorghum and corn, but what cotton we do grow probably requires a little less total moisture than beans — around three to 12 inches during peak consumptive use," the agricultural consultant noted.

He also produced figures to show that growers in the area tend to put 18-20 inches of water on their grain sorghum and 30 inches on corn.

"So, compared to these two crops, the bean is a good water-saving plant," he continued.

Beans Rotate Easily

Christian added his opinion that beans lend themselves to a rotation program. "In other words, they can be an excellent supplement to other crops."

For example, he suggested the use of beans in a double cropping program with wheat. Christian also cited the development of root rods in the soil from constantly planting only grain sorghum on the same land.

Soil Building Capabilities

Beans also, he pointed out, have soil building capabilities. "I have observed grain sorghum productivity increase on land previously planted in beans," the agronomist stated. "The result was a healthier and larger grain plant."

When asked about the possibility of irrigating beans with reclaimed irrigation water, Wimberly said no one has tried the procedure, to his knowledge, but that he saw "no reason why tailwater can't be applied".

Water With Tailwater?

As Bryant explained, "Water that is good for cotton should be usable on the bean plant."

According to Wimberly, the only possible drawback to expanding the program would be a failure to improve harvesting techniques. "With 400 to 500 acres still to be harvested in early October, we have mixed emotions from the growers," he explained.

"Those who already have completed harvesting are ready to go again next year."

The contractor said there is only "one hour in 24 hours" where climate conditions are perfect for harvesting the bean. "If the outside atmosphere is wet, the bean is too wet to harvest; and, if the climate is too dry, the bean will crack," he continued.

Wimberly cited similar climate problems in Idaho, one of the two states largely responsible for growing this particular bean.

Adapt Techniques to Area

According to Christian, growers need to take a combination of the harvesting techniques of all the major bean producing areas and adapt them to the High Plains.

For example, he said an improvement would be to go to wind rowing. "We have let the beans dry out in the past when we should have picked them green and let them cure in a wind row," he concluded.

All things considered, though, the contractors and the growers may have a good thing going — only time will tell.

About 1.25 million gallons of water pour over Niagra Falls in a second, which equals 40 billion gallons in a year. This being true, it would take six million years of such a flow to equal all the waters in all the oceans.

Jess Bryant, Operations Manager of Texas Sesame, and Dan Seale, District Field Representative, examine a few of the tiny beans in a field ready for harvest near Muleshoe. The bean plant is considered by its growers to be a good water-conservation crop.

In the photograph above, recently-harvested beans are unloaded into a dump pit, transferred into an elevator bucket and, via a spout from the elevator, emptied into another truck for shipping purposes (photograph to the right).

In this second truck the beans are transported to Lamesa for cleaning and are then shipped to Dallas where they are finally processed and canned.

Notice To Landowners

Income Tax Water Depletion Claims

A program for automating the information handling system and computer processing of the cost-in-water depletion, income-tax-allowance, claims has been undertaken by District personnel. As most readers of *The Cross Section* know, Parmer County's accounting procedure was added to this system in January of 1973.

Wherein the landowner or his accountant previously purchased the water table decline map and interpreted the amount of allowable decline from the contoured values placed thereon, the Parmer County claimants were supplied a personalized computer printout of the information pertaining to their 1972 tax claims.

While no final decision has been made by the District's Board of Directors, it is anticipated that Castro, Bailey and Lamb Counties will be converted to the automated system, along with Parmer County, for the 1973 tax claims.

It will be necessary for the landowner or his agent (accountant) to provide the District with an *accurate* copy of IRS Form 665 or a list of information including the landowner's name, address and tax account number (the name, address and tax number of the accountant are also requested where the accountant is processing the landowner's claim), a full legal description of the property claimed, including the number of acres involved, and any other information as is necessary to facilitate the location of the land and the handling of the decline data.

The cost of processing a claim from the automated data was $5 per parcel for Parmer County claimants last year, compared to the $7.50 charged for the decline map of the other District counties not yet automated.

While no new price change is anticipated at this time, Board consideration will be directed toward an analysis of the pilot program experiences in the past year's handling of Parmer County claims, and any revisions will be announced after the November Board meeting.

In order to facilitate handling of the large volume of paper work necessary to automate three additional counties under this program, the District urges all concerned parties to provide the basic data immediately.

Prompt receipt of accurate and complete information will expedite the forwarding of the needed decline data to the landowner or his agent.

President-Elect of TWCA Dies

Robert H. Vahrenkamp, Sr., General Manager of the Guadalupe-Blanco River Authority (GBRA) and President-Elect of the Texas Water Conservation Association (TWCA), died October 7 in a San Antonio hospital where he had been hospitalized since September 22 for surgery. He was 61.

A native of Seguin, Texas, Vahrenkamp was a long-time member of TWCA. He had served as chairman of the organization's River Authorities Panel from February, 1971, until February, 1973. At his death, he also held the post of TWCA Finance Chairman.

Vahrenkamp had managed the GBRA since 1960 and was employed in other positions with the Authority since 1948.

Born near Killeen in 1912, he was a 1933 graduate of Texas A&M University, earning a degree in Agricultural Engineering. He was employed by the U. S. Soil Conservation Service from his graduation until 1944. He then served in the U. S. Army for four years, receiving an honorable discharge in 1948 as a Lieutenant Colonel.

At the time of his death, Vahrenkamp was a registered professional engineer, a member of the Texas and American Societies of Professional Engineers and a member of the American Society of Agricultural Engineers.

The Cross Section speaks for the Water District in expressing sorrow at Mr. Vahrenkamp's death. His service to the State of Texas will be greatly missed.

LUBBOCK COUNTY COMMITTEEMAN DIES

Lubbock County Committeeman for Precinct 3, R. F. "Bob" Cook of Idalou, died in a Lubbock hospital September 22 following a lengthy illness. He was 73.

Elected to the County Committee in January of 1967, Cook served until his death. He was also a Director of the Idalou State Bank and a 25-year member of the Idalou Lions Club.

A native of Athens, Texas, Cook moved to Lynn County in 1924. In 1933 he moved to Crosby County, where he owned and operated a grocery store until 1949, at which time he began farming near Idalou. He retired in 1966.

Survivors include his wife, one son, Curtis; two grandchildren, and four brothers, W. H. of O'Donnell, E. A. of Tahoka, V. E. of Granbury and H. L. of Melbourne, Arkansas.

The Water District wishes to extend its sympathy to the family of Mr. Cook and to add its appreciation for his service to the District and its residents.

A very thought-provoking sign, located at the intersection of 34th Street and Indiana Avenue in Lubbock, Texas, asks the timely question, "How much energy have you wasted today?" Each and every individual would benefit from a re-evaluation of his own habits. Are they harmfully wasteful or admirably thrifty? Our natural resources are too valuable to carelessly consume.

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 11 "THERE IS NO SUBSTITUTE FOR WATER" *November, 1973*

Deep Aquifers–A Busted Promise*

By F. A. RAYNER

It is old hat to reiterate the magnitude of the strain that irrigation pumpage is placing on this area's primary water supply — the Ogallala aquifer. Nearly everyone concedes that this aquifer is being steadily depleted, and its ultimate demise as a supplier of this area's present irrigation demands is within the predictable future.

It also should be recognized that the decline of the water table in the Ogallala aquifer is not unexpected, unusual or a reason for panic. If this area is to continue to prosper, Ogallala water must be mined to do so. In short it could be realistically surmised that the decline of the water table is a sign of health, because it is a sign of wealth being generated.

Realizing the apparent ultimate fate of his groundwater-based prosperity, some of the High Plains irrigators tend to react like a man with an incurable disease—he starts grasping for straws, and will try anything that offers even the slimmest of promises.

Search for Aquifers

Such is the setting for the frantic search for deeper-lying fresh water aquifers. This dilemma is propounded by the unfounded suggestions, by those drilling deep wells, that new, undiscovered, deep aquifers do exist in this area. I have never met an oil well driller that has failed to claim that he drilled through deep-lying "oceans of fresh water"; yet, in the High Plains area, I have never met one that did.

Ogallala is "Cinderella"

Do not misinterpret my statement. I did not say that there are *no* fresh water aquifers below the Ogallala aquifer; but I am saying there are no such aquifers capable of replacing or even augmenting, to any appreciable degree, the water being mined from the Ogallala aquifer. The Ogallala aquifer, the "Cinderella" of aquifers, is nowhere rivaled in the deep subsurface.

Have I overstated a point? Is the Santa Rosa aquifer the one exception to the rule? Quite the contrary; it is the proof not the exception.

The Santa Rosa sands underlie the entire Southern High Plains area. These very lenticular sands range upward to nearly 300 feet in thickness. However, in a 34-county area in Texas underlain by these sands, nearly 80 percent of the aquifer contains brackish to brine (highly saline) water. In parts of Oldham, Potter, Deaf Smith, Randall, Armstrong, Swisher and Briscoe Counties this deep-lying (up to 900 feet below land surface) aquifer contains a limited amount of water that can, for the most part, be used for irrigation, municipal and industrial purposes. Even in most of this area, irrigators find that the long term use of Santa Rosa water can not be sustained on the heavy clay soils.

However, the best way to compare the Santa Rosa with the Ogallala aquifer is to take a look at their comparable characteristics. The first consideration is the physical locations of the respective aquifers. The Ogallala is near the land surface; the Santa Rosa several hundred feet deeper. In projecting this comparison, it will suffice to note that the greater the depth of the well, the several fold increase in drilling, completion and pumping costs.

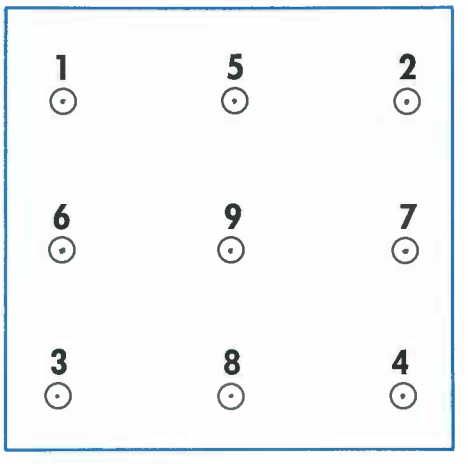
Ability to Store and Transmit

The ability of an aquifer to yield water (storage coefficient), and its ability to allow water to pass through it (permeability or transmissibility), control the long term capacity of the wells completed in same. These characteristics are much less in the Santa Rosa aquifer than are those for the Ogallala aquifer. The illustration, entitled "Comparable Aquifer Characteristics," shows that the permeability of the Ogallala aquifer is nearly two times greater than that of the Santa Rosa. This same chart indicates that the recoverable storage value for the Ogallala aquifer is 100 times greater than that of the Santa Rosa.

Hydrologic Characteristics

This discussion of hydrologic characteristics may not be impressive to you now, but when applied to a well field situation they reveal the tremendous differences in the declines in the water levels in the respective aquifers.

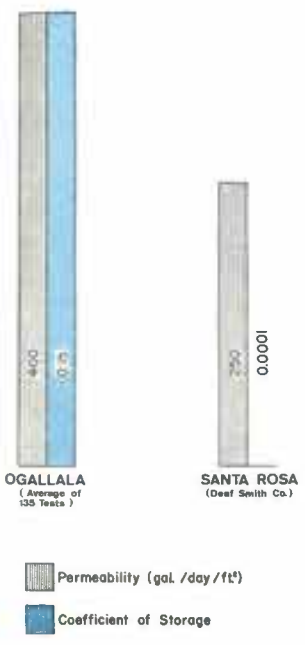
As an example, let us assume a nine-well, well field in the square grid pattern as shown below:



Square Grid Pattern of Nine Wells

The hydraulic characteristics as described above, and as set forth in the tables on page 3, were fed into a computer**. The water levels in each of the nine wells in each aquifer, for differing operating intervals, and at different well spacings (as set forth in the tables), were calculated.

The startlingly greater declines of the water level in the Santa Rosa aquifer, as compared to the identical situation in the Ogallala aquifer, pinpointed the one most important characteristic of the Santa Rosa aquifer—it is in no way (particularly from the standpoint of economics) comparable to, or a possible replacement for, the "Cinderella" aquifer.



COMPARABLE AQUIFER CHARACTERISTICS

If the hope for the eventual discovery of yet unfound "oceans of fresh water" can not be held out to the High Plains irrigator, then what are the alternatives? The problem reverts to these very simple terms: acceptance and institution of all economically feasible practices that afford greater beneficial efficiency of utilization of the area's groundwater reserves, with complete or near complete abstention from all forms of waste; and a uniting of our efforts to secure the eventual importation of water to this area.

* Paper given at the November 30, 1970, meeting of the Agricultural Committee of the Swisher County Chamber of Commerce, by Frank A. Rayner, Manager, High Plains Underground Water Conservation District No. 1.

** A program developed by the late Dr. Keith Marmion, Texas Tech University.

Fred Cowart Joins District Field Staff

The Cross Section is proud to introduce to its readers the newest member of its Field Representative staff, Fred Cowart. Bringing the Field staff total to four, Cowart began his employment with the Water District September 2.

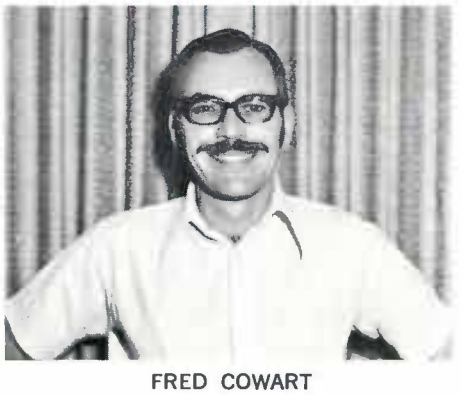
Cowart, a native of Houston, owns a Bachelor of Arts degree in Art History from Texas Tech University. He graduated in July, 1973.

A resident of Lubbock for 27 years, Cowart, 30, graduated from Lubbock High School in 1961. He has worked since then with hospitals in Lubbock and Austin while continuing his education.

Cowart and his wife, Ann, Supervisor of Lubbock's University Hospital, attend St. Luke's Methodist Church in Lubbock.

A practicing artist, Cowart will aid the District in that department when called upon, as well as carry on his field duties.

The Water District is pleased to welcome Fred Cowart to its staff.



FRED COWART

THE Cross SECTION

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Telephone 762-0181

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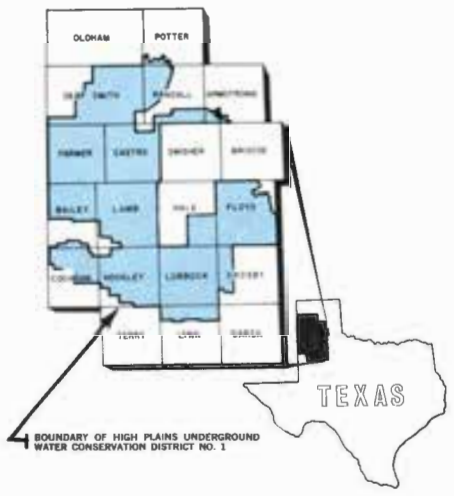

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Clint Gregory, Jr., 1976 ..... Box 98, Petersburg
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Joe Albracht, 1977 ..... Box 81, Bushland
Leonard Batenhorst, 1977 ..... Route 1, Canyon

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

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

Water District Board President Chester Mitchell (second from left) pauses for a conversation with three men of similar interests at the Annual Meeting of Soil and Water Conservation District Directors in Fort Worth, October 20. From left to right are Don Brandenberger, Field Representative, State Soil and Water Conservation Board; Mitchell; Frank Gray, Chairman, State Soil and Water Conservation Board, and Jake Schrum, State Soil and Water Conservation Board Field Representative.

EXPERIMENTAL CLOUD SEEDING PROGRAM PROPOSED FOR HIGH PLAINS

The State of Texas has begun its participation in a program initiated by the United States Bureau of Reclamation to study the feasibility of cloud seeding on the High Plains.

Twenty-three Texas men interested in the weather modification project attended the initial planning meeting in Austin, October 19. Appearing in behalf of the State of Texas, these men met with the Bureau representatives to discuss the preliminary working draft of an agreement on the proposed High Plains Cooperative Precipitation Management Program, a program of experimental cloud seeding.

The Bureau will conduct the experiment in 24 Western states, called the High Plains. According to John Carr, Director of the Weather Modification and Technology Division of the Texas Water Development Board (TWDB), "The efforts of interested parties . . . will be of much influence in determining how much of this important research project will be conducted in Texas."

City Council Resolution

The Lubbock City Council passed a resolution on October 11 concerning the city's participation in the research program. The resolution reads as follows:

WHEREAS, the Bureau of Reclamation has initiated a program in the High Plains region for the study and scientific testing of precipitation augmentation; and,

WHEREAS, the State of Texas, acting through the Texas Water Development Board, has expressed interest in participation in this program, and has invited the City of Lubbock to join in this study; NOW THEREFORE:

BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF LUBBOCK:

THAT the City of Lubbock does hereby express an interest in the High Plains Cooperative Program, an experimental cloud seeding program to be sponsored by the Bureau of Reclamation to test the scientific concepts of precipitation augmentation, and desires to enter into a preliminary study of such program and would encourage the consideration of Texas Tech University as a primary research center for this program.

Passed by the City Council this 11th day of October, 1973.

Primary Goal Set

The primary goal of the research effort, as set forth by the Bureau's Project Skywater, is to establish a verified working technology and operational management framework by 1980 capable of producing additional rain from cumulus clouds in the semi-arid Plains States.

Continuing contributions during this research are also to be made toward improving the operational technology and enhancing confidence in its use.

Immediate Program Target

According to the Conceptual Plan for a High Plains Cooperative Program, "The immediate program target is removal of critical scientific uncertainties and developing an overall certainty or confidence in producing benefits—expressed quantitatively—of about 90 percent."

"As this general technical and benefit assurance level is approached," the report goes on, "localities and states can more confidently make major commitments to conduct cloud seeding operations."

Bureau planning began in mid-January, 1973, with assignment of the primary responsibility for this program. The schedule aims for an accelerated, but well-planned, start of field experiments and most research in May, 1974, with completion and

—cont. on page 3 . . . EXPERIMENTAL

NOTE

Although too late to be reprinted in its entirety in this issue of *The Cross Section*, a resolution was passed by the Texas Water Development Board on November 20, 1973, strongly endorsing the inclusion of the Texas High Plains in the weather modification research being proposed by the U. S. Bureau of Reclamation.

FARMING INDUSTRY HIT BY "SHORTAGE" BLIGHT

Considering America's ever-changing economic picture, characterized by the increasing presence of shortages in goods and services, it should not be surprising that the farmer and his suppliers are two areas hardest hit.

The farming industry is coping with severe shortages in farm machinery, irrigation well casing, pipe and pumps, and even chemicals used on the farm, such as fertilizer.

The shortage problem itself is very real and obviously threatening, but the cause and cure are not fully understood. Many in the industry, those that buy and sell the disappearing commodities, have absolutely no idea as to either the reasons for the problem or the solution. They only know it exists and that they and *all* their competitors find themselves in an unfamiliar predicament.

For several months, the Water District has heard reports of shortages in irrigation well supplies — particularly 16-inch casing. Every pipe supply company questioned in the Lubbock area experienced the shortage in casing.

A Lubbock supply company reported they ran out of casing three months ago and have received no "solid date" from their suppliers as to when they will receive a new shipment.

No New Customers

Each pipe supplier said they were no longer accepting new customers, and that they were taking orders, but that they were "merely filling in a meaningless piece of paper" since no realistic date of delivery could be recorded.

Reports say the mills will not commit themselves on new orders until some time in the first quarter of 1974.

Problem Goes Back to Mills

Leroy Immel, a pipe salesman, said, "I think the problem stems from the fact that steel mills can make more money from the production of plate steel or sheets of steel than from tubular products."

Others questioned said it this way—steel companies can profit more by producing fuel - consuming products, such as automobiles and refrigerators, rather than fuel-producing products, such as for oil and irrigation wells.

Immel added his own opinion that part of the problem arises from the fact that steel products, which in the past were composed of 50 percent or more foreign components, are now 90-95 percent domestic content.

"We could solve part of the problem by importing more foreign-made materials," he continued.

Immel also said his company, as well as others, had begun to sell used casing and it is fast becoming non-existent.

When questioned about the possibility of rising prices, it was the general concensus that prices would definitely be raised as the difficulty of replacement increases.

Considering all this, it might seem surprising that the Water District's records of applications for well permits received and irrigation wells completed have not dropped at all in recent months. In both areas, statistics for January through October of 1972 and 1973 show a very steady rate of applying for permits and completing wells.

District Permits Extension

However, in October the District Board of Directors allowed a four-month extension on permits to drill two wells in Parmer County. In both cases, the wells were drilled, but the applicant had not been able to buy the pumps he needed.

Thus, the resulting conclusion that there is a scarcity of shafting and heavy tubing needed to manufacture irrigation well pumps.

Decline Not Encountered

Having not encountered an expected decline in permits and number of wells drilled, *The Cross Section* questioned area water well drillers to determine if their orders had backed up due to a shortage in equipment needed.

In line with the District's experience, several of the drillers said they had experienced an increase in orders rather than a decrease. They attributed it, however, to the fact that farmers had heard about the shortage and "wanted to get their wells drilled before the shortage hit them!"

Of course, this, in itself, helps create a shortage of supplies.

Wayne DeVaney, salesman for a Lubbock water well driller, said, "We have completed all the wells we've started, but I do see that the problem will reach us eventually."

Buck Palmer, pipe supply salesman, feels the shortage of steel is part of the reason for a steady rate of drilling irrigation wells. "However, most farmers are drilling right along because they need the water, more than for any other reason."

Timing is Ironic

The irony of this problem arising at this time is very pointed. For the first time in several years, farmers all over the country, as on the High Plains of Texas, are bringing in good crops. They have had the advantage of good weather and a receptive market.

But, with this prosperity comes the sad news that the tractor he has wanted and needed for several years is not available. The farmer has the money, but no product on which to spend it.

J. K. Applewhite, a farm implement dealer in Slaton, says he has not had a tractor to sell in more than a year.

"I think there is a shortage of component parts for machinery made by outside suppliers," said Applewhite. "Therefore, our suppliers can give us no idea as to a possible shipping date of *any* machinery."

Applewhite added that the situation is worsened by the fact that the demand is greater now than in the years when the supply was abundant.

Bill Fowler, salesman for a Lubbock manufacturing firm, says his company is expecting an inability to rent its tank trailers due to the short-

—continued on page 4 . . . FARMING

EXPERIMENTAL . . . cont. from page 2

distribution of the conceptual plan by May 1, 1975.

First Report Due in 1975

The first annual scientific report and Skywater Conference on findings from the analyzed and evaluated experiments are scheduled for March, 1975.

This will provide the first major High Plains annual input to improving precipitation management techniques and confidence levels for local operational application projects.

Decline, in feet, of the water level in each of 9 wells, located on a square grid pattern at spacing indicated, pumping 600gpm from the Ogallala aquifer. Assumed: permeability of 400 gpd/ft; coefficient of storage of 0.15; and an initial saturated thickness of 100 feet (adjusted for drawdown).

	SPACING 400 YDS				SPACING 440 YDS				SPACING 880 YDS				SPACING 1320 YDS				SPACING 1760 YDS			
WELL NO.	DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING			
	15	30	60	90	15	30	60	90	15	30	60	90	15	30	60	90	15	30	60	90
1	29.7	36.0	47.0	56.8	29.0	34.0	43.8	52.4	27.0	29.0	32.1	34.9	27.0	28.5	30.3	31.8	27.0	28.4	30.0	31.1
2	29.7	36.0	47.0	56.8	29.0	34.0	43.8	52.4	27.0	29.0	32.1	34.9	27.0	28.5	30.3	31.8	27.0	28.4	30.0	31.1
3	29.7	36.0	47.0	56.8	29.0	34.0	43.8	52.4	27.0	29.0	32.1	34.9	27.0	28.5	30.3	31.8	27.0	28.4	30.0	31.1
4	29.7	36.0	47.0	56.8	29.0	34.0	43.8	52.4	27.0	29.0	32.1	34.9	27.0	28.5	30.3	31.8	27.0	28.4	30.0	31.1
5	31.1	39.5	53.8	66.5	30.1	37.2	49.7	60.7	27.0	29.2	33.2	37.1	27.0	28.5	30.5	32.4	27.0	28.4	30.0	31.2
6	31.1	39.5	53.8	66.5	30.1	37.2	49.7	60.7	27.0	29.2	33.2	37.1	27.0	28.5	30.5	32.4	27.0	28.4	30.0	31.2
7	31.1	39.5	53.8	66.5	30.1	37.2	49.7	60.7	27.0	29.2	33.2	37.1	27.0	28.5	30.5	32.4	27.0	28.4	30.0	31.2
8	31.1	39.5	53.8	66.5	30.1	37.2	49.7	60.7	27.0	29.2	33.2	37.1	27.0	28.5	30.5	32.4	27.0	28.4	30.0	31.2
9	33.1	44.3	63.5	81.3	31.4	41.1	57.9	72.9	27.1	29.5	34.7	39.9	27.0	28.5	30.7	33.0	27.0	28.4	30.1	31.3

Decline, in feet, of the water level in each of 9 wells, located on a square grid pattern at spacing indicated, pumping 600gpm from the Santa Rosa aquifer. Assumed: transmissibility of 22,000 gpd/ft; and a coefficient of storage at 0.0001.

	SPACING 400 YDS				SPACING 440 YDS				SPACING 880 YDS				SPACING 1320 YDS				SPACING 1760 YDS			
WELL NO.	DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING				DAYS OF CONT.PUMPING			
	15	30	60	90	15	30	60	90	15	30	60	90	15	30	60	90	15	30	60	90
1	200.8	230.3	239.7	251.1	196.0	215.5	235.0	246.4	161.7	181.0	200.4	211.8	141.8	160.9	180.2	191.6	128.1	146.9	166.0	177.3
2	200.8	230.3	239.7	251.1	196.0	215.5	235.0	246.4	161.7	181.0	200.4	211.8	141.8	160.9	180.2	191.6	128.1	146.9	166.0	177.3
3	200.8	230.3	239.7	251.1	196.0	215.5	235.0	246.4	161.7	181.0	200.4	211.8	141.8	160.9	180.2	191.6	128.1	146.9	166.0	177.3
4	200.8	230.3	239.7	251.1	196.0	215.5	235.0	246.4	161.7	181.0	200.4	211.8	141.8	160.9	180.2	191.6	128.1	146.9	166.0	177.3
5	209.4	228.9	248.4	259.8	204.7	224.1	243.6	255.0	170.2	189.6	209.0	220.4	150.3	169.5	188.8	200.2	136.3	155.3	174.5	185.9
6	209.4	228.9	248.4	259.8	204.7	224.1	243.6	255.0	170.2	189.6	209.0	220.4	150.3	169.5	188.8	200.2	136.3	155.3	174.5	185.9
7	209.4	228.9	248.4	259.8	204.7	224.1	243.6	255.0	170.2	189.6	209.0	220.4	150.3	169.5	188.8	200.2	136.3	155.3	174.5	185.9
8	209.4	228.9	248.4	259.8	204.7	224.1	243.6	255.0	170.2	189.6	209.0	220.4	150.3	169.5	188.8	200.2	136.3	155.3	174.5	185.9
9	219.5	239.0	258.4	269.9	214.7	234.2	253.7	265.1	180.2	199.6	219.0	230.4	160.1	179.4	198.8	210.2	145.9	165.1	184.5	195.9

Parmer County Judge Archie Tarter, left, and Water District Board Director Webb Gober of Farwell, right, welcome Congressman George Mahon to Bovina, Texas. Congressman Mahon presented the principal address at the groundbreaking for the Running Water Draw Watershed Project, dedicated at site number 2, Bovina. The first watershed project on the High Plains will boast a dam measuring 23 feet high and 3,900 feet long. Water storage capacity is 793 acre feet.

DAMSITE DEDICATION KICKS OFF AREA'S FIRST WATERSHED PROJECT

Groundbreaking ceremonies for the first watershed project on the High Plains, the Running Water Draw Watershed Project, were held November 20 at Bovina, Texas. Dignitaries from all over the state attended the dedication, with U. S. Representative George Mahon, Lubbock, presenting the principal address.

A total of 227,782 acres in New Mexico and Texas are covered by the project, with three flood control structures planned — one in New Mexico and two in Texas. The draw begins north of Clovis, New Mexico, and runs through Plainview, Texas.

As a part of the multi-million-dollar project, six damsites will be constructed, the first of which is on Catfish Draw, near Bovina.

The other dams will be located northeast of Clovis in Curry County, one each in Lamb and Parmer Counties, and two in Hale County.

With construction just under way, several years of planning will be culminated with long-awaited action.

Efforts Begun in 1959

Original efforts on the watershed project were begun in 1959, with the application being rejected in September, 1960. Re-application was made in March, 1962, and the watershed was approved for planning in January, 1965.

A revised plan was approved by local sponsors in November, 1968, and the project was approved for operations in May, 1970. With all land rights cleared by April, 1971, bids were opened for construction on October 1, 1973.

Original sponsors of the watershed are the Parmer County Soil and Water Conservation District, the Parmer County Commissioners' Court, the Central Curry Soil and Water Conservation District, the Curry County Commissioners' Court and the City of Clovis.

Dam Statistics

Statistics for the dam to be built at Catfish Draw are as follows:

Drainage Area	18,714 acres
Surface Area at Top of Principal Spillway	130 acres
Water Storage	793 acre feet
Cubic Yards of Earth Fill	112,100 cu. yds.
Emergency Spillway	400 feet wide
Height of Dam	23 feet
Length of Dam	3,900 feet

FARMING . . . continued from page 3

age of ammonia fertilizer.

"We have plenty of customers, but, without the ammonia, they don't need to rent our trucks to haul the chemical to their farms."

The conclusion to be drawn here is very vague and indecisive. What can be done to bring about sufficient quantities of farm supplies is not fully comprehended—the problem appears to be real, but the solution remains as elusive as the cause.

CUT EXPENSES

RE-USE TAILWATER

Pictured in the three panels above is a cotton stripper hard at work early in November. The early harvesting in progress throughout the High Plains is a welcome sight. It brings with it an overall prosperous year, and with prosperity generally comes a profitable year for the farmer. However, there is irony in this happy picture. For the first time in years, the farmer is making a profit—he has money in the bank—but, also for the first time in years, there is a shortage of supplies. Farm equipment is practically non-existent and the farmer finds himself in an unfamiliar predicament. (See story on page 3.)

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

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 19—No. 12 "THERE IS NO SUBSTITUTE FOR WATER" *December, 1973*

Texas Governor Dolph Briscoe and General James Rose, Director, Division of Planning Coordination, Office of the Governor, address the Governor's Task Force in Austin November 27. Rose is the Task Force's Chairman. (TWDB Photo).

BRISCOE APPOINTS WATER TASK FORCE

The recently-appointed Governor's Water Resource Conservation and Development Task Force, charged by Dolph Briscoe, Governor of Texas, to translate existing *planning* efforts into a "strong *action* program coordinating the efforts of the State and local levels of government with appropriate Federal actions", has already taken great strides toward the executive charge.

The group of 29 heads of water agencies across the State, has met three times since its appointment on

—continued on page 2 . . . BRISCOE

1973 PRESIDENT'S REPORT

Looking back over 1973, it would seem almost anti-climactic to say it has been a big year for groundwater users and, indeed, all of the citizens of West Texas.

The release of the National Water Commission report opened the eyes of many who had here-to-fore regarded the Federal Government as an ever-present financial body for needed local and state water projects.

On April 12 a joint announcement of the Mississippi River Commission, the Bureau of Reclamation and the Corps of Engineers spelled out the cost of the importation aspects of the Texas Water Plan.

Since the feasibility and economic justification of transporting water to West Texas have been discussed at length in many forums, it should not be necessary to comment further in these columns. Our Congressional delegations have assured their continued interest in and support for a supplemental water source for West Texas, and Water, Inc., remains alive and active in promoting the concept.

However, considering the time lag in construction of such a project even after it receives the go-ahead, it would seem apparent that at the very least, one more generation of Plains farmers must be capable of coping with our diminishing water supplies.

In this century, each successive generation has expressed pride in having made the quality of life just a bit easier for their children. Unfortunately, in order to achieve the "good life", those of us engaged in irrigation farming have been compelled to consumptively use a substantial portion of our underground water resources each year.

Recognizing the economic fact that we must continue to deplete our water bank, and the political fact that importation of supplemental water to the area is still a great many years into the future, we come now to a time of decision.

Just what type of future do we want to leave our young generation? Most of us would answer, "The very best we can under the circumstances." Then, how shall we effectively go about achieving this aim?

When was the last time you gave some constructive thought into methods for better utilization and conservation of the pumped water? Have you installed that tailwater pit and return system you have been thinking about?

Do you have a pumping system for your playa lake to utilize that water when it is available? Have you been reading any of the research reports on water requirements and timing of applications for our various crops?

It is true that any or all of these conservation measures might require some money or effort on our part to implement and manage them effectively. The choice is ours; the consequences will be the heritage of our children.

Respectfully Submitted,

Chester W Mitchell

CHESTER W. MITCHELL, President
Board of Directors

Season's Greetings from Directors and Staff

FRONT ROW: Fred Cowart, Don McReynolds, Rebecca Clinton, Selmer Schoenrock (Director), Norma Fite and Pennye Newberry. BACK ROW: Ray Kitten, Tony Schertz, Chester Mitchell (Director), Webb Gober (Director), Obbie Goolsby, Billy Wayne Sisson (Director), Frank Rayner, Don Smith, Clifford Thompson, Dan Seale and Kenneth Carver.

THE Cross SECTION

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

1628 15th Street, Lubbock, Texas 79401

Telephone 762-0181

REBECCA CLINTON, Editor

Second Class Postage Paid at Lubbock, Texas
District Office at Lubbock

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1628 15th Street, Lubbock

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M. T. Darden, 1976 ..... Lorenzo

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County Courthouse, 2nd Floor, Hereford

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James E. Higgins, 1977 ... 200 Star St., Hereford
Garland Solomon, 1977 ..... Rt. 5, Hereford
W. L. Davis, 1977 ..... Box 312, Hereford

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Don Grantham, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

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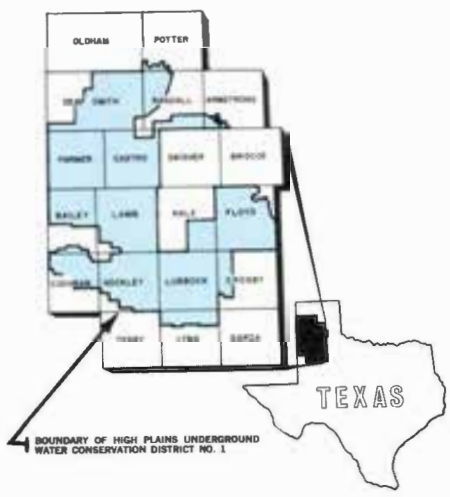
Pat Frizzell, 1974 ..... Box 1046, Lockney
Malvin Jarboe, 1976 ..... Route 4, Floydada
Connie Bearden, 1976 ..... Route 1, Floydada
M. M. Smitherman, 1976 ... Silverton Star Route, Floydada



Hale County

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Mayo Ins., 1617 Main, Petersburg

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

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Horn Insurance Agency, Bovina

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Edwin Lide, 1975 ..... Rt. 1, Bovina
Troy Christian, 1977 ..... Rt. 1, Farwell
Joe Moore, 1977 ..... Box J, Lazbuddie
Dalton Caffey, 1977 ..... 15th St., Friona

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W. J. Hill, 1975 ..... Bushland
Henry W. Gerber, 1977 ..... Rt. 1, Amarillo
Jim Line, 1977 ..... Box 87, Bushland
Albert Nichols, 1977 ..... Rt. 1, Box 491, Amarillo

Randall County

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

John F. Robinson, 1975 ..... 1002 7th St., Canyon
Fred Begert, 1975 ..... 1422 Hillcrest, Canyon
Harry LeGrand, 1977 ..... 4700 S. Bowie, Amarillo
Joe Albracht, 1977 ..... Box 81, Bushland
Leonard Batenhorst, 1977 ..... Route 1, Canyon

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

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

Frank Rayner, District Manager; Dr. Dan Wells, Director of the Water Resources Center at Texas Tech; Alice French, KCBD-TV, Lubbock, and Representative Bill Clayton, D-Springlake, pause following a 30-minute question-answer television show, "Eleven Questions", which aired December 15. The subject of the show was the future of water and irrigated agriculture on the High Plains.

BRISCOE . . . continued from page 1

November 21, 1973. Frank Rayner, District Manager, is a member of the Governor's Task Force.

Governor Briscoe, in forming the group of "knowledgeable professionals", expressed concern over the fact that, since the Federal Government has technically abandoned its participation in water resource programs, the State must solve its water problems on its own at an accelerated pace.

Task Force Charged

As a part of an executive order issued November 21 by Governor Briscoe, the Task Force was charged with the following duties:

1) Develop and recommend economic, social and environmental goals to be met by water development in Texas.

2) Examine all feasible plans and proposals for water resource development required to meet the forseeable needs of the State.

3) Outline a statewide program for coordinated action of all State, regional, and local government agencies to assure continued, effective, and timely implementation of water conservation projects in Texas, with or without Federal participation.

Briscoe's idea to create a Task Force followed the formation by the Senate, through Lieutenant Governor Bill Hobby, of four Citizens' Councils on Water Resources.

Efforts To Be Combined

The Task Force and a spokesman from the Lieutenant Governor's office, Bill Jenkins, pledged to combine their efforts to speedily bring about a realization of the State's immediate and future water needs.

In its initial meeting, the Task Force was organized into three committees, the function of each committee being to develop recommendations to be considered by the Task Force as a whole.

Committee number one, chaired by Walter Wells, General Manager of the Brazos River Authority, has the assignment of formulating recommendations for the Task Force's structure, operating procedures and schedule of *long-term* activities required to meet the Governor's charge.

Committee number two was authorized to identify the developmental, legal, institutional, and financial water problems the Task Force regards as most pressing in Texas *today*. This committee was chaired by Joe Carter, Chairman of the Texas Water Rights Commission.

The third committee was chaired by David Brune, General Manager, Trinity River Authority of Texas. His committee has the responsibility of identifying the State-level actions the Task Force recommends for the *short term* (next three to four months) to begin to assure Federal participation in water development in Texas.

Committee number one determined that the Task Force should meet the second Wednesday of each month, established a quorum for all meetings, and recommended the formation of the following committees (which were approved and formed by the Task Force):

Committees

1) Committe on Financing Water Resources Development

2) Committee on Federal Water Policy and Programs

3) Committee on State Water Policy and Programs.

The second standing committee noted the problems it considered to need the most urgent attention of the Task Force. Some of the suggestions of the Committee were:

1) The constitutional limit of $500 million for the Water Development Fund appears too low if the Federal Government is to abandon its traditional role of assisting in financing water projects.

2) Penalties should be imposed to deter waste where it is occurring.

3) Studies and research into weather modification to produce precipitation and desalination of sea and brackish water should not be impeded.

4) Reuse of water should be encouraged.

5) Flood plain management is long overdue.

6) Small communities and rural areas need planning aid and financial assistance.

7) Emergency measures should now be prepared for the next drouth.

8) Some innovative new approaches should be made to assure continued Federal participation along lines where the Federal interest is clearly involved.

Committee number three recommended five steps to be taken immediately "in the sequence listed".

1) Projections as to future water requirements to 2020 and as to the dependable yield of reservoirs existing

—continued on page 3 . . . BRISCOE

THE 1974 WATER DISTRICT ELECTION

The 1974 elections for the High Plains Underground Water Conservation District No. 1 will be conducted January 8.

Those counties located within Director's Precincts Number 1 (Crosby, Lubbock and Lynn), Number 2 (Cochran, Hockley and Lamb) and Number 5 (Floyd and Hale) will hold elections this year.

Directors from Precinct 1, Ray Kitten, and Precinct 5, Chester Mitchell, are both unopposed candidates for re-election. In Precinct 2, Hugh Hansen of Morton is contesting Director Selmer Schoenrock of Levelland.

Absentee balloting, which began December 19, 1973, will continue through January 4, 1974, at the District headquarters, 1628 15th Street, Lubbock, for Crosby, Lubbock and Lynn Counties; the District office, 1617 Main, Petersburg, for Hale County, and the County Clerk's offices in Cochran, Floyd, Hockley and Lamb Counties.

Qualifications to Vote

A qualified voter in the District's election is any person possessing a valid voter registration certificate and residing within the delineation of the District and within the county where a vote will be taken. The election judge at each of the polling places will have maps depicting the Commissioner's Precincts within each county included in the District's boundaries.

Polling Places

For the 1974 election, a total of 24 polling places has been established in the eight counties.

BRISCOE . . . continued from page 2

or actually under construction should be updated by the Texas Water Development Board and made available by January 1, 1974.

2) The Task Force should study and summarize:

a) The situation with regard to "Principles and Standards"
b) The National Water Commission Report
c) The situation with regard to land-use regulation
d) The situation with regard to moratorium regulations.

3) The Task Force should develop a recommended position for the Governor of Texas on the six areas of his concern.

4) The Governor of Texas, supported by the Lieutenant Governor, representatives of the Task Force and Regional Water Councils, should meet with the Director of the Office of Management and Budget to ascertain: (a) the philosophy underlying recent Federal actions, (b) the projected level of Federal investment in water projects in Texas during the next few years, and (c) the possibility of the Oroville concept of financing.

5) The Governor of Texas, supported by the Lieutenant Governor, the Chairman of the Regional Water Councils and the Task Force, should meet with the Texas Congressional Delegation soon after February 1, 1974, and should: (a) provide the Delegation with a resume of the area of concern, and (b) make positive recommendations to the Delegation as to what should be done.

The names and addresses of the candidates, the location of polling places and the names and addresses of the election judges are listed below.

NOMINEES FOR DISTRICT DIRECTOR

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

Ray Kitten, Route 1, Slaton, 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
Hugh Hansen, 502 Shelly Dr., 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 vote for one Committeeman-at-large

Jessie Clayton, 706 S. Main, Morton, Texas
L. Z. Scoggins, Star Route 1, Morton, Texas

Residents from Committeemen's Precinct East of State Highway 214 vote for one

Robert Yeary, Route 2, Morton, Texas
E. E. (Bud) Thomas, 204 E. Hayes, Morton, Texas

CROSBY COUNTY

Residents vote for two Committeemen-at-large

Donald Aycock, Lorenzo, Texas
Alvin Morrison, 409 Tyler Ave., Lorenzo, Texas

FLOYD COUNTY

Residents from Commissioner's Precinct 2 vote for one

Joe Cunyus, Box, Lockney, Texas

Residents in Commissioner's Precinct 4 vote for one

Fred Cardinal, Route 4, Floydada, Texas

HALE COUNTY

Residents vote for 2 Committeemen-at-large

Henry Kveton, Route 2, Petersburg, Texas
Gaylord Groce, RFD, Petersburg, Texas

HOCKLEY COUNTY

Residents vote for one Committeeman-at-large

J. E, Wade, Route 2, Levelland, Texas

Residents from Commissioner's Precinct 3 vote for one

Jimmy Price, Route 3, Levelland, Texas

LAMB COUNTY

Residents from Commissioner's Precinct 1 vote for one

Billy J. Langford, Box 381, Olton, Texas

Residents from Commissioner's Precinct 4 vote for one

Edward Fisher, Box 67, Sudan, Texas

LUBBOCK COUNTY

Residents vote for one Committeeman-at-large

Dan Young, 4607 W. 14th Street, Lubbock, Texas

Residents from Commissioner's Precinct 3 vote for one

R. B. (Ronnie) Stanton, Route 1, Box 167, Idalou, Texas
Clifford Hilbers, RFD, Idalou, Texas

LYNN COUNTY

Residents from Commissioner's Precinct 1 vote for one

Orville Maeker, Route 1, Wilson, Texas

Residents from Commissioner's Precinct 4 vote for one

Freddie Kieth, New Home, Texas

POLLING PLACES AND JUDGES FOR 1974 ELECTION

COCHRAN COUNTY

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

Presiding Judge: Clayton Stokes, Morton, Texas

Polling Place No. 2: G & C Gin, Morton, Texas

Presiding Judge: Max Clark, Morton, Texas

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

Presiding Judge: Mrs. Danny Key, Star Route 2, 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 and Locust, Lockney, Texas

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

HALE COUNTY

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

Presiding Judge: John Hegi, 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: Chamber of Commerce Building, 206 E. Main St., Earth, Texas

Presiding Judge: Norman G. Ellis, Box 194, Earth, Texas

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

Presiding Judge: Nolan Parrish, Box 456, Sudan, Texas

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

Presiding Judge: Mrs. Arthur Jones, 707 Littlefield Dr., Littlefield, Texas

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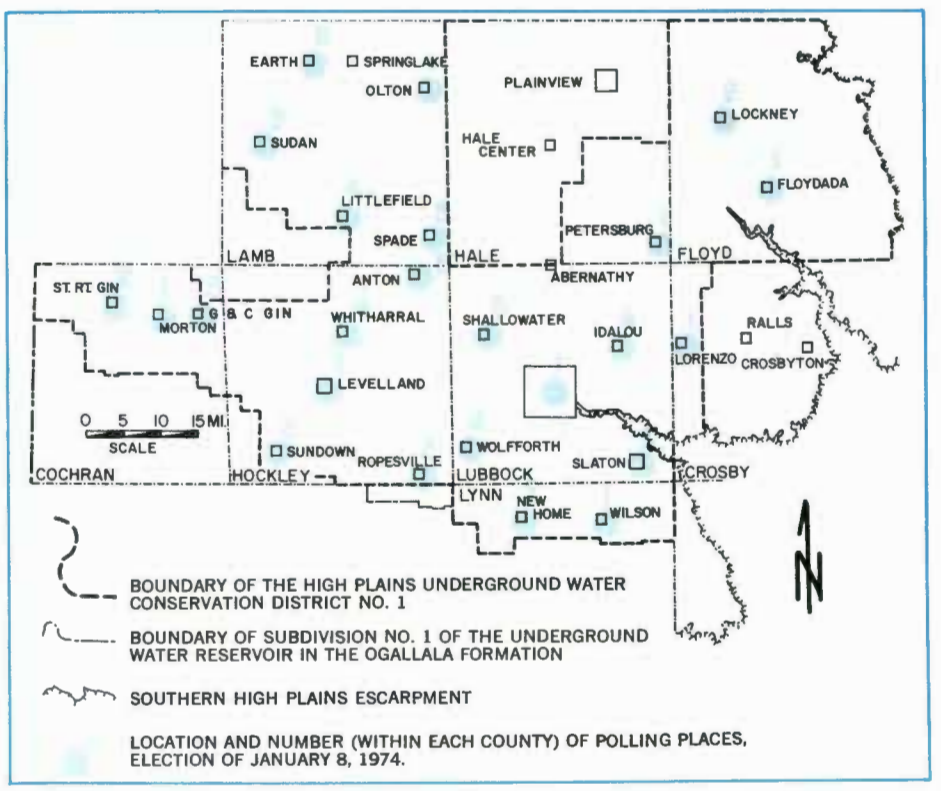

Map showing the area—District Directors Precincts 1, 2 and 5—and the locations of polling places wherein the election will be held on January 8, 1974.

B. C. Selden and Jack Page, Chief Engineer and Engineer with the Internal Revenue Service in Dallas, review water level maps with Bob Winn, Professor of Geology, West Texas State University, Canyon (right). The three men were in the Water District office December 7 through 11 working with District personnel on the District's cost-in-water depletion, income-tax-allowance, program.

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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 Courthouse, Lubbock, Texas
Presiding Judge: Tom C. Ingram, 3810 39th, Lubbock, Texas
Polling Place No. 2: City Hall, Wolfforth, Texas
Presiding Judge: Mrs. E. R. Haskins, 814, Main, Wolfforth, 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: Earl Weaver, Idalou, Texas
Polling Place No. 5: Community Clubhouse, Shallowater, Texas
Presiding Judge: Mrs. George Blackmon, 1008 14th, 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: Roger Blakney, Route 1, Wilson, Texas

Water Levels To Be Measured In January

Members of the High Plains Water District field staff and Texas Water Development Board (TWDB) personnel will begin measuring the depth to water in more than 800 observation wells during the second week of January, 1974.

Water District personnel will measure wells in Armstrong, Lamb, Hale, Floyd, Lubbock, Crosby, Lynn and Hockley Counties. Wells in Cochran, Bailey, Parmer, Deaf Smith, Castro, Randall and Potter Counties will be measured by the TWDB crew.

1974 tags will be placed on the well-head equipment of all observation wells. An orange and white adhesive tag will denote wells measured by the Water District, while white tags will identify those measured by the TWDB.

MEMBERS OF GOVERNOR'S TASK FORCE

Thirty-two men, prominent experts in the field of water resource development, have been appointed to Governor Dolph Briscoe's Water Resource Conservation and Development Task Force (see story on page 1). They are responsible for aiding the Governor in determining solutions to the State's many water problems.

Members of the Task Force are: Harry Burleigh, Executive Director of the Texas Water Development Board; Joe Carter, Chairman, Texas Water Rights Commission; Hugh Yantis, Executive Director, Texas Water Quality Board; David Brune, General Manager, Trinity River Authority of Texas; J. W. Buchanan, Manager, North Plains Water Conservation District No. 2; Harry Bozeman, Director of Utilities, City of Amarillo, and Atlee M. Cunningham, Director of Waterworks, City of Corpus Christi.

Other members are E. W. Easterling, Attorney, Lower Neches Valley Authority; Charles F. Herring, General Manager, Lower Colorado River Authority; Henry Graeser, Director, Water Utilities, City of Dallas; W. Ralph Hardy, Assistant City Manager, City of Fort Worth; John Hickerson, Manager, El Paso Water Utilities, Public Service Board, El Paso; Owen H. Ivie, Manager, Colorado River Municipal Water District; E. B. Cape, Director of Public Works, Houston; W. D. Parish, Manager, Hidalgo and Cameron Counties Water Control and Improvement District No. 9, and Fred N. Pfeiffer, General Manager, San Antonio River Authority.

Also included are Frank Rayner, Manager, High Plains Water District; Carl W. Reihn, Executive Director, North Texas Municipal Water District; John W. Simmons, General Manager, Sabine River Authority of Texas; John H. Specht, General Manager, Guadalupe - Blanco River Authority; Robert Van Dyke, Manager, City Water Board, San Antonio; Walter J. Wells, General Manager, Brazos River Authority; Maj. Gen. John W. White, Executive Director, Nueces River Authority; W. R. Farquhar, Jr., General Manager, Lavaca-Navidad River Authority; Fred Parkey, Red River Authority of Texas, and Homer Tanner, Northeast Texas Municipal Water District.

Other members are Roy Douglas, Upper Neches River Municipal Water Authority; William A. Elmore, Neches River Conservation District; Colonel McD. D. Weinert, General Manager, Edwards Underground Water District; Victor Jaeggli, Manager, West Central Texas Municipal Water District; Felix Ryals, Manager, Panhandle Underground Water Conservation District, and General James Rose, Director, Division of Planning Coordination, Office of the Governor, and Chairman of the Task Force.

BRISCOE'S MESSAGE ON WEST TEXAS

In a brief departure from the prepared text of a speech presented November 27 in Austin before the Task Force, Governor Dolph Briscoe emphasized his concern for the water needs of West Texas.

His impromptu remarks were as follows:

The importance today of agriculture and agricultural productivity in the High Plains and South Plains areas of this State is recognized, not only in Texas, but really as a national priority; because, if we are going to continue to meet the needs of the people of this country, and to help supply the needs of the people of the world for agricultural products that can be produced more efficiently, more economically in that area than probably anywhere else, then there is going to have to be a means found to develop supplemental source from outside this State—that will supply the needs of that area in the years to come. And this is certainly a long-range project, but one that we must undertake the planning for as of now. I think this is a very, very definite top priority.

VOTE

January 8, 1974

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

SECOND CLASS PERMIT