THE Cross SECTION

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

Volume 22—No. 1 "THERE IS NO SUBSTITUTE FOR WATER" *January, 1976*

Directors for 1976 are, seated, Selmer Schoenrock, President, and Webb Gober, Vice President. Standing are Billy Wayne Sisson, Secretary-Treasurer; James P. Mitchell, Member, and Malvin A. Jarboe, Member.

1976 ELECTION RESULTS ANNOUNCED

The Board of Directors of the High Plains Underground Water Conservation District No. 1 declared the results of the District's January 17 election to be official during its initial meeting of the year, January 23. Votes were canvassed and three Directors and 24 County Committeemen were elected to new terms.

Selmer Schoenrock of Levelland, Vice President of the Board in 1975, was re-elected to his fourth two-year term as representative of Director's Precinct 2 (Cochran, Hockley and Lamb Counties). Schoenrock was unopposed.

James P. Mitchell, Lubbock County farmer, was elected to his first term as Director from Precinct 1 (Crosby, Lubbock and Lynn Counties). Mitchell replaces past Board President Ray Kitten of Slaton, who retired from the Board this year. Mitchell was unopposed on the ballot.

Floyd County Committeeman Malvin A. Jarboe of Floydada won election to the board in Director's Precinct 5 (Floyd and Hale Counties). Jarboe fills the seat vacated by Chester Mitchell of Lockney, Board Member and officer since January, 1964. Jarboe was also unopposed for the position.

Other Board Members

Other members of the Board beginning the second year of their present terms are Billy Wayne Sisson of Hereford and Webb Gober of Farwell.

During a swearing-in ceremony January 23, Judge Thomas L. Clinton, 99th District Court, administered the oath of office to Schoenrock, Mitchell and Jarboe. The other Directors and the District staff witnessed the ceremony.

Officers Elected

Following the installation, the Board re-convened and elected officers for 1976.

Schoenrock was elected President; Gober, Vice President, and Sisson, Secretary-Treasurer.

County Committeemen

Twenty-four County Committeemen were elected from Director's Precincts 1, 2 and 5. These men will serve four-year terms, all to expire in January, 1980. They are:

COCHRAN
- Hershel M. Tanner, Morton
- Danny Key, Morton
- H. H. Rosson, Morton

CROSBY
- Tommy McCallister, Lorenzo
- Edward S. Smith, Lorenzo
- Pat Yoakum, Lorenzo

FLOYD
- C. O. Lyles, Floydada
- Connie Bearden, Floydada
- M. M. Smitherman, Floydada

HALE
- Clint Gregory, Jr., Petersburg
- Homer Roberson, Petersburg
- Henry Scarborough, Petersburg

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EPA DESIGNATES EDWARDS AQUIFER

On December 16, 1975, Russell Train, Administrator of the Environmental Protection Agency (EPA), designated the Edwards Underground Reservoir, part of the Edwards Aquifer, as the "principal source of drinking water for the San Antonio area" and published such determination in the *Federal Register*, exactly one year after the controversial Safe Drinking Water Act of 1974 (Public Law 93-523) was enacted by Congress.

After publication of such notice, ". . . no commitment for Federal financial assistance (through a grant, contract, loan, guarantee, or otherwise), may be entered into for any project which the Administrator determines may contaminate the reservoir and create a significant hazard to public health."

However, a commitment may be entered into, if authorized under another provision of law, to plan or design such project to assure that it will not so contaminate the reservoir.

Applies Only to Federal Funds

It should be noted that the designation applies *only* to Federally-funded projects, and those projects which could have significant impact on water quality are subject to selective review.

The EPA also requests that Federal agencies which propose funding projects that might contaminate the aquifer or reservoir prepare environmental impact statements or groundwater evaluations, which discuss the effects such projects might have on the quality of water when it reaches the aquifer.

EPA's intent in requiring the review is to prevent the creation, through inadequate planning, of any significant hazard to the public health.

According to the EPA, the new guidelines for the Edwards reservoir *"1) announce the determination of the EPA Administrator that the Edwards Underground Reservoir, a principal source of drinking water for the San Antonio area, would, if contaminated, create a significant hazard to the public health, and 2) establish interim*

—continued on page 2 . . . EPA

Cross Section Mailing List To Be Revised

During the months of February and March, the District will revise and update the mailing list of its monthly publication, **The Cross Section**, for the first time since its introduction to its readers in 1954.

Since its inception, **The Cross Section** has been requested by people residing outside the District's boundaries, as well as the residents of the District. At present, more than 12,000 copies are mailed monthly to geologists, hydrologists, engineers, legislators, educators and laymen, as well as irrigation farmers, in all 50 states and 15 foreign countries.

However, due to increased printing and mailing costs, as well as an increasing number of returns by the post office noting new addresses (at the expense of the District), the purging of the outdated names and addresses on the current mailing list is essential.

In this issue of **The Cross Section** there has been inserted a stamped self-addressed post card. If you, as a reader and recipient of **The Cross Section**, wish to continue to receive this monthly publication, or if you are not now receiving **The Cross Section** and you would like to receive same, free of charge, please return the post card to the District by March 15. Please check the address on this month's **Cross Section**, and note any discrepancy or changes which you wish to make known, and the updated mailing list will reflect those corrections.

If you have any questions, contact the District office, 2930 Avenue Q, Lubbock, Texas 79405

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

Telephone 762-0181

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Don McReynolds ..... Geologist
E. E. "Butch" Davis ..... Engineer in Training
Tony Schertz ..... Draftsman
Obbie Goolsby ..... Field Representative
J. Dan Seale ..... Field Representative
Kenneth Carver ..... Field Representative
Oscar Riemer ..... Field Representative
Clifford Thompson ..... Head, Permit Section
Mrs. Norma Fite ..... Secretary-Bookkeeper
Mrs. Pennye Newberry ..... Secretary
Mrs. Rebecca Clinton ..... Public Education

BOARD OF DIRECTORS

Precinct 1
(CROSBY, LUBBOCK and LYNN COUNTIES)
James P. Mitchell ..... Wolfforth

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

Precinct 3
(BAILEY, CASTRO and PARMER COUNTIES)
A. W. Gober, Vice President ..... Farwell

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

Precinct 5
(FLOYD and HALE COUNTIES)
Malvin A. Jarboe ..... Floydada

COUNTY COMMITTEEMEN

Armstrong County

Guy Watson, 1977 ..... Wayside
C. D. Rogers, 1977 ..... Wayside
Bill Heisler, 1977 ..... Wayside
Charles Kennedy, 1979 ..... Rt. 1, Happy
Cordell Mahler, 1979 ..... Wayside

Bailey County

Doris Wedel, Secretary
H&R Block, 224 W. 2nd, Muleshoe

Eugene Shaw, 1977 ..... Rt. 1, Muleshoe
Adolph Wittner, 1977 ..... Star Rt., Baileyboro
Jessie Ray Carter, 1977 ..... Rt. 5, Muleshoe
Marshall Head, 1979 ..... Rt. 3, Muleshoe
Harold Layton, 1979 ..... Rt. 2, Morton

Castro County

Garnett Holland, Secretary
City Hall, 120 Jones St., Dimmitt

Jackie Clark, 1977 ..... Rt. 1, Box 33, Dimmitt
Joe Nelson, 1977 ..... Box 73, Dimmitt
Bob Anthony, 1977 ..... Rt. 4, Dimmitt
Anthony Acker, 1979 ..... Rt. D, Nazareth
Glenn Odom, 1979 ..... Rt. 4, Box 136, Dimmitt

Cochran County

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

Jessie Clayton, 1978 ..... 706 S. Main, Morton
Robert Yeary, 1978 ..... Route 2, Morton
Hershel M. Tanner, 1980, Route 2, Box 36, Morton
Danny Key 1980 ..... Star Route 2, Morton
H. H. Rosson, 1980 ..... Star Route 2, Morton

Crosby County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Donald Aycock, 1978 ..... Lorenzo
Alvin Morrison, 1978 ..... Lorenzo
Tommy McCallister, 1980 ..... 209 N. Van Buren, Lorenzo
Edward S. Smith, 1980 ..... 102 N. Van Buren, Lorenzo
Pat Yoakum, 1980 ..... 707 First St., Lorenzo

Deaf Smith County

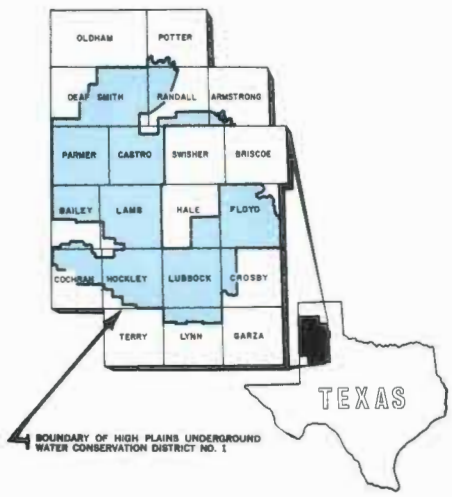
B. F. Cain, Secretary
County Courthouse, 2nd Floor, Hereford

James E. Higgins, 1977 ..... 200 Star St., Hereford
Garland Solomon, 1977 ..... Rt. 5, Hereford
W. L. Davis, 1977 ..... Box 312, Hereford
Bill Cleavinger, 1979 ..... Star Rt., Wildorado
George Ritter, 1979 ..... Rt. 5, Hereford

Floyd County

Helen Bertrand, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

Joe Cunyus, 1978 ..... Lockney
Fred Cardinal, 1978 ..... Route 4, Floydada
C. O. Lyles, 1980 ..... Route 4, Floydada
Connie Bearden, 1980 ..... Route 1, Floydada
M. M. Smitherman, 1980 ..... Silverton Star Rt., Floydada



Hale County

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

Henry Kveton, 1978 ..... Route 2, Petersburg
Gaylord Groce, 1978 ..... RFD, Petersburg
Clint Gregory, Jr., 1980 ..... Box 98, Petersburg
Homer Roberson, 1980 ..... Box 250, Petersburg
Henry Scarborough, 1980 ..... Route 2, Petersburg

Hockley County

Jim Montgomery, Secretary
609 Austin Street, Levelland

J. E. Wade, 1978 ..... Route 2, Levelland
Jimmy Price, 1978 ..... Route 3, Levelland
Billy Ray Carter, 1980 ..... Route 5, Levelland
Leon Young, 1980 ..... Route 1, Ropesville
Robert Phillips, 1980 ..... 218 Redwood, Levelland

Lamb County

Calvin Price, Secretary
620 Hall Avenue, Littlefield

Billy J. Langford, 1978 ..... Box 381, Olton
Edward Fisher, 1978 ..... Box 67, Sudan
P. A. Washington, 1980 ..... Box 124, Springlake
Jack Stubblefield, 1980 ..... Box 397, Spade
Larry Lockwood, 1980 ..... Star Rt. 2, Littlefield

Lubbock County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Dan Young, 1978 ..... 4607 W. 14th St., Lubbock
Clifford Hilbers, 1978 ..... RFD, Idalou
Don Bell, 1980 ..... Box 114, Wolfforth
Ronald Schilling, 1980 ..... Route 1, Slaton
Granville Igo, 1980 ..... Route 1, Shallowater

Lynn County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Orville Maeker, 1978 ..... Route 1, Wilson
Freddie Kieth, 1978 ..... New Home
S. B. Rice, 1980 ..... Route 1, Wilson
W. R. Steen, 1980 ..... Route 2, Wilson
Wendell Morrow, 1980 ..... Route 1, Wilson

Parmer County

Johnie D. Horn, Secretary
Horn Insurance Agency, Bovina

Troy Christian, 1977 ..... Rt. 1, Farwell
Joe Moore, 1977 ..... Box J, Lazbuddie
Dalton Caffey, 1977 ..... 15th St., Friona
Floyd Reeve, 1979 ..... Box 1196, Friona
Ralph Roming, 1979 ..... 809 Ridglea Dr., Bovina

Potter County

Henry W. Gerber, 1977 ..... Rt. 1, Amarillo
Jim Line, 1977 ..... Box 87, Bushland
Albert Nichols, 1977 ..... Rt. 1, Box 491, Amarillo
F. G. Collard, 1979 ..... Rt. 1, Box 433, Amarillo
W. J. Hill, 1979 ..... Box 53, Bushland

Randall County

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

Harry LeGrand, 1977 ..... 4700 S. Bowie, Amarillo
Joe Albracht, 1977 ..... Box 81, Bushland
Leonard Batenhorst, 1977 ..... Rt. 1, Canyon
Bill Dugan, 1979 ..... Rt. 2, Box 30, Happy
John F. Robinson, 1979 ..... 1002-7th St., Canyon

NOTICE: Information regarding times and places of the monthly County Committee meeting 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.

Parmer County Secretary Dies

Johnie Horn of Bovina, Parmer County Secretary for the Water District since June, 1973, died January 25 in a Taos, New Mexico, hospital of an apparent heart attack. Funeral services for Horn, 61, were held in Bovina January 28.

A native of Bonham, Texas, Horn was a former Bovina mayor and had served on the Bovina School Board for six years. He was President of the Bovina Lions Club and a 28-year member of the Bovina Baptist Church.

Horn was owner of Horn Insurance Agency at Bovina when he died. He is survived by his wife, Mina; three sons, two sisters, a brother and four grandchildren.

The family asks that memorials be made in the form of donations to the Johnie Horn Memorial Fund to be used in missionary work in Japan through the Southern Baptist Association.

The Water District wishes to extend its sympathy to the family of Mr. Horn and to express its appreciation for his service to the District and its residents.

NOTICE

If you wish to continue to receive The Cross Section complete and return the attached postcard to the District by March 15, 1975

EPA . . . continued from page 1

project review guidelines under which EPA will review the Environmental Impact Statement (EIS) for major Federal financially-assisted projects to insure that they will not result in contamination of the Reservoir through its recharge zone. This zone is about 1,600 square miles in area. In addition to this review of projects located on the recharge zone, the Agency may also in exceptional cases review projects in outside areas feeding the recharge zone through which the Reservoir is replenished. If petitioned to do so, EPA may also review major projects for which an EIS is not required."

History of Edwards Designation

On January 3, 1975, only 18 days after PL 93-523 was signed into law by President Gerald R. Ford, the Sierra Club, the League of Women Voters and the Citizens for a Better Environment petitioned the EPA to designate the aquifer under the provisions of the new Act. And on June 4, 1975, the EPA held a public hearing in San Antonio to receive comments from local citizens about the possible aquifer designation. (For a detailed account of that hearing, see the June, 1975 issue of *The Cross Section.)*

Train then signed the Notice of Determination on December 10, 1975, in which he states that the determination is based upon these facts:

1) The Edwards Underground Reservoir is the principal source of high quality water for about one million people.
2) The reservoir is vulnerable to contamination through its recharge zone.

On January 7, 1976, an informal town meeting was held in San Antonio to give EPA Region VI Administrator John C. White a chance to answer questions the citizens of the area had about the designation and the review process of projects which could impact the aquifer.

Some citizens present pointed out that the quality of water in the aquifer is presently above national standards

—continued on page 3 . . . EPA

C. M. Banks, Branch Manager with the Internal Revenue Service (IRS) in Dallas (second from right), reviews the District's cost-in-water depletion, income-tax-allowance, program January 16 with B. C. Selden, Engineer Group Manager, IRS; Don Smith, District Geologist, and Frank Rayner, District Manager.

THREE DIRECTORS ELECTED TO BOARD FOR 1976-1978

Judge Thomas L. Clinton, right, of the 99th District Court, issues the oath of office January 23 to newly-elected Directors Selmer Schoenrock of Levelland, Malvin A. Jarboe of Floydada and James P. Mitchell of Wolfforth. The Directors represent Directors' Precincts 1, 2 and 5, respectively, and will serve two-year terms.

SELMER SCHOENROCK

Selmer H. Schoenrock of Levelland, Member of the Board of Directors since January, 1970, was re-elected to that position for a fourth consecutive two-year term January 17. Schoenrock represents Director's Precinct 2 (Cochran, Hockley and Lamb Counties).

The Hockley County farmer was also elected President of the Board for 1976 by his fellow Board Members on January 23. The Director has also served the District as Vice President of the Board in 1975, and as a Hockley County Committeeman from January, 1963, until January, 1969.

Moved to Levelland in 1934

A native of Clifton, Texas, Schoenrock moved with his family to the Levelland area in 1934, where he graduated from Levelland High School in 1941. He then served in the U.S. Navy from 1944 to 1946.

Schoenrock, 53, married his wife, Maurine, on November 22, 1946, and has been farming near Levelland since that time. The Schoenrock's have three children and two grandchildren.

Their daughter, Donna Kay Taylor, 27, is married and lives in Corpus Christi, where she teaches Special Education at Lozano Elementary School. She and her husband, Mike, have two children, Heather, five, and Cody, 18 months. Donna's husband is also a teacher.

The Schoenrock's other daughter, Lynn, 26, teaches Special Education at Levelland High School and resides in Levelland. She and Donna are both graduates of Texas Tech University.

Jerrell, the Schoenrock's son, is 20 and lives at Lubbock, where he is a junior student at Texas Tech, majoring in Micro-biology.

The Director presently farms 1,650 acres of cotton and milo, and operates 20 irrigation wells. He is concerned about the future of the High Plains irrigation farmer, and he hopes that, by serving on the District's Board of Directors, he can be a spokesman for his fellow farmer during the critical time ahead.

"Surveys have proved that High Plains residents see the need for the Water District, but I don't think people realize, even today, how much we all depend on water."

Economy Depends on Water

"The economy of the area will depend on how long farmers can afford to pump water, rather than how soon we run out of water," said the Director.

"And future irrigation will depend on whether or not it is economically feasible to pump, not on whether there is any more water underground. Therefore, we all need to conserve all our resources so as to be able to continue to provide food for the country and the world."

The Water District is pleased that Selmer Schoenrock will continue to serve on its Board of Directors.

SELMER SCHOENROCK

MALVIN A. JARBOE

Malvin A. Jarboe, Floyd County farmer, is the new Director representing Director's Precinct 5 (Floyd and Hale Counties). Elected to the position January 17, Jarboe has served as Floyd County Committeeman since January, 1969.

Born in Floydada in 1921, the Director graduated from Floydada High School in 1939 and has farmed in Floyd County since 1941. Married in January, 1943, Jarboe and his wife, FloElla, also born in Floydada, have one daughter, Vickie Pitts, 28.

Vickie and her husband, Kenneth, have two daughters, Kelly, eight, and Kerrie, three. Kenneth also farms near Floydada. Vickie, a 1966 graduate of Texas Tech University, has taught elementary school in Shallowater and Wolfforth.

Jarboe is also active in his community as Vice President of the Federal Land Bank Association of Floydada and President of the Board of Consumers Fuel Association of Floydada.

The Director farms 1,700 acres of cotton, wheat and milo and operates 13 small irrigation wells. He maintains several reclamation systems on land he owns, and says, "Tailwater pits are great — they're worth more than any well on the farm."

He believes farmers should save "all the water we can if we want to stay in business". Jarboe added that he does not feel there is as much waste today as there used to be and concludes, "The price of fuel will cut down on a lot of waste. Farmers just won't be able to afford to pump the water to the extent they used to."

The Water District welcomes Malvin Jarboe to his first term as a member of its Board of Directors.

JAMES P. MITCHELL

On January 17, residents of Director's Precinct 1 (Crosby, Lubbock and Lynn Counties) elected James P. Mitchell of Wolfforth to the District's Board of Directors. Mitchell, 42, farms near the Lubbock County town.

The Director, raised north of Wolfforth, graduated from Frenship High School in 1952 and studied Agriculture for two years at Texas Tech University. He farmed near New Deal from 1957 to 1959, and has farmed near Wolfforth since then.

Mitchell married the former Sylvia Wright of New Deal in November, 1954. He and his wife have two children, Cindy Jan, 17, and James Kevin, 15. Both are students at Frenship High School.

The Lubbock County farmer has been active in his community in the past. He has served as Vice President of the Frenship Co-Op Gin Board, Director of the Plains Co-Op Oil Mill, Director of the Frenship School Board and a Member of the Lubbock County FHA Loan Committee.

The Director presently farms 1,500 acres of cotton, milo and sunflowers, and operates 22 irrigation wells. When asked why he sought his position on the District's Board of Directors, Mitchell said he wanted to represent the producers and irrigators in his area in the best way he could.

"I feel the District is necessary for the purpose of protecting the groundwater resources, to ensure that farmers are fair to each other and to prevent waste.

"If we don't protect our own resources as producers, a Federal agency will take over and we can tend to our own business better than some agency foreign to our interests," he added.

The District welcomes James Mitchell to its Board of Directors.

MALVIN A. JARBOE

JAMES P. MITCHELL

Size of Texas Farms Increases

Texas Agriculture Commissioner John C. White recently estimated that Texas presently has 2,000 fewer farms and ranches than it did a year ago.

He cited Texas Crop and Livestock Reporting Service statistics that reveal there are 205,000 farms and ranches, compared to the 1975 revised number of 207,000.

White also said the total amount of farm and ranch land has remained the same—14.8 million acres—which indicates the average size has increased from 685 acres to 692 acres per farm.

EPA . . . continued from page 2

and that to only require it to meet current national standards would allow for degradation.

The Bexar County Medical Society approved a policy statement which supported "pure water", but failed to oppose development over the aquifer recharge zone. Spokesmen for the society said further examination of existing scientific data is needed before the group could take a stand against aquifer development.

Interested persons have until the middle of February to make comments on the designation (60 days after the publication of the guidelines in the *Federal Register).* Comments should be mailed to the U.S. Environmental Protection Agency, Office of Public Affairs, 1600 Patterson Street, Dallas, Texas 75201.

HIGH PLAINS IRRIGATED AGRICULTURE LEADS STATE IN PRODUCTION

by BUTCH DAVIS

The High Plains continues to dominate Texas irrigated agriculture as reported in recent publications of the Texas Water Development Board* and the Texas Agricultural Extension Service**.

In 1974, a staggering 5,900,000 irrigated acres (two-thirds of the State's total) were located in the 39-county Texas High Plains region. However, being superior is not without sacrifice, since these counties were responsible for more than 78 percent of all groundwater pumped within the State during that year.

High Plains Acreage High

The 15 counties located totally or in part within the area served by the High Plains Underground Water Conservation District No. 1 contain an impressive 2,950,000 irrigated acres (one-third of the State's total).

Furthermore, farmers in these 15 counties cultivated approximately 50 percent of the irrigated cotton, 43 percent of the irrigated grain sorghum, 54 percent of the irrigated corn and 33 percent of the irrigated wheat acreage harvested in Texas.

Since the irrigation water used in these counties is "mined' from the Ogallala aquifer (pumpage greatly exceeds the rate of natural recharge), almost every farmer has felt the "pinch" of a decreasing water supply. This situation, coupled with educational programs conceived and carried on by the District, has resulted in more and more irrigators becoming "water conservation conscious".

Underground Pipeline Extensive

This was exemplified in 1974 by the expanded use of underground pipeline to replace open ditches (in 1974 there were 11,200 miles of underground pipeline in these 15 counties—enough to outline the State of Texas nearly three times).

Additionally, published reports indicate a one-year increase of 200 new tailwater recovery systems and lake pumps, and an increase of 500 sprinkler systems. All these improvements result in decreased water use and increased groundwater conservation.

Without irrigation, the High Plains would cease to be as important to Texas agriculture as it is today. The future calls for a continuous expansion of water conservation practices to assure the continued economic success of the area.

**Inventories of Irrigation in Texas 1958, 1964, 1969 and 1974,* Texas Water Development Board Report 196, based on inventories made cooperatively by the Soil Conservation Service, U. S. Department of Agriculture, the Texas State Soil and Water Conservation Board and the Texas Water Development Board.

***1974 High Plains Irrigation Survey,* compiled by Leon New, Area Irrigation Specialist, Texas Agricultural Extension Service, Lubbock, Texas, from county irrigation surveys and other information obtained from County Extension Agents.

TWCA CONVENTION SET FOR FEBRUARY 25-27

The 32nd Annual Texas Water Conservation Association Convention has been scheduled for February 25 through 27 at the La Quinta Royale Motor Inn in Corpus Christi.

Major addresses will be by Bob Armstrong, Commissioner of the General Land Office of Texas; Dr. Thomas G. Gebhard, Director, Public Utilities Commission of Texas, and Stanley W. Legro, Assistant Administrator for Enforcement, United States Environmental Protection Agency.

Anyone wishing to obtain information concerning the convention program should contact the District at 2930 Avenue Q, Lubbock 79405, or the Texas Water Conservation Association, 202 San Jacinto Building, Austin 78701.

ELECTION . . . continued from page 1

HOCKLEY
- Billy Ray Carter, Levelland
- Leon Young Ropesville
- Robert Phillips, Levelland

LAMB
- P. A. Washington, Springlake
- Jack Stubblefield, Spade
- Larry Lockwood, Littlefield

LUBBOCK
- Don Bell, Wolfforth
- Ronald Schilling, Slaton
- Granville Igo, Shallowater

LYNN
- S. B. Rice, Wilson
- W. R. Steen, Wilson
- Wendell Morrow, Wilson

JOHN H. GARRETT

GEORGE W. McCLESKEY

TWO DIRECTORS NAMED TO TWDB

George W. McCleskey, Lubbock attorney and President of Water, Inc., and John H. Garrett of Houston were appointed to six-year terms on the Texas Water Development Board (TWDB) January 16 by Governor Dolph Briscoe.

McCleskey, the Law Member of the Board, and Garrett, Public Member, replaced Carl Illig of Houston and John H. McCoy of New Boston, whose terms expired in January.

A. L. Black Named Chairman

Governor Briscoe also appointed Friona farmer and rancher A. L. Black as President of the TWDB. Black, a former President of Water, Inc., was first appointed to the TWDB in March, 1974, for a six-year term. He replaces McCoy as Chairman.

Upon his appointment, McCleskey resigned his position as President of Water, Inc., and J. W. Buchanan of Dumas, First Vice President, assumed that position until officers are elected at the annual meeting to be held February 14 at Hereford.

McCleskey also resigned as Chairman of the Lubbock Chamber of Commerce Water Committee January 16. An attorney for the High Plains Water District, as well as counsel for the Taxpayer in the case of U. S. vs. Shurbet, which established groundwater depletion allowance for irrigation farmers within the Water District, McCleskey has been very involved in water matters.

He is a Member of the Advisory Board of the West Texas Water Institute. Member of the Lieutenant Governor's Water Resources Advisory Committee, past Chairman of the Water Committee of the West Texas Chamber of Commerce, President of Water, Inc., in 1974, and Director of the Canadian River Municipal Water Authority from 1971 until 1976.

Garrett has been President of Richmond Road and Engineering Company since 1970, Vice President of that firm from 1967 until 1970 and General Superintendent in Charge of the Highway Division from 1957 until 1967.

He has been appointed by the Houston County Commissioners' Court as Port Commissioner and to the Houston Area Rapid Transit Commission. He was a Member of the Houston Area Citizens Advisory Committee to the Texas Constitutional Revision Commission and was appointed by Governor Briscoe as Chairman of the Public Employees Study Commission.

Garrett Active in Public Role

Garrett is also a Director of the First National Bank of Deer Park, Director of the Madison-Southern National Bank of Houston and Director of Spaw-Glass, Inc. (commercial and industrial contractors).

McCleskey's and Garrett's appointments must be confirmed by the Senate at its next general session, probably in January, 1977. They join W. E. Tinsley of Austin (Finance Member), Milton Potts of Livingston (Public Member), Robert B. Gilmore of Dallas (Engineer Member) and Black (Farmer-Rancher Member) on the TWDB.

NOTICE

If you wish
to continue to
receive
The Cross Section
(see instructions on page 1)

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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Volume 22—No. 2 "THERE IS NO SUBSTITUTE FOR WATER" *February, 1976*

Mailing List Update Reminder

As noted in the January, 1976, issue of The Cross Section, *the District is in the process of updating the mailing list of this monthly publication. The purging of outdated and incorrect names and addresses is brought on by increasing printing and mailing costs, as well as an increasing number of returns from the postal service.*

The deadline for notifying the District of address changes or corrections in name is March 15. If you are interested in continuing to receive The Cross Section, *free of charge, please complete the stamped, self-addressed post card inserted in the January issue of* The Cross Section *and return it to the District as soon as possible.*

If you do not have a post card, please write the District at 2930 Avenue Q, Lubbock, Texas 79405, and give us your correct name and address and indicate if this is a new *or* old *address. Thank you.*

TWDB NAMES EXECUTIVE DIRECTOR

General James M. Rose, Director of the Division of Planning Coordination, Office of the Governor, since August, 1973, was named Executive Director of the Texas Water Development Board (TWDB) on February 5. The announcement was made jointly by Governor Dolph Briscoe and TWDB Chairman A. L. Black of Friona.

Rose, who assumed his new post February 16, succeeds Harry Burleigh, who resigned December 31, 1975.

Previously Adviser to Governor

Prior to his appointment to the TWDB, Rose advised Governor Briscoe in the areas of State and regional planning, energy, youth, water and the military. He was a member of the Governor's Advisory Council on Energy, the Governor's Task Force on Youth Care and Rehabilitation and chaired the Task Force's Support Working Group.

GENERAL JAMES M. ROSE

Chairman of Water Task Force

Rose was also the Governor's Special Advisor on Youth Affairs and the Governor's Advisor on Military Matters. He also served as Chairman of the Governor's Water Resource Conservation and Development Task Force, which was created in November, 1973.

From 1965 to 1971, prior to joining the Governor's Office, Rose was the Assistant Adjutant General of Texas for Air and directed the Air National Guard in Texas. He has worked in State government for more than 25 years in various other positions.

Career Government Employee

A native of Little Elm, Denton County, Texas, Rose is an active member of the First Baptist Church in Austin, former Treasurer of the West Austin Rotary Club, a member of the Executive Board of the Boy Scouts' Capitol Area Council and a member of the American Legion.

The Executive Director and his wife, the former Roxana Newton, have four children: Linda, a secretary at the University of Texas at Austin; Randal, Vice President of Business Development, Forum Bank, Arlington; Mark, Administrative Assistant to Senator Peyton McKnight, and Melanie, a sophomore at Southwest Texas State University.

Briscoe also named Charles D. Travis, the Governor's Budget Director, to succeed Rose as Director of the Governor's Division of Planning Coordination.

WEATHER MODIFICATION HEARINGS HELD

The Texas Water Development Board (TWDB) held public hearings in Plainview and Littlefield February 10 and 12, respectively, for the purpose of gaining information from area citizens regarding weather modification activities in West Texas.

In both hearings, opposition to such activities was obvious. Approximately 100 to 150 persons were present at each of the hearings.

Plains Weather Improvement Association (PWIA), a non-profit corporation which has been modifying weather from its Plainview base since 1973, and Atmospherics, Inc., of Fresno, California, and based in Littlefield, both have applied to the TWDB for new permits to suppress hail and augment rainfall in several West Texas counties.

Previously, permits were granted on an annual basis, with no provision for long-term contracts. However, a 1975 law passed by the Legislature allows the TWDB to grant four-year permits for weather modification activities.

Opposition Wants Vote of Citizens

Most of the opposition was voiced by farmers who felt that their rights are infringed when the TWDB grants permits for activities to take place over their property without their consent. Several representatives of county commissioners' courts asked that a vote be taken in each of the counties involved prior to the granting of permits.

The intent of the original 1967 Weather Modification Act was to encourage weather experiment operations over hail-prone and often dry areas of the State. According to that original statute, the TWDB had no choice but to issue yearly permits to any weather modification company which proved itself financially responsible and met certain technical requirements.

Voting Right Stricken from Bill

A 1975 amendment to the Act attempted to include provisions for a vote, but that measure was stricken by a Senate subcommittee after the bill, with the voting right included, had passed unanimously through the House.

At the Plainview hearing, about 20 persons spoke against weather modification, while only two persons, both officials of PWIA, spoke for it. And, in Littlefield, approximately 10 persons opposed the permits (some of the same persons who appeared in Plainview) and about 55 names were entered into the record as favoring hail suppression.

Said Don Bryant, Muleshoe farmer, "Until a year ago, I was opposed to weather modification; but, in the last six months, I have done much study and have reversed my opinion. With weather modification, we could turn West Texas into a tropical rain forest."

Modification Strictly Experimental

And, speaking for the opposition, Nolan Harmon of Bula said, "Weather modification activities are strictly experimental, not operational."

Others urged the TWDB to reject

—continued on page 3 . . . WEATHER

Texas Water Development Board (TWDB) Members John H. Garrett of Deer Park, Chairman A. L. Black of Friona and George McCleskey of Lubbock listen to testimony of proponents and opponents to weather modification activities in West Texas. The TWDB held hearings in Plainview and Littlefield on February 10 and 12 for the purpose of gaining insight into public sentiment regarding the granting of weather modification permits.

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

Telephone 762-0181

REBECCA CLINTON, Editor

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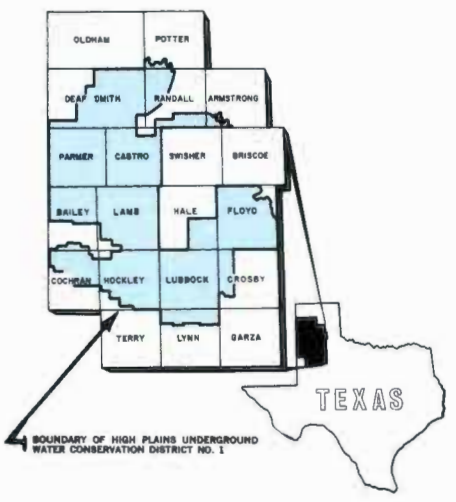

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1975-1976 Soil Moisture Data Released

O. H. Newton, Charles W. Wendt and O. C. Wilke*

A dry top layer of soil across the South Plains, combined with dry weather since last November, generally has led farmers to believe that preplant watering to get their 1976 crops started is all but certain. But such may not be the case.

A soil moisture survey of 87 locations in 14 counties across the South Plains, completed in early February, 1976, shows that a significant amount of moisture is being held in the subsurface layer from one to five feet deep.

While it is impossible to accurately determine how much moisture is needed to rewet the top five feet of soil to the point of saturation in every soil type area of the South Plains, this survey does provide an overall picture. The map below indicates that, with the exception of two or three small areas, only two to four inches of moisture is needed from now to May for adequate soil moisture in Parmer, Castro, Swisher and Dawson Counties.

Purpose and Significance of the Soil Moisture Survey

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

During the early years of 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 could lose nutrients which may be leached out of the soil.

It would be highly preferable to evaluate the soil moisture in every field in the South Plains to determine water needs; but, because this is well beyond the scope of this survey, a wide-spaced sampling technique was used.

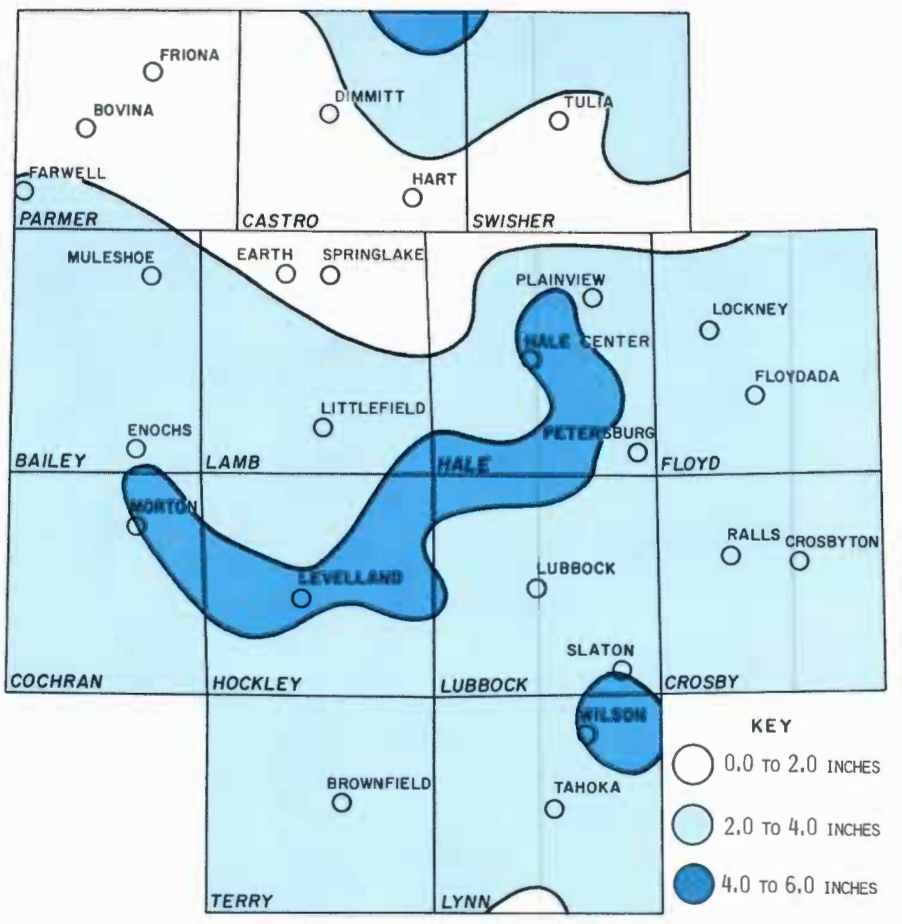
Up to 12 representative locations were selected in each of the 14 counties in which the amount of available moisture was determined. Since South Plains soils are quite variable in texture and, thus, water-holding capacity, the values found were compared to the highest values ever found during previous readings.

In most cases, this high value was recorded during the 1969-70 survey which followed an excessive rainfall period. The technique further involved the best information available on the water-holding capacity of various soils in the area. The accuracy of this technique was proven at two locations where heavy irrigation had been applied. In each case, the additional water needed to wet the soil was indicated to be very near zero.

Probability of Precipitation Filling the Need

As most farmers realize, the top 12 to 18 inches of soil is very dry in virtually all parts of the South Plains. Most areas will need from two to three

—continued on page 3 . . . 1975-1976



AMOUNT OF WATER NEEDED TO REWET THE TOP FIVE FEET OF SOIL

1975-1976 . . . continued from page 2

inches of moisture prior to planting time. This must be supplied by rainfall or irrigation in order to get the crops off to a good start. Most of that moisture will have to come fairly close to planting, in order for the crops to germinate.

In looking at rainfall patterns over the years, several outstanding features can be found. First, late fall and winter seasons are usually dry, but with an occasional wet month. Another, and probably the most significant fact, is that the bulk of the rainfall comes during the spring and summer months when the agricultural needs are greatest.

And third, rainfall patterns vary widely over the years in terms of amounts and distribution. This last feature should not cause concern, in spite of the odds in favor of sufficient rainfall occuring.

It should be noted, though, that if farmers are to take advantage of spring rains, there must be room to store the water. This means part of the soil needs to be unsaturated. Chances for rain increases rather rapidly starting the last few days of March and continuing well into May.

To get a clearer picture of this, rainfall records have been taken at Lubbock from a 55-year period and subjected to computer analysis. These records give rainfall probability from March 20 to May 31. A table showing the percent probability is presented on this page.

Effect of Rainfall and Past Season Irrigations

Several years of research provided by past soil moisture surveys have shown that the moisture in the soil below the 12- to 16-inch level changes very little during the winter months. This means that, even though the area has had no significant precipitation since last fall, the base moisture is still in moderate supply.

The reason for this moderate supply can be explained partially by what happened to our crops, especially cotton, last season. We know that moisture applied to the soil by late-season irrigations or fall rains, such as we had last fall, appear to be the most important of a crop season.

General conditions that developed last year during the summer and early fall were not favorable for cotton production, although area crops did very well. Rainfall was adequate, but not excessive. Irrigation was fairly heavy over many of the corn and sorghum fields and this, combined with moderate late season rains, added moisture to the soil that was not used by the crops.

This was especially true of cotton, much of which was prematurely defoliated in September by early, cold weather and an unusual combination of temperature, moisture and soil factors. Due to these conditions considerable deep moisture was found in the survey.

1976 Soil Moisture Data— Analysis and Significance

Reflecting on previous years, one can see more effects of deep moisture supplies on crop yields, which reveal that, given an adequate supply at this time, we can be optimistic.

Starting with an examination of the soil moisture condition prior to the 1973 production year, an average of all readings which showed the amount of water needed to rewet the soil to a depth of five feet was calculated. This average was 2.8 inches. The average for 1974 was 6.0 inches, and 1975 was 2.2 inches. The average for 1976 stands at 3.2 inches.

If we look at the cotton production records for the past three years, they show that this area produced about two million bales in 1973, about 1.2 million bales in 1974 and between 1.3 and 1.4 million bales in 1975.

We know that seasonal weather factors played an important role during each of these years, but were extremely adverse in 1975. On the other hand, the very dry soil conditions in 1974 are considered to be an extremely

—continued on page 4 . . . 1975-1976

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

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

WEATHER . . . continued from page 1

the permits unless a vote of the residents is taken. Said one farmer, "I don't object to the permits; I object to the way they are granted" (meaning without a vote of the citizens).

Also mentioned in testimony was the report, "An Evaluation of Weather Modification Activities in the Texas High Plains", prepared by the Center of Applied Geosciences, College of Geosciences, Texas A&M University, and presented to the TWDB, which revealed that "statistical analysis of rainfall data indicate that cloud seeding does not influence rainfall" nor does the hail suppression program "significantly affect cotton hail damage". (For more information, see the October, 1975, issue of *The Cross Section.)*

TWDB Chairman A. L. Black of Friona noted in the hearings that the two days of testimony was taken to give the Board an insight into public sentiment, but that "documented facts" would be weighed equally.

He also announced that, in keeping with the 1975 law dealing with such activities, an adjudicatory hearing will also be held to "explore the legal complaints of property owners who think weather control infringes on their interests."

The time and place of the hearing, where testimony will be taken under oath and witnesses will be cross-examined, will be announced at a later date.

Answering questions on the subject "Balancing Food Supplies and Population" during a public seminar in Lubbock, January 30, were, left to right, John C. White, Commissioner, Texas Department of Agriculture; Dr. Glenn Burton, USDA and University of Georgia Experiment Station; Dr. John Timmons, Professor of Economics, Iowa State University; Dr. Charles Westoff, Director of the Office of Population Research, Princeton University, and Dr. Georg Borgstrom, Professor of Food Science and Geography, Michigan State University. The theme of the seminar was "Population, Food, Water: West Texas Faces the Challenge".

Food and Water Conference Held in Lubbock

West Texas' potential for increasing world food supplies was discussed by nationally recognized authorities in food and population in a one-day public seminar in Lubbock, January 30.

The seminar, entitled "Population, Food, Water: West Texas Faces the Challenge", was sponsored by the West Texas Water Institute, the Texas Department of Agriculture, Texas Tech University, the Planned Parenthood Associations of Lubbock and Northeast Texas and the West Texas and Lubbock Chambers of Commerce.

Texas Agriculture Commissioner John C. White keynoted the seminar which he described as "a search for answers to resolve a conflict we will face by the end of this century—a conflict that is developing between two worlds—one rich and one poor".

World Conflict for Food

"On one side is the United States and other industrialized non-Communist states, whose citizens enjoy history's highest standard of living, and on the other side are about 100 underdeveloped poor states with two billion people—millions living in the shadow of death by starvation and disease," White noted.

He, as well as other speakers, pointed out that the world's growth rate will double in the next 35 years. White stated that five people are born every two seconds, or 70 million new births per year, which will bring the world population to eight billion by the year 2000.

Dr. Glenn W. Burton, known throughout the world as the developer of Coastal Bermuda pasture grass, discussed the progress in genetic research as one answer to world food shortages.

World Population Authorities Speak

Two authorities in world population studies, Dr. Charles Westoff of Princeton University and Dr. Georg Borgstrom of Michigan State University, reviewed current studies in population growth and the necessary limits of that increase.

Former United Nations consultant Dr. John Timmons of Iowa State University discussed world land resources for food production.

With the background in the world situation, the afternoon sessions were then devoted to West Texas' role in meeting world food demands,

K. Bert "Tex" Watson, President of Pioneer Corporation, presented an analysis of the area's energy situation. George W. McCleskey, Member of the Texas Water Development Board and immediate past President of Water, Inc., discussed the possibilities of transferring water to the High Plains of Texas and Eastern New Mexico.

Two possible means of conserving the area's present water supply were reviewed by Dr. Frank G. Viets, Jr., an independent agricultural consultant, and Jack Musick of the USDA Great Plains Research Center, Bushland.

Dr. Viets discussed research he has performed on the basic requirements of crops and the effects of fertilization on water used by crops. Musick discussed limited irrigation techniques and limited and no tillage methods on irrigated land.

Others participating in the program included Speaker of the House of Representatives Bill Clayton, State Senator Kent Hance, Dr. Anson R. Bertrand, Chairman of the West Texas Water Institute, and Bob Scott, Chairman of the Water Development Committee of the West Texas Chamber of Commerce.

Don Reddell Receives Agriculture Engineer Award

According to the December, 1975, issue of *Texas Aggie,* Dr. Don Reddell, Associate Professor of Agricultural Engineering at Texas A&M University since 1969, has received the "Agricultural Engineer of the Year" award from the Texas Section, American Society of Agricultural Engineers.

Reddell, Agricultural Engineer for the High Plains Water District from 1960 to 1965, heads research in animal waste management at A&M.

Says *Texas Aggie,* "Reddell's research on six-year-crop soil response to high feedlot manure application is widely quoted and his runoff research has exempted farmers from needing permits to apply manure to their land."

The professor was honored in 1974 with a certificate of achievement award from the Livestock Environmental Sciences Committee which recognized him as being in the top 10 percent of researchers of livestock management in the nation.

In behalf of the District, *The Cross Section* congratulates Don Reddell.

Water For Texas Conference Set

The Texas A&M University Centennial Year Water for Texas Conference has been scheduled for March 25 and 26, J. Earl Rudder Center Tower, College Station, Texas. The theme of the annual conference is "Water for Food and Fiber Production".

The program agenda for the two-day meeting follows.

THURSDAY, MARCH 25

MORNING SESSION—Jarvis E. Miller, Director, Texas Agricultural Experiment Station, presiding

9:45 H. O. Kunkel, Dean, College of Agriculture, Texas A&M University, "Food and Fiber Production: Technology and the Resource Base"

10:30 E. O. Heady, Professor, Department of Economics, Iowa State University "U. S. Supply Situation for Food and Fiber and the Role of Irrigation Agriculture"

11:30 ADJOURN FOR LUNCH

AFTERNOON SESSION—J. R. Runkles, Director, Texas Water Resources Institute, presiding

1:15 Ray E. Jensen, Director, NOAA-National Weather Service, Environmental Studies Service Center, "Cycles of Climate and Food Production"

2:00 Ronald D. Lacewell, Associate Professor, Department of Agricultural Economics, Texas A&M University, "Impact of Energy Cost on Food and Fiber Production"

2:40 RECESS

3:00 Don Anderson, Anderson Farms, Crosbyton, "Critical Water Issues Facing the High Plains Crop Producers"

3:30 Emery N. Castle, Vice President, Resources for the Future, Washington, D. C., "Summary and Reaction"

4:00 ADJOURN

6:30 BANQUET—Memorial Student Center, Room 225
Keynote address—Bill Clayton, Speaker of the Texas House of Representatives

FRIDAY, MARCH 26

MORNING SESSION—Fred Pfeiffer, General Manager, San Antonio River Authority, presiding

8:30 Quentin West, Administrator, Economic Research Service, U. S. Department of Agriculture, Washington, D. C., "The World Food and Fiber Situation and U. S. Position"

9:00 A. R. Schwartz, Texas State Senator, "Impact of Bays and Estuaries on Food Demand in State and Nation"

9:30 W. D. Parish, General Manager, Hidalgo-Cameron Counties WCID #9, "Irrigation Agriculture with Environmental Constraints"

10:00 RECESS

10:20 PANEL—"Competition for Water", Joe D. Carter, Chairman, Texas Water Rights Commission, panel chairman
Mack Wallace, Railroad Commissioner, "Oil and Gas Industry"
Bob Huston, Consulting Engineer, Espey, Huston and Associates, Austin, "Power Industry"
Henry Graeser, Director, Water Utilities, Dallas, "Municiple"
A. R. Schwartz, Texas State Senator, "Bays and Estuaries"

12:00 ADJOURN

Texas Water Rights Commission Executive Director Robert E. Schneider reviews groundwater maps of the District with Don McReynolds, District Geologist.

High Plains Irrigation Conference, March 9

Diminishing water supplies and the reasons for well cave-ins in the High Plains area will be discussed by District Geologist Don Smith at the High Plains Irrigation Conference, March 9 at the Hereford Bull Barn, beginning at 9:45 a.m.

Producers, agriculture specialists and industry representatives joining in the confab will also hear features of low cost pumping units, how to improve existing pumps, achieving efficient row and center pivot irrigation and relationship of soil water-holding capacity to plant growth.

Joining Smith on the program will be J. K. Childress, District Manager, FMC Corporation, Plainview; Joe Harbin of Bailey County Electric Cooperative, and Jack Musick, Agricultural Engineer, USDA Southwestern Great Plains Research Center, Bushland.

Also speaking will be Charles Schlabs, Chairman of the Deaf Smith Water Association, Hereford; Darrell Watts, Extension Irrigation Engineer, University of Nebraska, and Wayne Keese, Agricultural Engineer, Texas Agricultural Extension Service, College Station.

1975-1976 . . . continued from page 3

important factor in the low cotton production that year.

This might suggest that the survey data can be used as a predictor for estimating the potential production for the area. However, we know that other factors enter into the picture, as was the case for the 1975 crop. Certainly, area farmers can be encouraged by a good supply of soil moisture to start the season, but they can be sure that this is only the first step in producing a profitable crop.

The primary purpose of the survey relates to the preplant irrigation requirements. Fields that have a high percent of their moisture-holding capacity need less water to rewet the soil. This water may, in some cases, be provided by no more than average rainfall, but if by irrigation, the amount may be significantly reduced.

The smaller deficits shown in some areas of the 14-county area can be overcome by average rainfall, but there are also some drier areas that need more than that amount. In any case, we do know that the farmers must have a moist seedbed at planting time and, if irrigation is available, it may be necessary to apply water to assure this favorable planting condition.

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

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

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

*The authors, O. H. Newton, Charles W. Wendt and O. C. Wilke, are, respectively, Advisory Agricultural Meteorologist, National Weather Service for Agriculture, Associate Professor of Soil Physics, and Assistant Professor of Agricultural Engineering, Texas Agricultural Experiment Station, Texas A&M University Agricultural Research and Extension Center at Lubbock.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 22—No. 3 "THERE IS NO SUBSTITUTE FOR WATER" *March, 1976*

Representatives of Nebraska groundwater conservation districts and natural resource districts visited the District February 24 to study groundwater management practices in Texas. From left are Deon Axthelm, Lincoln; Gerald Ochsener, Clay Center; Carl Epp, York; Rollin Harden, Austin; Frank Rayner, District Manager; Vernon Pearson, Davenport; Roger Kreutz, Aurora; Milvern Noffke, York; Dave Aiken, Lincoln; Bob Schneider, York; Tom Votipka, Geneva; Richard Bristol, Aurora; Webb Gober, District Director from Farwell; Noel Eberspacher, Seward, and Malvin Jarboe, District Director from Floydada. (See related article and photograph on page 4.)

Groundwater Management Districts

Frank Rayner Elected President of Association

On March 12, the first Board of Directors of the Groundwater Management Districts Association met in Wichita, Kansas, and elected Frank Rayner, Manager of the High Plains Underground Water Conservation District No. 1, as its President.

In its initial meeting, the Board also elected Frank Dragoun, Assistant Manager, Central Nebraska Public Power and Irrigation District, Holdrege, Vice President, and Keith Lebbin, Executive Director, Western Kansas Groundwater Management District No. 1, Scott City, Secretary-Treasurer.

The Groundwater Management Districts Association, created in December, 1975, is a coalition of groundwater management districts and their respective boards of directors and managers. At present, the states of Colorado, Kansas, Nebraska, Oklahoma and Texas are represented. (For more information, see the November, 1974, and December, 1975, issues of *The Cross Section.*)

Other Association Directors

Other Directors, elected by state caucus, two from each state, at the December 9 and 10 Groundwater Management Workshop in Dodge City, Kansas, were Ben Saunders, Holyoke, Colorado; Gordon Thompson, Wray, Colorado; Mel Noffke, York, Nebraska; George C. Bergner, Texhoma, Oklahoma; James McCray, Panhandle, Texas; Mrs. Bonita Hoeme, Guymon, Oklahoma, and Melvin Winger, Johnson, Kansas.

The Directors unanimously passed a motion that a special commendation and letter of appreciation be presented, by Rayner, to Deon Axthelm, Cooperative Extension Service, University of Nebraska-Lincoln; DeLynn Hay, Extension Agricultural Engineer, Kansas State University, Manhattan; Dave Pope, Extension Agricultural Engineer, Kansas State University, Garden City, and Dwayne Konrad, Extension Agricultural Engineer, Colorado State University, Burlington, for the assistance they and their states' extension services gave in the creation of the Association.

The Board also appointed Axthelm, Hay and Pope as Advisers to the Board.

In other business, Rayner appointed the following committees.

1976 Groundwater Workshop or Convention — Gordon Thompson, Chairman; Ben Saunders and Dwayne Konrad, assistants. The Board indicated that some site in Colorado should be selected for the next general meeting, and the dates of December 9, 10 and 11, 1976, were suggested to be considered.

Program Committee — Mel Noffke and George Bergner, Co-Chairman, with assistance from Axthelm and Hay.

Resolutions Committee — Bergner, Chairman, Jim McCray, Assistant Chairman.

Membership Committee — Keith Lebbin, Chairman, with assistance from all Board Members.

Charter Membership Discussed

Discussion also was held regarding charter membership in the Association. President Frank Rayner was asked to develop guidelines which will be provided to all Board Members and then forwarded to interested districts and others for solicitation into the Association as a charter member.

Much of the two days of meetings was relegated to a discussion and review of the Association's bylaws, which were in draft form. After agreement on the revisions of the updated draft of the bylaws, the Board of Directors officially adopted them (as directed by those in attendance at the general meeting in Dodge City, Kansas, in December).

Anyone interested in obtaining more information about the Association should contact the High Plains Water District office, 2930 Avenue Q, Lubbock, Texas 79405.

TWCA ELECTS WEBB GOBER TO IRRIGATION PANEL

Webb Gober, Vice President of the Board of Directors of the High Plains Underground Water Conservation District No. 1, was elected to the Irrigation Panel of the Texas Water Conservation Association (TWCA) at the Association's Thirty-Second Annual Convention in Corpus Christi, February 25-27.

In that capacity, Gober will also serve a two-year term on the Association's Board of Directors.

Also elected to the Irrigation Panel was Fred Vanderburg of Pampa, Member of the Board of Directors of the Panhandle Groundwater Conservation District, White Deer.

Officers and Board Members Elected

In other business, TWCA delegates elected Franklin B. Moon, a Houston engineer, as President for 1976-1977; Carl Riehn, Executive Director, North Texas Municipal Water District, Wylie, President-Elect, and John Specht, General Manager of the Guadalupe-Blanco River Authority, Seguin, Vice President.

Others elected to TWCA's Board of Directors were Felix Ryals, White Deer, and William H. Spice, Jr., San Antonio (Groundwater Panel); J. L. Robinson, Fort Worth, and Otis Goldman, Falfurrias (Municipal Panel); James P. Murray and Robert R. Johnson, Houston (Industrial Panel); John Simmons, Orange, and Fred Pfeiffer, San Antonio (River Authorities Panel); Andrew H. Nicholaus, Victoria, and Alfred J. D'Arezzo, Austin (Environmental Panel), and Lee F. Moore, Port Arthur, and E. G. Lantz, Brownsville (Navigation Panel).

Webb Gober, right, Farwell farmer and Vice President of the High Plains Water District, and Fred Vanderburg of Pampa, Member of the Board of the Panhandle Groundwater Conservation District, White Deer, were elected to the Irrigation Panel of the Texas Water Conservation Association (TWCA) February 26. They will also serve a two-year term on TWCA's Board of Directors.

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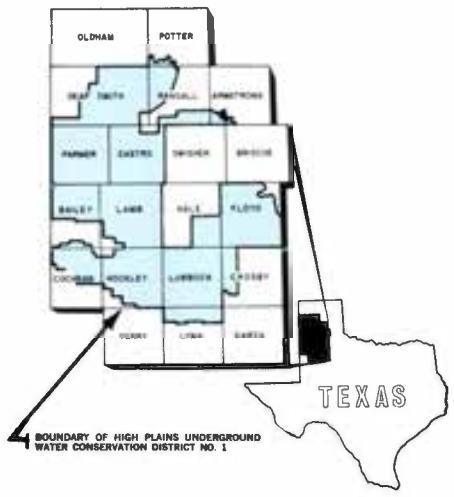

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INTERNATIONAL FOOD POLICY RESEARCH INSTITUTE ORGANIZED

In an attempt to provide better understanding of the world food picture and policies that will help increase food production and distribution, the Ford Foundation, the Rockefeller Foundation and the International Development Research Centre of Canada have established the International Food Policy Research Institute (IFPRI).

IFPRI is a non-profit research institution which will concentrate on policy problems relating to food needs of developing countries. The mandate of the Institute is to seek to identify major opportunities for expanding world food production and actions that could be taken by governments and international agencies to increase food supplies through greater production, trade and improved efficiency and equity in distribution.

A comprehensive research report released by the Institute on March 19 states, "A better balance to the food/people equation in the next decade depends almost entirely on increasing the availability of food by accelerating production in developing market economy countries and/or increasing transfers from developed countries."

The report continues, "The only feasible way for most of these countries to meet food demand—and the least costly over the long run—is to increase production more rapidly. It would require increasing the production growth rate from two percent a year to almost four percent.

"To approach this goal would require very substantial increases in investment in resources devoted to food production and greatly improved agricultural performance in the countries concerned. This will not be possible without heavy transfers of capital and technology from developed countries."

Institute Research Program Broad

The research program will fall into four broad program areas:

1) An analysis of world food trends and the basic factors underlying them;

2) Policies which influence the rate of technological change, investment and resource productivity and, thus, the food production potential in developing countries;

—cont. on page 4 . . . INTERNATIONAL

Irrigation Vital To Texas Exports

Exports of agricultural products are important to the U.S. economy as a key component in the balance-of-payments picture, as a generator of farm-related jobs and income for farm workers, as well as a creator of non-farm jobs in agribusiness and transportation.

According to economic experts, agricultural products account for 22 percent of the total exports, with agriculture's positive contribution increasing from $2.1 billion in 1965 to $12 billion in 1975.

Texas ranked fourth among the states in value of agricultural exports in 1975, behind Iowa, Illinois and Kansas.

Texas farmers' share of the $22 billion of U.S. exports of agricultural products was $1.3 billion or six percent of the total in 1975.

Irrigation is essential to continue production in Texas at its present level. Since 1970, the percentage of cash receipts from production on irrigated land has averaged about 62 percent.

In 1974 about 40 percent of the value of the Texas wheat crop was irrigated, 60 percent of the cotton crop was produced under irrigation, approximately 53 percent of our feed grains, 45 percent of the soybeans and all of our rice was produced with the aid of irrigation. Other crops important to Texas agriculture economy in which irrigation is essential are fruits, vegetables, and peanuts.

The food and fiber production from Texas' current irrigated acres and the increased production that could be realized from another 35 million potentially irrigable acres can be a powerful force in increasing the state's portion of exports.

U. S. Senator Lloyd Bentsen, second from left, visits in the offices of the High Plains Water District on March 29 to receive the public's thoughts and recommendations regarding groundwater and agricultural matters of interest to the High Plains area. From left are Board President Selmer Schoenrock, Levelland; Senator Bentsen, Malvin A. Jarboe, Director from Floydada, and James Mitchell, Director from Wolfforth. Mitchell is presenting the Senator with a packet of groundwater material.

Texas Water Development Board (TWDB) General Counsel and Hearing Examiner, Royston Lanning, conducted an adjudicative hearing in Lubbock, March 17, to accept testimony regarding two applications for permits to conduct weather modification activities on the High Plains. Testifying is Thomas J. Henderson, President of Atmosperics, Inc., of Fresno, California, one of the applicants. Seated in the foreground is Jerry Kirby, Attorney for the permit applicants.

TWDB HOLDS ADJUDICATIVE HEARING ON WEATHER MODIFICATION PERMITS

The controversial subject of weather modification received two more days of public discussion March 17 and 18 in Lubbock, when Texas Water Development Board (TWDB) General Counsel Royston Lanning conducted an adjudicative hearing to accept testimony regarding two permit applications for modification activities in West Texas.

The hearing followed two public hearings in February in Plainview and Littlefield, where mostly the same persons testified for and against the granting of the permits.

According to Lanning, also the adjudicative hearing examiner, the TWDB will rule on the applications within 60 days (following the close of the March 18 hearing).

Four-Year Permits Requested

Atmospherics, Inc., of Fresno, California, and Plains Weather Improvement Association, Inc. (PWIA), Plainview, have applied for four-year permits to seed clouds in order to suppress hail and augment rainfall.

The application for a four-year permit, rather than a one-year permit, is a result of the 1975 amendment to the 1967 Weather Modification Act which gave the TWDB the right to grant permits up to four years.

Four-Year Permit Discretionary

However, according to Lanning, the four-year permit is discretionary. "The Board can grant a permit from as short a time as one month to four years."

To apply for a permit, the applicant must be a licensed and qualified weather modifier and pay a required fee. The licensing procedure is not subject to public review.

Better Weather, Inc., of Littlefield is the sponsor for Atmospherics, Inc., while PWIA owns its own airplane, has a license, staffs its own meteorologist and sponsors itself in its application.

Volunteer Organizations

PWIA and Better Weather, Inc., are organizations funded on a volunteer basis by two groups of farmers who claim cloud seeding has reduced hail capable of wiping out their crops.

Approximately one-third of the 100 persons in the audience during the first day of the Lubbock hearing claimed opposition to the petition. Most of these men were farmers, many dryland, who felt that hail suppression also reduces rainfall.

Tom Henderson, President of Atmospherics, Inc., said he does not feel that weather modification halts rainfall and that it does reduce the occurrence of hailfall.

One Percent of Clouds Seeded

Henderson said that less than one percent of the clouds in the sky are seeded, and only 15 percent of the clouds that produce an echo on radar equipment are actually seeded.

His records show that, in 1975, 101 seeding flights were conducted on 43 days, with 152 pounds of silver iodide dispensed, while 115 observation flights were also conducted in which no seeding took place.

In other testimony, the idea once again surfaced that the citizens of the area would like to have a vote to determine whether weather modification activities should be allowed over their property. Such a referendum was attached to the 1975 amendment, but that provision, after passing the House, was stricken by a Senate sub-committee.

Target Area Counties

Atmospherics, Inc., has applied to modify weather over all or portions of Parmer, Castro, Swisher, Lamb, Hale and Hockley Counties.

The permit, if granted, would also authorize observation flights over portions of Deaf Smith, Randall, Bailey, Cochran and Lubbock Counties.

PWIA has applied to modify weather over all or portions of Castro, Swisher, Hale, Lubbock and Floyd Counties.

The permit would also authorize flights over portions of Lamb, Briscoe, Crosby, Hockley, Randall, Deaf Smith and Parmer Counties.

WATER ORDINANCE PASSED

The Panhandle City Council has recently approved a new water rate ordinance for that Carson County town.

According to the March 11, 1976, issue of the Amarillo Daily News, the ordinance provides for adjusted rates of 10 cents per 1,000 gallons for customers who use *over* 8,000 gallons per month during winter months and *over* 10,000 gallons per month during summer months.

Panhandle officials said *customers using less than these amounts will see no increase in their monthly bills.*

The water supplier said approximately 66 percent of its winter rate customers and 33 percent of the irrigation rate customers will not be affected by the increase.

Irrigation Management Service Introduced

A relatively new water management program available to farmers as a means of increasing crop yields while also cutting irrigation costs is called Irrigation Management Service (IMS).

IMS, instituted in 1973 by the U. S. Agricultural Research Service, U. S. Bureau of Reclamation, to improve irrigation efficiency, is aimed at educating the farmer as to when to apply the correct amount of water to achieve improved growth of his crop.

IMS is a means of calculating the precise amount of water that needs to be put back into the ground at a particular time to maintain the soil moisture within levels that will assure the greatest growth potential of the particular crop.

Temperature and Humidity Considered

Taken into consideration are temperature variances, solar radiation, humidity, the water need of the plants at the current stage of growth, evaporation, useful precipitation, the type and condition of the soil and other factors.

The Bureau administers IMS on several levels, from a full program that involves field men working with farmers to assure maximum benefit, to a specialized program in which evapotranspiration information is broadcast over radio stations or printed in newspapers for general areas, from which farmers may then adjust the information to arrive at irrigation needs for their particular area and crop.

IMS Promotes Water Efficiency

Initiated in the Western states by the Bureau as a means of increasing the efficiency of water used in Bureau projects, many IMS programs are administered through local water districts that contract for Bureau water.

According to the January-February, 1976, issue of *Western Water,* publication of the Association of California Water Agencies, about 25,000 acres are using IMS in California.

In the Districts where IMS is in use, the Bureau has established weather stations for monitoring local weather conditions, has provided field men to visit each field in the program every week or two and work with the local district and farmers, and provided computer time for handling all available data.

Soil Data Computerized

Thus, once the program has been established, the computer has in memory information on each field in the program, including soil conditions, crop and stage of growth of the crop. Weather information is fed into the computer on a daily basis.

The farmer is then provided a printout, available on a weekly basis, that tells him the moisture level of the soil and the precise time to irrigate, and with how much water, in order to maintain the soil moisture at the optimum level for the particular crop.

IMS Established for Water Conservation

Although IMS was originally established as a means of encouraging more efficient use of Bureau water and for water conservation, IMS, at various times of the year and for particular fields, may lead to increased water use. The program merely provides information on the amount of irrigation needed to assure optimum soil conditions for plant growth.

If a farmer has been under-irrigating, IMS will result in increased water use on his fields. If a farmer has been over-irrigating, IMS can result in savings in water use.

Therefore, observers say, the program works to provide more effective and efficient use of water, rather than to merely provide for water conservation.

With increasing energy costs, farmers are taking better advantage of water and energy conservation programs. *Recent studies indicate that tailwater return systems and playa lake modifications require 25 percent less energy than irrigation wells—resulting in an obvious savings in pumping costs.*

If you have not already done so, install a tailwater return system or playa lake pump this season and save energy and water.

Frank Rayner, District Manager, discusses groundwater conservation and management on the High Plains of Texas with Environmental Conservation students at West Texas State University, Canyon. The students expressed interest in the life of the water supply in the Ogallala aquifer and what might be done and is being done to conserve the supply for future generations of irrigation farmers. District personnel are available to present similar programs to civic groups and other educational institutions, upon request.

Directors and managers of groundwater conservation districts and natural resource districts in Nebraska exchange information regarding groundwater conservation and management in Texas and Nebraska. Following their day in Lubbock, the Nebraska group traveled to New Mexico to observe that State's system of allocation of groundwater by the State Engineer. (See related photograph on page 1.)

WEATHER MODIFICATION COURSE BEING CONDUCTED AT TEXAS TECH

The relatively new science of modifying the clouds to suppress hail and augment rainfall is being studied in the classroom by students at Texas Tech University this year.

A graduate-level course, entitled "Survey of Weather Modification", is being offered in an effort to provide a survey of the field of weather modification, with special emphasis on weather modification in the United States.

Dr. Gerald Jurica, Associate Professor of Geosciences at Texas Tech, said the course, which is not confined to Atmospheric Sciences or Meteorology students but is aimed at the student with enough technical background to be able to absorb the concepts, is being offered during the formative stages of the graduate program in Atmospheric Science.

Cloud Systems Studied

Jurica said he is interested in teaching the course from the point of view of "how we might study cloud systems and determine those properties in clouds which would lend themselves to modification".

The course consists of a brief background in the history of weather modification and the initial discoveries of modified clouds, the physics of weather modification, and the design of experiments and modification programs.

Students will also survey a series of projects attempted in the past or currently being conducted. According to Jurica, the projects will be selected on the basis of their distinguishing properties, showing successes or failures. These projects are examples of *intentional* weather modification.

Unintentional or *inadvertent* weather modification — global temperature changes and local changes brought about by the current high degree of urbanization—will also be studied.

A few weeks will also be spent on the legal and social aspects of weather modification projects.

Jurica, who was teaching Atmospheric Science at Purdue University at West Lafayette, Indiana, prior to coming to Texas Tech in 1975, is also studying synchronous meteorological satellite data to see if applying satellites to cloud systems in the South Plains may be able to complement conventional techniques of determining when to modify which clouds.

Weather Modification Controversial

"Many people are making persuasive statements, both positive and negative, regarding the results of weather modification projects," contends Jurica.

"However, there are a number of cloud processes which are not yet thoroughly understood. It is essential to continue to conduct carefully planned experiments in order to acquire the knowledge to further substantiate such statements as well as to provide guidance for future decisions regarding weather modification operations."

INTERNATIONAL . . . cont. from page 2

3) Policies which affect the total availability and distribution of food between and within countries, and

4) Policies which affect the trade and concessionary food aid flows of significance to developing countries.

World Food Data Evaluated

IFPRI's work also will involve a periodic evaluation of the world food situation. This will include policy changes at the national and international level which would affect the availability of food to developing countries. The Institute will not generate new statistics, but will concentrate on analyzing material available from numerous national and international organizations.

The Institute, formed in response to a recommendation of the Technical Advisory Committee of the Consultative Group on International Agricultural Research, is governed by an international Board of Trustees, headed by Sir John Crawford of Australia, former Vice-Chancellor of the Australian National University.

Headquartered in Washington

Dr. Dale E. Hathaway, former Professor of Agricultural Economics at Michigan State University, has been selected as Director of the Institute, headquartered in Washington, D.C.

Nebraska Delegation Visits District

Directors and managers of Nebraska groundwater conservation districts and natural resource districts toured the headquarters of the High Plains Underground Water Conservation District No. 1, February 24, for the purpose of observing and reviewing groundwater management and conservation programs in the District and in Texas.

The delegation also visited the State Engineer's Office in New Mexico to observe that State's method of groundwater management—allocation by the State Engineer.

Second Visit By Nebraska Group

The visit marked the second time a group from Nebraska has toured the District. The first visit was by the Senate Public Works Committee, in September, 1974. That committee was in the process of studying possible water legislation; and, in May, 1975, the Legislature passed the Groundwater Management Act, which gave certain regulatory powers to the groundwater conservation districts (GWCD's) and natural resource districts (NRD's).

Members of the Nebraska contingent were Deon Axthelm, Water Resources Specialist, Cooperative Extension Service, University of Nebraska-Lincoln; Gerald Ochsener, Director, Clay County GWCD, Clay Center; Carl Epp, President, Blue River Association of GWCD's and Director, York County GWCD, York; Vernon Pearson, Director, Little Blue NRD, Davenport; Roger Kreutz, Director, Hamilton County GWCD, Aurora; Milvern Noffke, Manager, Blue River Association of GWCD's, York, and Bob Schneider, Director, Upper Big Blue NRD, York.

Others Visiting Water District

Also present were Tom Votipka, Director, Fillmore County GWCD, Geneva; Richard Bristol, Director, Hamilton County GWCD; Noel Eberspacher, Director, Seward County GWCD, Seward, and Dave Aiken, Water Law Specialist, University of Nebraska-Lincoln. Also present to visit with the Nebraska group were Rollin W. Harden, Consulting Hydrologist - Geologist, Austin; Webb Gober, District Director; Malvin A. Jarboe, District Director, and members of the District staff.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

DONALD C. SIGNOR
BOX 3355
LUBBOCK, TEXAS 79410

THE Cross SECTION

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

Volume 22—No. 4 "THERE IS NO SUBSTITUTE FOR WATER" *April, 1976*

High Plains Residents Realize Need for Groundwater Management

High Plains residents are aware and have definite opinions about groundwater conservation districts and groundwater management, according to the results of a survey conducted recently by Frank L. Baird, Associate Professor of Political Sciences, Texas Tech University.

Baird and Russell E. Smith, graduate student, conducted a study in 1975, entitled "What do People Think of District and Management Policies?", the primary objective of which was to measure attitudes toward alternative public institutions for groundwater planning and management on the Texas High Plains.

Attitudes Measured in Survey

Specifically, the study measured the attitudes of irrigation farmers, urban residents and college students in the High Plains of Texas on various possible forms for the planning and management of groundwater.

Questionnaires were administered to 1500 irrigation farmers in six counties, selected so that three counties were within active groundwater conservation districts (Carson, Lubbock and Moore) and three were adjacent to, but outside of, such districts (Dallam, Gray and Hale).

Similar questionnaires were also mailed to 317 Lubbock residents selected from the city directory. Another questionnaire was administered to 438 Texas Tech students, so as to determine if there was a generation gap in opinion.

Findings of the Study

In the Lubbock survey (Lubbock was the only Texas SMSA city lying within a district), 72.6 percent of its residents were aware that the city is in a district, indicating, according to Baird, *"that the High Plains Underground Water Conservation District No. 1 has done an effective job in making its presence known to Lubbockites—and in a generally favorable light."*

Given the choices of federal, state or local control, as compared to leaving water management up to the individual farmer, 74.4 percent of Lubbockites favored local control by districts. Centralized administration of groundwater planning (federal or state) was the least preferred in all surveys.

Texas Tech Students Polled

In the survey of Texas Tech students, 71.1 percent felt that management should be at the local level, and 78.2 percent of students from the High Plains favored this form of management. Students and Lubbockites ranked the alternatives in identically the same order, indicating no appreciable generation gap.

In the survey of irrigation farmers, 77.8 percent favored local or regional government, such as districts. "In fact, this was the most favorably approved type of management and planning by more than two and one half times the next highest accepted option — management left to each individual (27.7 percent)," quotes the report.

Advantages Cited by Farmers

The farmers which preferred district control cited the following advantages: 1) minimum regulatory control by local farmers; 2) local participation is maximized; 3) they are the most democratic form of management; 4) they adhere more closely to local conditions in their policies; 5) they are the least costly, and 6) they, hopefully, will forestall direct state and federal management planning.

In farmers' response to the question about district powers, the only management power farmers overwhelmingly favored was one presently used by districts—well spacing. All others were rejected by a majority (as the chart below indicates).

Regulatory Mechanisms	*Percent in Favor*
Well Spacing	78.8
Number of wells per section	45.6
Drilling new wells	33.2
Amount of water which could be pumped	30.0
Deepening of existing wells	17.9
Number of hours or days of pumping	12.9

Regarding controls on their private property, the report states, "The perseverance of the High Plains irrigation farmer is conclusively resolved by the finding that less than one in twenty of them (4.8 percent) favors pumping out all available irrigation water and then leaving the country."

Conservation Important

Some irrigation farmers that had experienced a declining groundwater supply and then moved where the water was plentiful, felt that it was "important to stretch their groundwater supply by availing themselves of some means of public management and planning while they still had a plentiful supply."

The study revealed that, with a loss of a natural resource, comes a sense of urgency, and responses from Lubbock County indicated a "crisis-inspired sense of urgency".

One farmer credited the High Plains Water District as a "life saver concerning what little water folks around here have left". Another, in an area of strong water, concentrated on the suitability of districts to meet local needs.

"The High Plains Underground Water Conservation District is like an ordered suit of clothes. We set it up the way we wanted it and it does what we wanted it to do."

Conclusions

Finally, Baird made several overall conclusions, listed below.

"1) A pattern appears to have emerged in Texas. In those counties where irrigation is still developing and confidence in the future supply of adequate groundwater is high, there will be strong opposition to any form of public management and planning; where irrigation is well developed, farmers are more inclined to want to join a water district, and by the time groundwater depletion becomes severe, the cohesiveness of their opinions backing districts gradually dissipates and comes apart.

"2) Local districts would be well advised to attempt to expand into non-affiliated regions of the aquifer or help such regions form their own districts.

"3) In depleting areas, local districts might want to seek legislation strengthening their powers over such

—cont. on page 4 . . . HIGH PLAINS

GLEN E. RONEY APPOINTED TO TWDB

Glen R. Roney, McAllen banker, was appointed by Governor Dolph Briscoe March 18 to the Texas Water Development Board (TWDB). Roney, 45, fills the remainder of the term (to expire December 31, 1977) of W. E. "Buck" Tinsley of Austin.

Tinsley, the Finance Member of the Board since its creation by Governor Price Daniel in December, 1957, resigned April 1.

The Board's first elected Vice Chairman, Tinsley was twice appointed as Chairman—in 1964 by Governor John Connally and in 1972 by Governor Preston Smith.

Roney, President and Chief Executive Officer of McAllen State Bank, has been active in banking since 1947, at which time he became employed as a file clerk at San Benito Bank and Trust Co., San Benito, Texas.

He remained with the bank until 1961 (except for a four-year tour with the U.S. Air Force), serving as Cashier, Vice President and Loan Officer, and a Member of the Board of Directors.

In 1961, the Board Member became Vice President and Cashier at the McAllen State Bank. He was elected to the Board of Directors in 1963, was promoted to Executive Vice President and Chief Executive Officer in 1967, and in 1972 was elected President and Chief Executive Officer.

Roney also organized the Harlingen State Bank in 1972, and presently serves as Chairman of its Board of Directors.

Born in Winkler, Freestone County, Texas, Roney graduated from Corsicana High School, Corsicana, and attended Chillocothe College, Chillocothe, Missouri. Roney and his wife, Cathryn, have four children.

The Water District wishes Mr. Roney much success as the new Finance Member of the TWDB.

GLEN E. RONEY

A. W. Wyatt to Head Importation Division

A. Wayne Wyatt, Chief of the Groundwater Data Branch of the Texas Water Development Board (TWDB), was named by TWDB Executive Director James Rose to head the newly-created Water Importation Division, April 20.

Wyatt, Field Representative and Office Manager for the High Plains Underground Water Conservation District No. 1 from 1957 until 1967, has been with the TWDB in various capacities since 1968. At the time of his appointment to the new Division, Wyatt was also serving the TWDB as

—continued on page 3 . . . WYATT

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

Telephone 762-0181

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Danny Key 1980	Star Route 2, Morton
H. H. Rosson, 1980	Star Route 2, Morton

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2930 Avenue Q, Lubbock

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Alvin Morrison, 1978	Box 6, Lorenzo
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Pat Yoakum, 1980	Box 146, Lorenzo

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Garland Solomon, 1977	Rt. 5, Hereford
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Bill Cleavinger, 1979	Star Rt., Wildorado
George Ritter, 1979	Rt. 5, Hereford

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Farm Bureau, 101 S. Wall Street, Floydada

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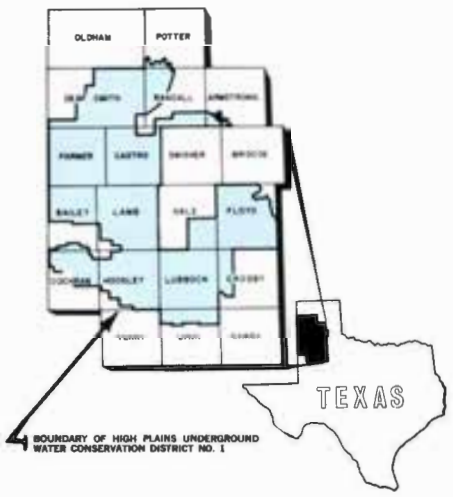
Fred Cardinal, 1978	Route 4, Floydada
C. O. Lyles, 1980	Route 4, Floydada
Connie Bearden, 1980	Route 1, Floydada
M. M. Smitherman, 1980	Silverton Star Rt., Floydada



Hale County
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Mayo Ins., 1617 Main, Petersburg

Henry Kveton, 1978	Route 2, Petersburg
Gaylord Groce, 1978	RFD, Petersburg
Clint Gregory, Jr., 1980	Box 98, Petersburg
Homer Roberson, 1980	Box 250, Petersburg
Henry Scarborough, 1980	Route 2, Petersburg

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609 Austin Street, Levelland

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Leon Young, 1980	Route 1, Ropesville
Robert Phillips, 1980	218 Redwood, Levelland

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2930 Avenue Q, Lubbock

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Don Bell, 1980	Box 114, Wolfforth
Ronald Schilling, 1980	Route 1, Slaton
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Lynn County
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2930 Avenue Q, Lubbock

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S. B. Rice, 1980	Route 1, Wilson
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Horn Insurance Agency, Bovina

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Joe Moore, 1977	Box J, Lazbuddie
Dalton Caffey, 1977	15th St., Friona
Floyd Reeve, 1979	Box 1196, Friona
Ralph Roming, 1979	809 Ridglea Dr., Bovina

Potter County

Henry W. Gerber, 1977	Rt. 1, Amarillo
Jim Line, 1977	Box 87, Bushland
Albert Nichols, 1977	Rt. 1, Box 491, Amarillo
F. G. Collard, 1979	Rt. 1, Box 433, Amarillo
W. J. Hill, 1979	Box 53, Bushland

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

Harry LeGrand, 1977	4700 S. Bowie, Amarillo
Joe Albracht, 1977	Box 81, Bushland
Leonard Batenhorst, 1977	Rt. 1, Canyon
Bill Dugan, 1979	Rt. 2, Box 30, Happy
John F. Robinson, 1979	1002-7th St., Canyon

NOTICE: Information regarding times and places of the monthly County Committee meeting 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 MANAGEMENT DISTRICTS ASSOCIATION ADOPTS CONSTITUTION

The Groundwater Management Districts Association (GMDA), created in December, 1975, is a coalition of groundwater management districts, commonly concerned with the management, development, conservation and protection of groundwater.

The first Board of Directors of the Association, comprised of directors and managers of groundwater management districts in the Great Plains States of Colorado, Kansas, Nebraska, Oklahoma and Texas, met March 12 and adopted a Constitution.

In an effort to inform the readers of *The Cross Section* of the purposes, structure and goals of the Association, that Constitution is reprinted below. (For more information on the GMDA, see the November, 1974; December, 1975, and March, 1976, issues of *The Cross Section.)*

Questions regarding the GMDA can be addressed to the Association's President, Frank Rayner, Manager, High Plains Underground Water Conservation District No. 1, 2930 Avenue Q, Lubbock, Texas 79405.

ARTICLE 1.0: NAME

The name of the Association shall be "Groundwater Management Districts Association" (GMDA).

ARTICLE 2.0: PURPOSE

The Groundwater Management Districts Association is a non-profit organization established to provide groundwater management districts, groundwater developers, users, owners, and other individuals and organizations concerned with the management, development, conservation and protection of groundwater, the opportunity to exchange ideas, develop or influence programs for the development, utilization, conservation, protection and management and control of groundwater; and in furtherance thereof the Association shall endeavor:

a) To be informed of and exchange ideas on current trends and problems as they affect groundwater, including those which have, or may have, technical, legal, administrative and economic implications.

b) To review and analyze methods and techniques employed by members and their associates in conducting studies and research on management of groundwater, and in designing and obtaining solutions to problems associated therewith.

c) To review, analyze, propose, and influence legislation and policy as they affect groundwater.

d) To evaluate activities and plans of governmental bodies, and other organizations and associations as they relate to groundwater and to take appriate action.

e) To develop and propose joint or coordinated plans of action to meet national, interstate and regional groundwater problems and needs.

f) To assess and encourage, as appropriate, the conjunctive use and management of both surface and groundwater supplies with due consideration for the unique and limiting properties of each resource.

g) To foster the general public's knowledge and appreciation for the economic advantages of the private enterprise and development of groundwater.

h) To promote orderly and equitable development, conservation and management of groundwater through local government.

ARTICLE 3.0: MEMBERSHIP

Membership in the Association shall be open to all individuals, organizations, corporations, districts, agencies, authorities, cities, towns, firms, educational institutions, and other entities interested in furthering the purposes of the Association.

ARTICLE 4.0: TYPES OF MEMBERSHIP

There shall be four types of membership: District, Organizational, Affiliate and Individual.

a) District membership is open only to those districts who have major programs and responsibilities for groundwater development, conservation and management, and which are chartered under the laws of their respective states.

b) The Organization membership is open to organizations and associations whose major purposes are the development, conservation and management of groundwater.

c) The Affiliate membership is open to those organizations, agencies, corporations, businesses or partnerships affiliated with the interests and purposes of the Association.

d) The Individual membership is open to those individuals interested in the purposes of the Association.

ARTICLE 5.0: DUES

The Membership Dues of the Association shall be set annually by the Board of Directors, and are due and payable on October 1 of each year.

ARTICLE 6.0: DUES STRUCTURE

The minimum dues for each type of membership shall be as set forth herein or as subsequently altered by the Board of Directors. Each type of membership may contribute any additional amount desired.

a) District membership dues shall be: $75.00.

b) Organizational membership dues shall be: $50.00.

c) Affiliate membership dues shall be: $25.00.

d) Individual membership dues shall be: $10.00.

ARTICLE 7.0: BOARD OF DIRECTORS AND VOTING

The Association shall be governed by a Board of Directors consisting of two members from each individual state with representation in the Association by District or Organization membership, with Board of Directors members selected by state caucuses in accordance with Article 8.0. All voting on Association matters before the Board of Directors shall be determined by the majority vote of the Directors present. Any proposition adopted by majority vote of the Board of Directors can be vetoed by a two-thirds vote of the District membership in attendance at an annual or special meeting; and a call for such veto referendum can be made by any District member. Each District shall have one vote in such a veto referendum.

ARTICLE 8.0: STATE CAUCUSES

At the beginning of each annual meeting, a state caucus consisting of the state's entire membership shall meet and elect, by majority vote of the members in attendance, two persons to serve on the Board of Directors of the Association. At each annual meeting, or any special meeting of the entire membership of the Association, each state's Directors shall call for state caucuses to present matters before the Association to such caucuses. Such state caucuses shall consider the matters presented and a majority vote of the Association membership present shall be the guide for the vote of the state's Directors on the matters before the Association.

It will be the responsibility of the states to provide for the filling of any vacancies which may occur in their respective state representation on the Board of Directors.

ARTICLE 9.0: CAUCUS VOTING RIGHTS

All members shall be entitled to vote in the state caucuses in accordance with the type of membership (Article 4.0) and as set forth below.

a) District members shall be entitled to four votes.

b) Organization members shall be entitled to three votes.

c) Affiliate members shall be entitled to two votes.

d) Individual members shall be entitled to one vote.

ARTICLE 10.0: OFFICERS

The activities of the Association shall be set and maintained by the Officers, consisting of a President, Vice President and Secretary-Treasurer. The Vice President shall

—cont. on page 4 . . . GROUNDWATER

John Arnn, Executive Director of the National Food and Fiber Institute of Achievement, holds a scale model of an exhibit explaining the history of the cotton and beef cattle industries. The exhibit, to be completed and ready for viewing in the Texas Tech University Museum in mid-September, is part of the Institute's attempt to tell the story of agriculture and its development in the United States.

NATIONAL FOOD AND FIBER INSTITUTE OF ACHIEVEMENT CREATED

Amidst the increasing awareness of the role of agriculture and its importance to this country, the Food and Fiber National Institute of Achievement has recently been created, with national headquarters in Lubbock.

The Institute, founded by the Lubbock Bicentennial Committee as a major contribution to the nation's Bicentennial celebration, is anticipated by its Board of Directors to serve a unique educational and research role.

John Arnn, the Institute's Director since January 3, 1976, said the purposes of the Institute are to tell the story of agriculture and its development in the United States, and also to explain the influence which technology, industry and science have had on the development of foods and fibers.

Impact Of Food And Fiber

"These changes in foods and fibers and the development of scientific agriculture, with its rapid changes in processing and marketing, have had a vital impact on social mores, life style, health and land use, throughout the history of this country," Arnn explained.

To follow through on this thought, the Board of Directors is basing the first segment of development of the Institute on the following concept: "To research and to communicate the development of production and processing of natural food and fiber, produced from or dependent upon the soil, throughout the history of the United States by tracing the line of development of each food and each fiber; and to recognize individuals who made a unique and significant contribution to the achievement of the current state of development."

Goals Of The Institute

Other important goals will be 1) to inform the public of the importance of food and fiber production and the significance of past, present and future development that will continue to make adequate food and fiber available to this nation and to the world; 2) stimulate awareness of and interest in the history of food and fiber production (through permanent and traveling exhibits, audio-visual programs, seminars and meetings), and 3) provide a central research and informational center for the use of the general public, students, business people and organizations, educators and scientists interested in or involved with food and fiber production, processing and use.

The Institute is designed to reach several audiences with its message. It will interpret information to the "man in the street" who is not necessarily acquainted with the contributions of agriculture. It will interpret material to school children. Attention will also be focused on persons interested in research and problem-solving and those directly involved in some area of the food and fiber industries.

Reference Center To Be Available

In order to be attractive to scholars, the Institute exhibits and interpretative visual materials will be backed by a substantial resource and reference center, which will be keyed to computer terminals in order that users of the Institute will know what resources and references are available anywhere in the U.S. on the topic of interest.

The initial series of exhibits is currently being constructed, with cooperation from Texas Tech University. One exhibit on cotton and beef cattle will be on display for two weeks in Philadelphia in May, and the other exhibit, also on cotton and beef cattle, will be completed and displayed at the Texas Tech Museum in September.

Tech Students Designing Exhibits

Bill Griggs, Director of the History of Engineering program, Department of Civil Engineering, Texas Tech, is conducting the research for the exhibits. He and a research and display staff of graduate students in the fields of museum science, park administration, engineering and agriculture, are designing and building the displays.

In order to achieve a maximum of accuracy, Griggs has developed a talking rancher and talking farmer for the Tech museum display, "so as to relate the subjects of beef cattle and cotton production to *people*".

According to Griggs, who has studied exhibits in the Smithsonian Institution and other museums, the talking manican, used in conjunction with a screen, is only the second use of the technique in the country.

Hall Of Fame To Be Initiated

As a part of its attempt to recognize distinguished achievements of contributors to food and fiber production during the past 200 years, the Institute will honor an individual, group or organization this year in the fields of cotton and beef cattle. The selection committee will judge the nominees' contributions for social, political and economic impact, significance, relevance, permanency and uniqueness.

Funding, to date, has been from the Texas Department of Agriculture, Lubbock Chamber of Commerce and Lubbock County Commissioners, with an initial grant from the Bicentennial Administration.

Future And Continuing Support

Future support will be sought from organizations and associations from within the industry, grants from Federal and State agencies and endowments from the private sector, as well as membership dues.

Membership will be open to producers, processors, manufacturers, distributors, marketers, transporters, breeders, seed producers, and associated organizations.

The first Directors of the Institute include Dr. John Bradford, Dean, College of Engineering, Texas Tech; Alton Brazell, Lubbock County Commissioner; Donald A. Johnson, Executive Vice President, Plains Cotton Growers, Inc., Lubbock; Arnold Maeker, architect; Kenneth May, Associate Editor, Lubbock Avalanche-Journal; Dr. George McBee, Soil and Crop Sciences Department, Texas A&M University; George McCleskey, attorney, and Don Workman, Senior Vice President, First National Bank, Lubbock.

Water Quality Board Seeks Answers From EPA

Legal and environmental questions have arisen at the Texas Water Quality Board (TWQB) following the U.S. Justice Department's recent ruling concerning San Antonio's territorial annexations.

According to Hugh C. Yantis, Jr., Executive Director of the TWQB, inquiries are being prepared for Russell Train, Administrator of the U.S. Environmental Protection Agency, and for John Hill, Texas Attorney General, concerning environmental and individual rights.

Train is being asked three questions. The first concerns citizens within an area which has been incorporated, but who are not allowed to vote because the Justice Department thinks their voting is not in harmony with the city's racial balance.

Question of Federal Grants

Yantis wants to know if the city is still eligible to apply for and receive Federal grants for sewage treatment plants or other improvements which affect that particular area, even though the people within the area are forbidden the right to vote in municipal elections and bond issue elections which may be part of the process.

The second question concerns unincorporated areas which have no form of government able to provide sewage service. If these people are denied the privilege of being incorporated into a city because of the Voting Rights Act, will they still be able to apply for and receive grants, or will they be denied environmental rights and Federal assistance to build treatment facilities on the grounds that they are not in an incorporated area?

Question of Incorporation

The third question involves an unincorporated area outside of a city, with population consisting of people who have moved from the nearby incorporated city. Can they be denied incorporation solely on the basis, under the Voting Rights Act, that they are a racial majority from the incorporated city, and thereby be denied environmental rights?

Since the Texas Attorney General must pass on the legality of all municipal bond issues, General Hill will be asked whether bonds will be impaired where some citizens are not permitted to vote on issues due to being disenfranchised by the Justice Department.

Can a Water District be Formed?

Another question for the Attorney General will be concerning presently unincorporated areas. Under Texas law, they cannot incorporate, or form a water district without approval of the city near them, and if they are to be forbidden annexation because of the Voting Rights Act, will they then be free to form a water district, or incorporate as a separate city regardless of whether the nearby city agrees?

Yantis views these matters as being especially important since denial of voting rights on municipal matters could occur in almost every city in Texas at one time or another. "I think these are matters which must be resolved on an entirely rational basis for the protection of the basic rights of Texas citizens," he said.

WYATT . . . continued from page 1

Assistant Director of the Groundwater Data and Protection Division.

Importation and Development Essential

In his announcement of the appointment, Rose said he created the new division "in order to achieve our mission to develop the water resources of Texas while at the same time protecting our environment and bringing about an import of water into Texas".

Rose also announced the consolidation of the Groundwater Data and Protection Division and the Water Availability Division into the new Groundwater Division. Tommy Knowles, formerly with the Water Resources Center, Texas Tech University, Lubbock, was named Director.

At the time of his appointment, Knowles was Acting Director of the Systems Engineering Division of the TWDB. While in Lubbock, Knowles was research assistant on a cooperative project between the High Plains Water District and Texas Tech, entitled "Mathematical Management Model, Unconfined Aquifer—Phase II".

Other States to be Studied

According to Wyatt, his duties will be to study all available means of importing water to the High Plains. "We will study other states to see if they have any excess water that we can buy," said Wyatt.

"Water is a valuable commodity, like oil and gas developed in Texas. I would like to see it delivered to the High Plains for a reasonable price, like we export gas for a reasonable price that people can afford."

Future Water Supply Uncertain

In his statement to the TWDB in its April meeting in Houston, Rose said, "The most recent Water Development Board staff studies show that the water requirements in the year 2020 to meet the needs for cities (homes),

—continued on page 4 . . . WYATT

Ogallala Aquifer in Hale County Studied

The future course of groundwater depletion in Hale County and its effects on groundwater production are projected through the next 44 years in a report recently released by the Texas Water Development Board (TWDB).

Report 200, "Analytical Study of the Ogallala Aquifer in Hale County, Texas", written by A. Wayne Wyatt, Ann E. Bell and Shelly Morrison, is the first of more than 40 planned county studies to be devoted to the declining supply of groundwater in the Ogallala aquifer, High Plains of Texas.

Residents Are Well Informed

According to the TWDB, "Essentially every High Plains resident is well informed on the continuing decline of the region's groundwater, and knows that this is the lifeblood of the area's irrigation farming. Yet, serious questions have remained in the minds of some concerning how long these supplies might actually last and how urgent is the need to implement conservation measures."

Regarding the need to implement additional conservation practices in the county, the following conclusions were reached by the authors.

"The Ogallala aquifer in Hale County contained approximately 11.9 million acre-feet of water in 1974. Historical pumpage has exceeded 300,000 acre-feet annually, which is approximately ten times the rate of natural recharge to the aquifer in the county. This overdraft is expected to continue, ultimately resulting in reduced well yields, reduced acreage irrigated, and reduced agricultural production.

Groundwater Unevenly Distributed

"There is a very uneven distribution of ground water in the county. Some areas have ample ground-water resources to support current usage through the year 2000; whereas, in other areas of the county, ground water is currently in short supply.

"To obtain maximum benefits from the remaining ground-water resources, *Hale County water users should implement all possible conservation measures so that the remaining groundwater supply is used in the most prudent manner possible and with the least amount of waste.*"

Guidelines provided in the report were obtained by the use of modern electronic computers that simulate the aquifer's behavior and the TWDB hopes the guidelines will provide the groundwater user in the county with reasonably good estimates by which future management decisions can be made.

Groundwater Supply Will Decline

Hale County had about 11.9 million acre-feet of groundwater in 1974. The computer study shows that 36 percent, or only 4.4 million acre-feet, will be left by 2020 if past water-use patterns and aquifer behavior continue in the future.

The report says the groundwater supply is not expected to be totally depleted anywhere in the county, but yields of wells will decrease and the expense of irrigation pumpage will climb. Pumping lifts in wells, which now range from 100 to 300 feet, will approach 400 feet in some local areas by 2020.

Annual Pumpage Should Also Decline

The report further states that, with the thinning of the aquifer's saturated thickness, annual pumpage of irrigation water in the county will decline significantly. Compared to the 332,000 acre-feet of water produced in 1974, the amount expected to be produced in 2020 is about 185,000 acre-feet—a decline of 44 percent.

These findings, the authors emphasize, are based on the continuation of past trends. Future events can be very different if these trends change, the authors say.

Copies of Report 200 are available, without charge, from the Texas Water Development Board, P.O. Box 13087, Austin 78711.

WYATT . . . continued from page 3

industries, cooling electric power plants and just to maintain our present level of irrigated agriculture will be in excess of 30 million acre-feet".

"If we develop the in-state water resources to the fullest extent possible, using present and foreseeable sources of funds, we will only be able to meet the projected municipal and industrial needs."

Rose continued, "We cannot continue to support irrigated agriculture at its present level much beyond the year 2000, because a large part of this industry in Texas is using water from the Ogallala aquifer of the High Plains. To meet our future needs and provide for growth, we have to develop Texas' water resources to the fullest and find ways to import fresh water to Texas.

Search for Water at Higher Altitude

"In the Importation Planning work, we shall be searching for a source of water at a higher altitude than the Lower Mississippi, *keeping in mind that the present plan from the Lower Mississippi has been developed and can be updated and implemented at any time. It has not been abandoned.*"

The Executive Director added, "As you know, the Texas High Plains is Texas' leading agricultural area since this area produces approximately 66 percent of the cotton, 53 percent of the grain sorghum, 72 percent of the wheat and 82 percent of grain fed beef produced in Texas.

Depletion Predicted in 30 Years

"And we also know, the groundwater supply which supports this irrigation will be seriously depleted during the next 20 to 30 years, necessitating an import of water to this area to sustain agricultural production and the State's food supply.

"We plan to study all possible alternatives and find the 'best' plan to achieve our goals of importing water to the Texas High Plains and other areas that need it. *If no better way can be found, then we shall return to the Trans Texas System for further consideration, because we must import water. We can't move land,*" Rose concluded.

HIGH PLAINS . . . cont. from page 1

things as limitations on pumping and relaxation of limitations on their taxing authority. Meanwhile, they could vigorously utilize those powers they already possess.

"4) In cities within local districts, there is considerable latent support for such districts since many city residents realize the need of a prosperous agricultural base for the city's economy. Yet they feel they should have a greater opportunity to participate in the affairs of the district. There is an inconsistency since so few city dwellers participate when given the opportunity such as in elections.

"5) Among college students, those from farms and urban areas on the High Plains support districts. However, those from the more distant portions of the state and, particularly from the large cities, tend to favor state groundwater management over districts. The gap is primarily geographical rather than generational. The age of the students (18-19 years old) would indicate that they largely reflect their parents' views, which carries with it even more significant implications.

"6) The stark reality is that the votes lie not among Plainsmen but in the large cities off the Ogallala. In view of this indisputable fact plus the findings among young college students from Texas' large cities, the future course of local districts will probably be decided largely by the voters of the big cities and their representatives."

For copies of the report, contact the District office at 2930 Avenue Q, Lubbock 79405.

GROUNDWATER . . . cont. from page 2

also serve as President Elect and shall assume the office of Presidency whenever vacated by the President.

ARTICLE 11.0: TERMS OF OFFICE

All officers shall serve for one year, except for the provisions for the accession of the Vice President to the Presidency, and all officers shall be elected at each annual meeting by majority vote of the Directors in attendance.

ARTICLE 12.0: DUTIES OF OFFICERS

The Officers of the Association shall, until employment of a Manager, perform all of the routine functions of the Association and the Officers can select one such officer to act as Manager of the Association

- *a) The President shall preside over all meetings of the Board of Directors, and shall sign checks for the Association in accordance with c) below.*
- *b) The Vice President shall record all proceedings of the meetings of the Board of Directors.*
- *c) The Secretary-Treasurer shall be responsible for the maintenance of the financial affairs of the Association, signing all checks, and in conjunction with the President, sign all checks for expenditures exceeding $500.00.*
- *d) The President or Vice President of the Association can call for a meeting of the Board of Directors upon 15-day written notice to all Directors.*
- *e) The President shall appoint all Committees, and set their duties.*

ARTICLE 13.0: MEETINGS OF THE ASSOCIATION

- *a) There shall be an annual meeting of the entire membership to carry out the purposes of the Association and to present matters before the Association to the state caucuses. The date for such annual meeting shall be set by the Board of Directors with a minimum of 30-day notice of the meeting to be provided to the membership.*
- *b) Special meetings of the entire membership may be called as deemed necessary by the Board of Directors with a 15-day notice of such meetings provided to the membership.*

ARTICLE 14.0: AMENDMENTS

These Articles of Association may be amended or repealed in whole or in part upon the two-thirds vote of the Board of Directors, and suggested amendments or repeal, may be made by a majority vote of members present at any annual meeting of the membership of the Association in accordance with Articles 8.0 and 9.0.

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 22—No. 5 "THERE IS NO SUBSTITUTE FOR WATER" *May, 1976*

District Field Representative Butch Bates measures the depth to water in an observation well by inserting a steel tape into the well. Each January, the District conducts such measurements in more than 800 wells lying within the boundaries of the District as a part of the observation well program. The measurements are taken in order to determine the water-level declines or rises within the District during the past year.

Annual Water Statement, 1975-1976

by DON McREYNOLDS

The annual depth-to-water measurements in "observation" wells located within the boundaries of the High Plains Underground Water Conservation District No. 1 were completed by District personnel in January. Of the 815 observation wells included in the District program, 93.7 percent were successfully measured during the 1976 measuring season.

An observation well is a privately owned well (none are owned by the District) which has been selected for inclusion in the annual water-level measuring program. These wells are selected at spaced intervals and of adequate density to present data on water-level changes for areas within the District.

Most Wells Operational

Most of the wells are operational irrigation wells; however, a few abandoned wells and domestic supply wells are also included in the program.

It is important to note that the wells selected for inclusion in the District's water-level program are located within the boundaries of the High Plains Underground Water Conservation District No. 1 and do not necessarily reflect water levels for an entire county. For example, only a small portion of Armstrong County lies within the boundaries of the District; therefore, the measurements of the few wells selected in that county reflect changes in water levels for those wells only—*not* for the entire county.

—continued on page 3 . . . STATEMENT

Continued Agricultural Production Essential to U.S. Economy

Exports of agricultural products continue to be important to the U.S. economy because of a need to balance a massive fuel and mineral resource import bill. As a counter-weight to these fuel imports, the only U.S. commodity for which a comparable expanded foreign market exists is food.

According to economists, agricultural exports are not only beneficial to the U.S. balance of payments, but also the sale of U.S. agricultural products in foreign countries means income for American farmers and additional jobs for farm workers in agri-business, storage, transportation and handling of crops as they are moved from farms to seaports.

Economist Discusses Export Values

Dr. Herbert Grubb, Economist with the Texas Water Development Board, Austin, says the U.S. balance of payments represents the amount by which the value of exports of all goods and services exceeds the value of our imports of all goods and services.

As most economists will readily point out, the deficit in the U.S. balance of payments has been caused by an increase in prices for crude oil and an increased demand for importation of crude oil to the United States. In 1970, the value of petroleum and petroleum products imported by the U.S. was $2.77 billion; by 1975, such imports had increased to approximately $25 billion.

Agricultural Exports Increasing

Likewise, the value of agricultural exports has increased from $6.2 billion in 1965 to $22 billion in 1975, with most of the growth since 1970. In 1975, agricultural products accounted for approximately 22 percent of the total exports, with exports increasing from $27.5 billion in 1965 to $106.6 billion in 1975.

Net exports of agricultural products (agriculture's positive contribution to the balance of payments) increased from $2 billion in 1965 to $12 billion in 1975 — an increase of 471 percent.

Feed Grains Pass Cotton Exports

In 1975, Texas ranked fourth among the states in value of agricultural exports, behind Iowa, Illinois and Kansas. For years, Texas' major export crop (in dollar value) was cotton, but in 1975 cotton, with an export value of $240.1 million, was passed by feed grains, with an export value of $370.7 million.

Other major crops exported from Texas in 1975 were rice, with an export value of $238.5 million; wheat, with an export value of $152.7 million, and soybeans, with an export value of $26.2 million. Exports of fruit and vegetables and their by-products amounted to $29.1 million in 1975.

Texas farmers' share of the $22 billion of U.S. exports of agricultural products was $1.3 billion, or six percent of the total in 1975. This figure represents 28 to 30 percent of the State's value of crops and livestock products.

Irrigation Necessary To Production

According to Grubb, irrigation is necessary to continue production of Texas' crops at present levels. The percentage of cash receipts from crop production on irrigated land has varied from year to year, depending on weather conditions and the development of irrigation systems technology, but it has averaged about sixty-two percent since 1970."

In 1974 about 40 percent of the Texas wheat crop, 60 percent of the cotton crop, 53 percent of the feed grains, 45 percent of the soybeans and all of the rice was produced with the aid of irrigation.

Said Grubb, "The food and fiber produced on Texas' current irrigated acreage and the increased production that could be realized from the 35 million potentially irrigable acres, can be a powerful force in increasing the State's exports."

The second important contribution of agricultural exports to the U.S. economy is the impact it has on farm income and farm jobs. In 1974, approximately 23 percent of U.S. farmers' cash receipts were from export sales.

Percentages Of Crops Exported

In terms of acreage, 96 million acres —or three of every ten acres harvested in 1974 — produced crops for the export market. Fifty-eight percent of the 1974 wheat crop was exported, as well as 56 percent of the rice crop and 48 percent of the soybean crop.

Said the economist, "The increased foreign demand for our agricultural products has played an important role

—continued on page 2 . . . ECONOMY

TWDB Approves Weather Modification Permits

The Texas Water Development Board (TWDB) has approved two controversial permits to conduct weather modification activities on the High Plains of Texas. Granted permits during a special TWDB meeting May 7 were Plains Weather Improvement Association, Inc. (PWIA), of Plainview, and Atmospherics, Inc., of Fresno, California, and based in Littlefield (sponsored by Better Weather, Inc.)

The approval of the permits followed months of hearings in Littlefield, Plainview and Lubbock, at which time proponents and opponents expressed their views about the merits of weather modification. (For additional information, see the February, 1976, and

—continued on page 2 . . . TWDB

THE Cross SECTION

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

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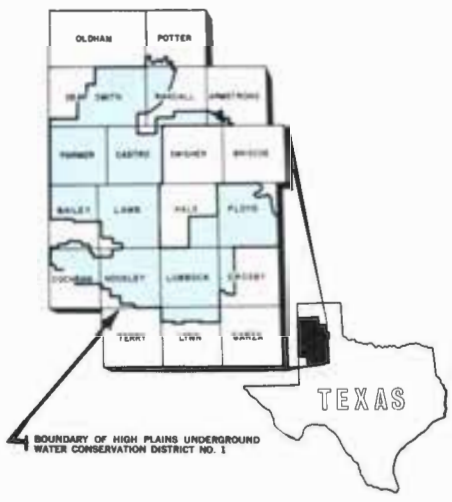

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Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)

Selmer H. Schoenrock, President — Levelland

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)

A. W. Gober, Vice President — Farwell

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)

Billy Wayne Sisson, Secy.-Treasurer — Hereford

Precinct 5

(FLOYD and HALE COUNTIES)

Malvin A. Jarboe — Floydada

COUNTY COMMITTEEMEN

Armstrong County

Guy Watson, 1977	Wayside
C. D. Rogers, 1977	Wayside
Bill Heisler, 1977	Wayside
Charles Kennedy, 1979	Rt. 1, Happy
Cordell Mahler, 1979	Wayside

Bailey County

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Adolph Wittner, 1977	Star Rt., Baileyboro
Jessie Ray Carter, 1977	Rt. 5, Muleshoe
Marshal Head, 1979	Rt. 3, Muleshoe
Harold Layton, 1979	Rt. 2, Morton

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City Hall, 120 Jones St., Dimmitt

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Anthony Acker, 1979	Rt. D, Nazareth
Glenn Odom, 1979	Rt. 4, Box 136, Dimmitt

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

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Robert Yeary, 1978	Route 2, Morton
Hershel M. Tanner, 1980,	Route 2, Box 36, Morton
Danny Key 1980	Star Route 2, Morton
H. H. Rosson, 1980	Star Route 2, Morton

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2930 Avenue Q, Lubbock

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Alvin Morrison, 1978	Box 6, Lorenzo
Tommy McCallister, 1980	209 N. Van Buren, Lorenzo
Edward S. Smith, 1980	102 N. Van Buren, Lorenzo
Pat Yoakum, 1980	Box 146, Lorenzo

Deaf Smith County

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

James E. Higgins, 1977	200 Star St., Hereford
Garland Solomon, 1977	Rt. 5, Hereford
W. L. Davis, 1977	Box 312, Hereford
Bill Cleavinger, 1979	Star Rt., Wildorado
George Ritter, 1979	Rt. 5, Hereford

Floyd County

Helen Bertrand, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

Joe Cunyus, 1978	Lockney
Fred Cardinal, 1978	Route 4, Floydada
C. O. Lyles, 1980	Route 4, Floydada
Connie Bearden, 1980	Route 1, Floydada
M. M. Smitherman, 1980	Silverton Star Rt., Floydada

Hale County

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

Henry Kveton, 1978	Route 2, Petersburg
Gaylord Groce, 1978	RFD, Petersburg
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Homer Roberson, 1980	Box 250, Petersburg
Henry Scarborough, 1980	Route 2, Petersburg

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Jim Montgomery, Secretary
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J. E. Wade, 1978	Route 2, Levelland
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Billy Ray Carter, 1980	Route 5, Levelland
Leon Young, 1980	Route 1, Ropesville
Robert Phillips, 1980	218 Redwood, Levelland

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Calvin Price, Secretary
620 Hall Avenue, Littlefield

Billy J. Langford, 1978	Box 381, Olton
Edward Fisher, 1978	Box 67, Sudan
P. A. Washington, 1980	Box 124, Springlake
Jack Stubblefield, 1980	Box 397, Spade
Larry Lockwood, 1980	Star Rt. 2, Littlefield

Lubbock County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Dan Young, 1978	4607 W. 14th St., Lubbock
Clifford Hilbers, 1978	RFD, Idalou
Don Bell, 1980	Box 114, Wolfforth
Ronald Schilling, 1980	Route 1, Slaton
Granville Igo, 1980	Route 1, Shallowater

Lynn County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

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Freddie Kieth, 1978	New Home
S. B. Rice, 1980	Route 1, Wilson
W. R. Steen, 1980	Route 2, Wilson
Wendell Morrow, 1980	Route 1, Wilson

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Ken Horn, Secretary
Horn Insurance Agency, Bovina

Troy Christian, 1977	Rt. 1, Farwell
Joe Moore, 1977	Box J, Lazbuddie
Dalton Caffey, 1977	15th St., Friona
Floyd Reeve, 1979	Box 1196, Friona
Ralph Roming, 1979	809 Ridglea Dr., Bovina

Potter County

Henry W. Gerber, 1977	Rt. 1, Amarillo
Jim Line 1977	Box 87, Bushland
Albert Nichols, 1977	Rt. 1, Box 491, Amarillo
F. G. Collard, 1979	Rt. 1, Box 433, Amarillo
W. J. Hill, 1979	Box 53, Bushland

Randall County

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

Harry LeGrand, 1977	4700 S. Bowie, Amarillo
Joe Albracht, 1977	Box 81, Bushland
Leonard Batenhorst, 1977	Rt. 1, Canyon
Bill Dugan, 1979	Rt. 2, Box 30, Happy
John F. Robinson, 1979	1002-7th St., Canyon

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

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District Manager Frank Rayner (right) and Don Smith, District Geologist (left), visit with Kenneth D. Frederick, Resources for the Future, Inc., Washington, D.C. Frederick was in Lubbock to study the problems High Plains irrigation farmers face and what can be done to maintain the current high level of agricultural production.

TWDB . . . continued from page 1

March, 1976, issues of *The Cross Section.)*

TWDB Legal Counsel Royston Lanning, who conducted the adjudicative hearing in Lubbock on March 17 and 18, made the following basic findings in his report to the TWDB.

Three Basic Findings

"The proposed operations will not dissipate clouds, and, in fact, probably cannot dissipate them by silver iodide seeding.

"The operations will not prevent the natural course of developing rain from the clouds in the areas where the operations are to be conducted, but may change the form of precipitation from hail, to rain, and will probably increase the rainfall.

"There will be no material detriment to persons or property in the area of the proposed operations from diminished rainfall, but there may be benefits from the elimination of hail."

Lanning also noted that lay witnesses on both sides felt that the seeding operations could not show clouds had been dissipated and who sincerely believe that precipitation has been and will be modified by cloud seeding operations.

—continued on page 4 . . . TWDB

Crop Reports Needed

During the last of May, a random sample of some 24,000 Texas farmers was mailed a crop acreage questionnaire from W. H. Walther, Agricultural Statistician in Charge of the Texas Crop and Livestock Reporting Service, Austin.

A cooperative effort of the U.S. Department of Agriculture's Statistical Reporting Service and the Texas Department of Agriculture, the questionnaire will be the basis for determining the planted acreage for the State of Texas and for each county in the State.

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

Farmers who received questionnaires are urged to complete and return them by mail. All individual reports are confidential and are used only for tabulating State and county totals.

ECONOMY . . . continued from page 1

in reducing our large surplus of commodities and has allowed our farmers to plant fence-to-fence and still receive a fair price for their crops without government price support programs. Thus, the policy of selling our surplus commodities in the world market at a price established by world supply and demand has replaced our previous programs of subsidizing American farmers with tax dollars."

Favorable Impact On Farm Prices

Foreign demand for U.S. agricultural products has had a favorable impact on farm prices, and, therefore, farm income. Prices of major export crops rose significantly between 1972 and 1973. For example, wheat went from $1.56 per bushel to $3.04, rice went from $6.44 per cwt to $14.80, cotton rose from 23 cents per pound to 46 cents per pound, and grain sorghum increased from $2.39 per cwt to $3.73.

And, higher crop prices mean more gross farm income. *At 1973 levels of production, the price increase for the State's leading crops added $1.2 billion to the gross farm income in Texas — while approximately $691 million of this increase went to producers of irrigated crops.*

Dr. Russell McDonald, Marketing Economist with the Texas Agricultural Extension Service, Texas A&M University, College Station, says that, "In addition to being the main contributor to the United States' trade balance, agricultural exports spawn added business activity in the country.

Two Dollars Returned For One

"Agricultural products at the port of shipment were worth $22 billion last year and generated an additional $21 billion worth of business in the U.S. in the form of goods and services needed to produce these exports. *This means that, for every dollar's worth of agricultural exports, almost another dollar was generated in other areas of the economy.*

"The $21 billion spinoff included $6 billion in the farm sector, $2 billion in food processing, $5 billion in other manufacturing services, $2 billion for trade and transportation, and $6 billion for various other services. According to the U.S. Department of Agriculture estimates, about 70 per-

—continued on page 4 . . . ECONOMY

STATEMENT . . . continued from page 1

A vinyl tag was attached to the well-head equipment of each measured well. The tag contains the observation well identification number and the measured depth to water, in feet below land surface. The measurement tag is a convenient device employed by the District to inform the well owner or operator of the depth to water in the measured well.

The data collected is also available in the District's Lubbock office for public inspection and use. In addition, historical water-level measurements are maintained in the District's Lubbock office, and personnel will discuss the data with interested parties.

Utilization of Data

An important utilization of the annual depth-to-water measurements is in preparation of the guidelines for calculating cost-in-water depletion for income tax purposes. Averages of the recorded changes in water levels in observation wells are the basic data used in preparation of these approved guidelines.

However, use of the yearly measurements in determining a value for depletion claims on income tax returns is not acceptable. The most readily approved guidelines within the boundaries of the District are contoured county maps or the parcel claim information provided as an additional service by the District.

Average changes in the depths to water recorded in January of 1976 as compared to the averages of ten measurement years are presented on the map, "Average Decline or Rise of the Water Table Within the High Plains Underground Water Conservation District No. 1". It is worthy to note that six counties for the 1975-1976 period exceeded the ten-year county average decline. These counties include Armstrong, Castro, Deaf Smith, Hale, Parmer and Randall.

Correlation Noted

An interesting coincidence or possible correlation was noted in Deaf Smith and Randall Counties, which recorded the two greatest departures above the ten-year average annual decline. National Weather Service records of total precipitation received during 1975 at two reporting stations, one in each of these two counties, show a departure of from just less than five to more than six inches of precipitation below the average annual precipitation for the area.

Undoubtedly, there are a considerable number of factors which could account for the apparent increase in water-level declines, but a lack of precipitation could have significant effect upon the amount of water pumped for irrigation during a crop year.

The remaining nine counties within the District exhibited an average water-level decline for 1975 of less than the ten-year average annual decline for corresponding counties. Five of these nine counties (Bailey, Crosby, Floyd, Lamb and Potter) did record some continued average decline.

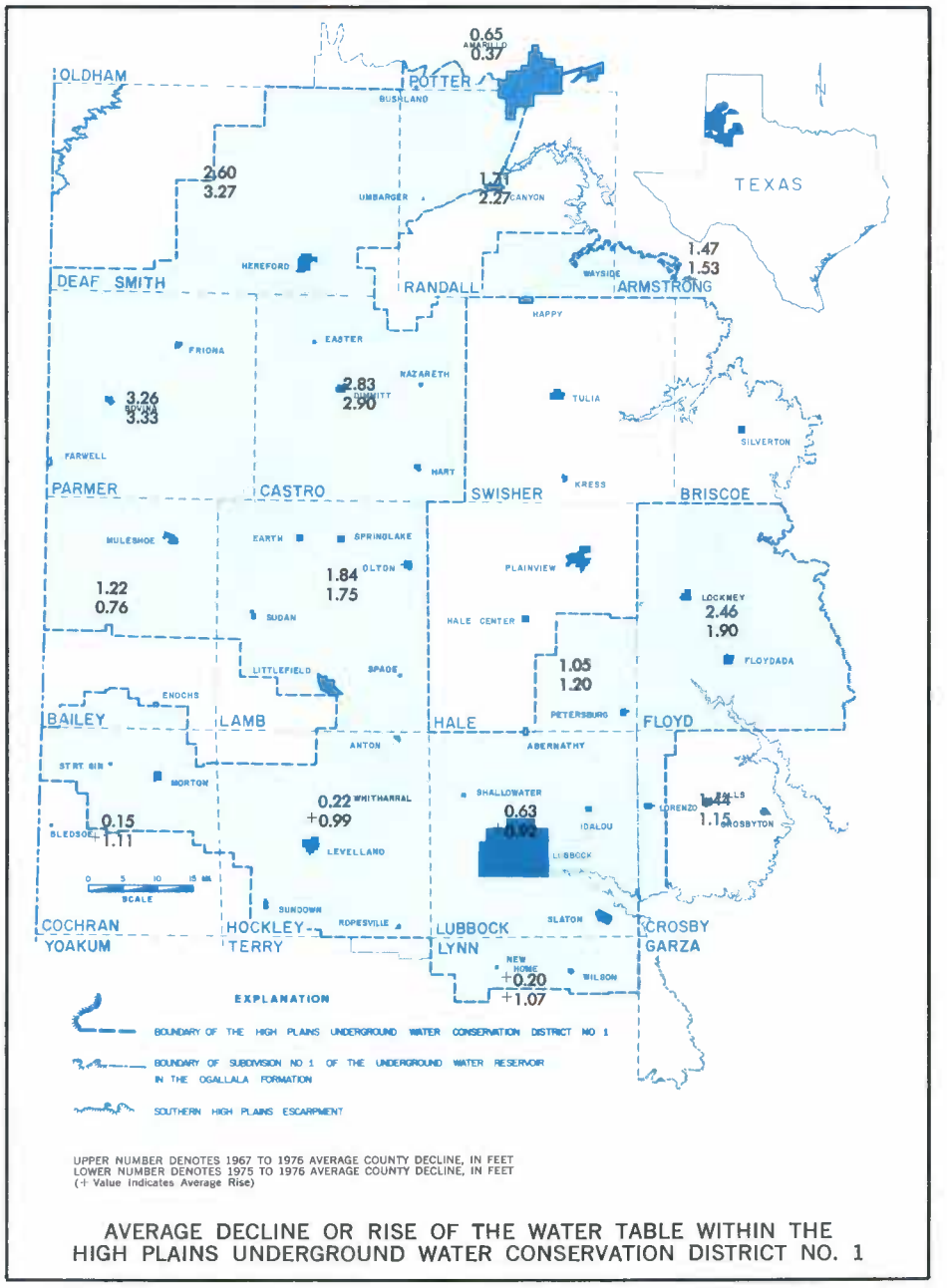
Cochran, Hockley, Lubbock and Lynn Counties exhibited a relative decrease in average decline to the extent that an average net rise (plus [+] value for a decline indicates a water-level rise) for 1975 was shown.

Apparent Average Rises

Apparent average rises in the water levels in observation wells in some counties probably do not reflect a recharge to the aquifer. Most often these apparent rises result from the accumulated effect of the variable cycles of pumping and resting periods of wells.

As an example, suppose that an observation well was measured in January, 1975, after recent pumpage and actual static water level had not fully been attained. If this same well were measured in January, 1976, following a longer resting period since last being pumped, the net difference between the depth to water in January, 1975, and January, 1976, could reflect a rise in the water table.

A significant number of these circumstances occurring in any one county can be reflected as an average rise in the water table. As a result of this and similar phenomena, the total record of water-level measurements of an observation well often has more significance than individual annual measurements.



AVERAGE DECLINE OR RISE OF THE WATER TABLE WITHIN THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1

The table, "Summary of Water-Level Measurements", presents the minimum and maximum depths to water in each county for 1967 and 1976. The average depth to water for all wells measured in each of the counties for both years is also included in the table. In order to reflect the amount of data used to determine the average depth to water for each county, the number of wells from which measurements were used each year is also included in the table. (See page 4.)

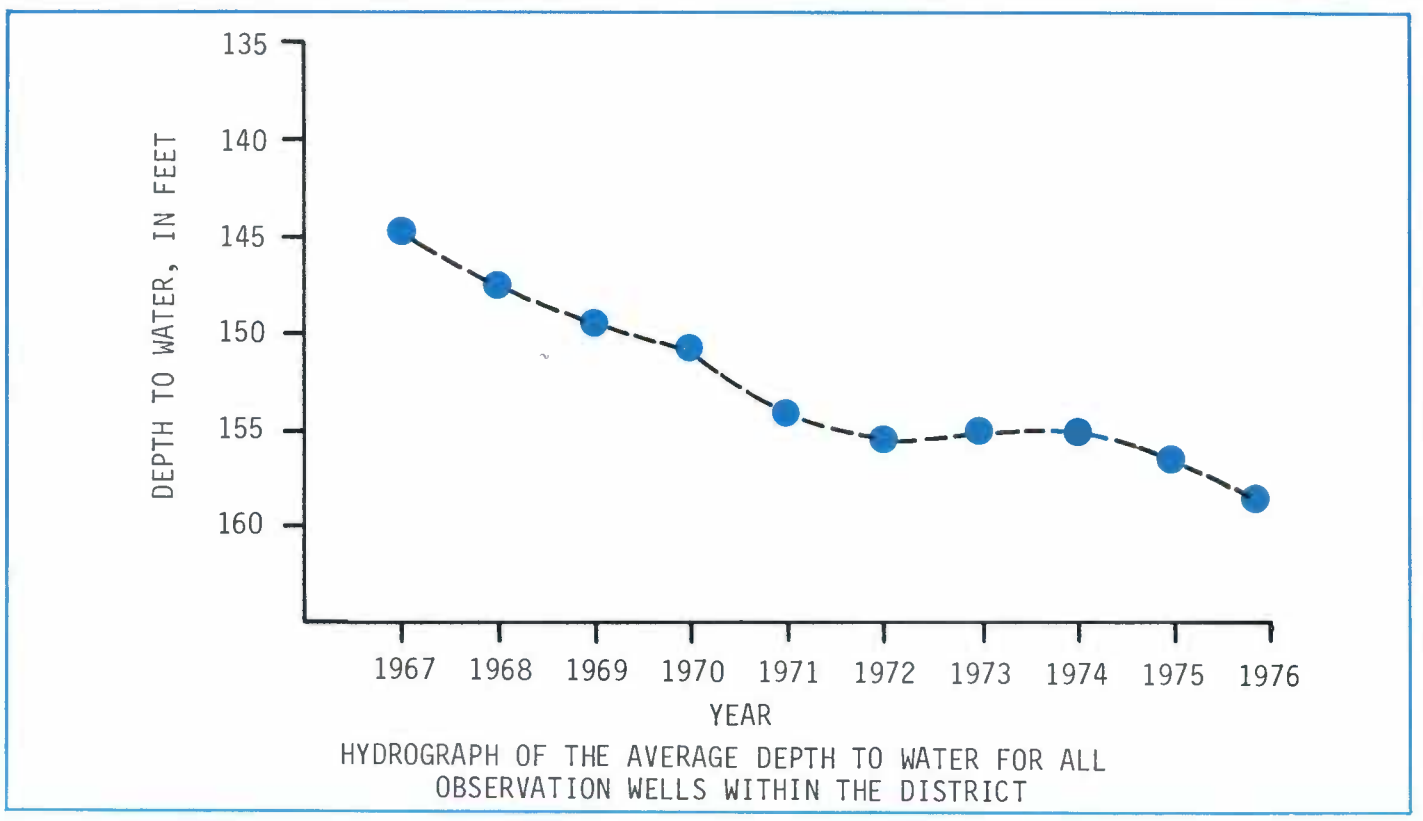
With the exceptions of Lynn and Potter Counties, all counties within the District exhibited an average depth to water in 1976 which exceeded the average depth to water for each county in 1967.

Differences Noted

The county showing the greatest difference between the average depth to water in 1967 and the average depth to water in 1976 was Parmer, with 30.3 feet difference. This county was followed by Floyd with 20.3 feet and Deaf Smith with 19.3 feet.

The graph, "Hydrograph of the Average Depth to Water for All Observation Wells Within the District", presents a summary of the average depths to water for all counties since 1967. The vertical scale of the graph represents depth to water, in feet, while the horizontal scale represents time in one-year increments.

The degree of slope of the dashed line between points indicates the severity of the average decline of the water table per year. A greater slope indicates more average decline while, conversely, a lesser slope portrays a decrease in decline. It would appear that the period 1975 to 1976 experienced very similar average water-level changes to that of the period 1974 to 1975.



HYDROGRAPH OF THE AVERAGE DEPTH TO WATER FOR ALL OBSERVATION WELLS WITHIN THE DISTRICT

ECONOMY . . . continued from page 2

cent, or $15 billion, accrued to non-farm segments of the economy."

Exports Benefit Non-Farm Employment

The third important area in which agricultural exports benefit the economy is in non-farm employment. Many jobs in Texas and the U.S. are somehow dependent on foreign demand for agricultural products.

In 1974, a total of five percent of the American work force (1.2 million workers) was involved in some way in the agricultural export picture, with four percent producing food and related products and one percent producing goods and services.

Jobs in the non-farm sector that stem from agricultural exports included 50,000 in food processing, 300,000 in trade and transportation, 100,000 in manufacturing and 200,000 in other services.

World Will Demand More Food

It has been estimated that, by the year 2000, the world's projected six billion people will require 68 percent more grain and 89 percent more meat in order to maintain an adequate diet.

This increase in demand will require an even greater increase in production. To achieve this end, the U. S. agricultural community, with its vast technical know-how, will play a leading role in the transfer of this expertise to the developing nations of the world.

In the interim, U. S. leaders must ensure that adequate natural resources (land and water) are made available to the farmer so that he can continue to produce at the present capacity.

According to researchers, urban sprawl is siphoning off some of the most productive farmland in the U. S. Statistics released by the California Department of Water Resources indicate approximately 54 million acres of cropland were converted to other uses such as urban housing, highways and shopping centers, during the past 20 years.

And, according to "Texas Almanac" and the Texas Water Development Board, 24.6 percent of the State of Texas' 35 million acres of cropland is under irrigation. Likewise, 9.62 percent of the United State's 434.9 million cultivated acres is irrigated (from "Water Resources of the World").

Statistics reveal, however, that, in Texas, the value of irrigated crop production is approximately two-thirds of the total value of all crop production.

Ironically, the majority of the leading exporting states rely heavily on irrigation as a supplement to natural rainfall or as the major source of moisture. Considering agriculture's capacity to fulfill this country's economic needs and its humanitarian desire to help feed others, the seriousness of declining and non-renewable resources essential to farming cannot be ignored.

SUMMARY OF WATER-LEVEL MEASUREMENTS

	1976				1967			
	No. of Wells	Depth to Water (Feet)			No. of Wells	Depth to Water (Feet)		
County	Measured	Min.	Max.	Avg.	Measured	Min.	Max.	Avg.
Armstrong	9	111.74	156.80	135.07	9	105.53	139.52	121.87
Bailey	58	25.00	161.69	92.55	53	23.48	137.02	78.90
Castro	63	107.05	279.84	188.42	50	123.61	256.15	168.81
Cochran	49	76.52	197.62	142.03	41	87.92	194.54	140.76
Crosby	19	133.58	223.68	194.44	13	124.12	208.68	183.04
Deaf Smith	72	58.55	330.87	188.98	48	65.96	302.60	169.64
Floyd	94	61.59	301.21	204.32	77	50.93	291.74	184.00
Hale	17	79.77	201.59	139.33	14	84.39	178.92	131.23
Hockley	74	42.78	196.04	125.30	72	42.67	191.79	124.82
Lamb	71	37.41	214.16	126.06	62	31.20	173.46	109.41
Lubbock	116	13.47	219.14	129.56	94	9.18	190.91	123.96
Lynn	31	23.82	151.80	89.72	30	37.55	154.30	90.19
Parmer	57	170.60	355.28	252.12	46	141.31	314.61	221.82
Potter	3	195.79	220.47	210.19	3	205.32	216.34	212.18
Randall	31	105.01	245.01	174.17	25	93.89	222.61	157.41

TWDB . . . continued from page 2

"On the other hand," he said, "there are many hundreds of farmers who are thoroughly convinced that the hail suppression activities are protecting their crops and livelihood against hail damage" and who have invested money for hail suppression.

The report continued, "It would be difficult for the Board to make a finding one way or the other as to whether the proposed operations will dissipate clouds and prevent their natural course of developing rain, in the absence of evidence provided by experts in the field."

Target Area Counties

Atmospherics' permit includes permission to operate in all or parts of Lamb, Deaf Smith, Randall, Parmer, Castro, Swisher, Bailey, Hale, Cochran, Hockley and Lubbock Counties.

PWIA's permit is for all or portions of land in Lamb, Hale, Castro, Swisher, Briscoe, Floyd, Crosby, Lubbock, Hockley, Randall, Deaf Smith and Parmer Counties.

PWIA's permit runs from May 7 to November 30 and Atmospherics' extends from May 7 to October 31. The applicants had originally asked for four-year permits, as a result of the 1975 amendment to the 1967 Weather Modification Act which gives the TWDB the right to grant permits up to four years.

Agricultural productivity in this country is unequalled anywhere in the world. And this productivity has been the savior of the U. S. balance of payments in recent years because the increasing world-wide demand for agricultural products has yet to surpass the American farmer's ability to produce. However, statistics reveal that by the year 2000, the world's projected six billion people will demand 68 percent more grain and 89 percent more meat. On the High Plains of Texas, millions of acres of cotton, wheat and grain sorghum are harvested each year and the massive production of feed grains has turned the area into the most heavily concentrated cattle feeding center in the world. However, the key to maintaining the current level of productivity is groundwater for irrigation, and that resource is non-renewable and in short supply on the High Plains. What will be done to ensure a continuous supply of this resource remains unanswered.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 22—No. 6 "THERE IS NO SUBSTITUTE FOR WATER" *June, 1976*

Well Permits On The Increase In 1976

by KEN CARVER

In the first five months of 1976, the number of applications for permits to drill water wells received by the High Plains Water District increased 47 percent over the first five months of 1975. In 1976, 595 applications for permits were received, compared to 405 for 1975.

Likewise, the number of new wells completed in 1976 compared to the same period in 1975 increased by 29 percent. Through May, 1976, 454 wells were completed, as compared to only 352 in 1975.

Thus far in 1976, only 76 percent of the applications received by the District have been completed. Through this same time in 1975, 87 percent of the applications received had been completed. (See "Drilling Statistics" charts on page 4.)

Increase In Most Counties

All counties in the District have shown an increase in the number of permits issued, with the exception of four—Armstrong, Cochran and Crosby, which issued the same number both years, and Lubbock, which was the only county with an actual decrease.

Two counties, Castro and Deaf Smith, showed marked increases, having not only the most activity, but also some of the largest percentage increases. Castro had an 87-percent increase, while Deaf Smith increased by 77 percent the number of permits issued.

The reasons for these outstanding increases are numerous, one of which could be an increase in acreage planted in corn, which requires more water than previously planted crops. There has been a trend established in this direction in the past few years.

Corn Acreage Increasing

For example, according to the Texas Water Development Board Report 196, in 1969, Castro County had 36,637 irrigated acres in corn and Deaf Smith had only 4,000 irrigated acres. In 1974, comparative figures showed Castro, with 102,234 irrigated acres, and Deaf Smith, with 45,000 irrigated acres.

Another possible reason for the increase in permits is that, in 1975, Deaf Smith County precipitation measured below normal. Also, with water-level declines, and the resultant reduction in well capacities, additional wells are needed in order to maintain the same volume of pumpage.

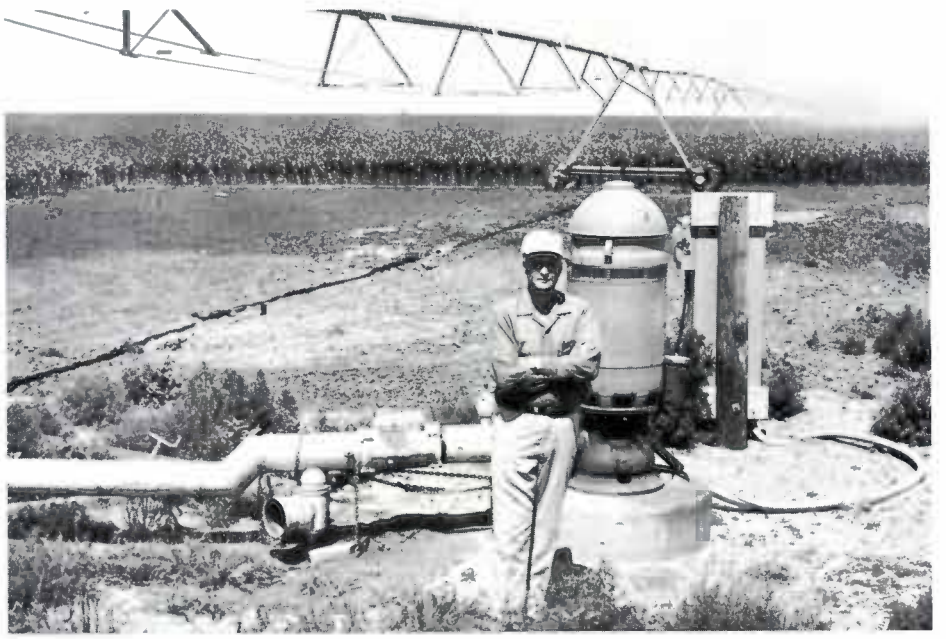
Drilling Postponed In 1975

Another reason is that, because of economic conditions in 1975, many farmers postponed drilling. However, they are now forced to drill in order to obtain the necessary water to operate.

The noted increase in permit applications and wells completed means farmers are investing additional millions of dollars to obtain needed water. Therefore, High Plains irrigation farmers are becoming more aware than ever before that groundwater conservation also conserves dollars.

NOTICE

For details on the revision of The Cross Section mailing list, see page 4.



Gene Smith of Lazbuddie stands beside one of his center pivot sprinkler systems which he has operated for two years now. Said Smith, "I wish I had more of these systems because they save on labor, time and fuel." Smith believes that one man can tend 12 or 15 center pivot systems, as compared to only four wells irrigating by the furrow method. (See related photograph on page 3.)

Say Parmer County Farmers

CENTER PIVOT SPRINKLERS SAVE WATER AND FUEL

Sprinkler irrigation, said by many researchers and irrigators to be a way to stretch the water supply and avoid wasteful runoff, has become more and more popular on the High Plains of Texas.

According to the *1975 High Plains Irrigation Survey,* prepared by the Texas Agricultural Extension Service, Lubbock, sprinkler systems in the 40-county High Plains area irrigated 1,577,000 acres, or 25 percent of the area's total irrigated acreage.

Approximately 27 percent of the 1,230 sprinkler systems used in 1975 are the center pivot type, and use of the center pivot increased 11 percent in 1975.

Sprinklers Gaining Popularity

In Parmer County, one of the more groundwater affluent counties within the High Plains Water District, 49,000 of the 375,811 irrigated acres were irrigated by sprinkler systems in 1975, and 265 of the 317 sprinklers operated were center pivots.

Parmer County farmer Gene Smith of Lazbuddie irrigates 4,500 acres of corn and wheat. This year he is irrigating corn with three center pivot sprinklers. He has three circles, with 133 acres under each.

Smith, who is operating these sprinklers for the second year in a row, says he wishes he had more systems. "I see a greater potential with the center pivots this year than the year before."

Smith said he was watering 80 acres with one eight-inch well, but now he can water the same 80 acres with 60 percent of the water; in other words, he waters 50 more acres (133 per circle) with the same amount of water.

No Need For Tailwater Pits

"Another benefit of the sprinkler is that you eliminate the need for tailwater return systems—because you have no runoff," Smith points out.

Smith is a firm believer in knowing conditions and testing each well ahead of time to eliminate guesswork. With one eight-inch well tied into each system, Smith pumps 750 to 800 gallons per minute through each sprinkler.

All of his sprinklers are automated to run four days and shut off three days, irrigating one or one-and-one-half inch each week, taking four 24-hour days to make one circle.

Smith says, "Irrigation is just like a dairy—you have to be there day and night." But, he also believes sprinklers save on labor and man-hours. "One man can tend 12 to 15 center pivots without any problem, but he can only manage four wells under furrow irrigation."

Area Adaptable To Sprinklers

The farmer also believes the entire area is adaptable to center pivots. "The land out here is sloped and hard to row water, but sprinkler irrigation allows you to distribute the water evenly and with less expense."

Jim Roy Daniels, Parmer County Committeeman from 1968 to 1974, says, although this is his first year to use center pivots in his operation, they pay for themselves quickly in reduced labor costs, fuel and man-hours in the field.

He also noted that liquid fertilizer can be applied during the irrigation, reducing that additional cost, and that "the sprinkler tends to wash bugs off the leaves of the plant."

Daniels said he paid around $26,000 for each of his three systems and believes he made "an investment that will repay itself in a few seasons".

Roming Operates Two Sprinklers

Another Parmer County Committeeman and irrigation farmer, Ralph Roming of Bovina, operates two center pivots. In his first year of operation, Roming says that, as of June 21, he has put on one-half as much water as he believes he would put on in a full pre-season irrigation.

"I put on four inches of pre-plant irrigation water and, by the end of the year, I hope to apply 10 inches of total moisture—and I used to put on 10 inches during pre-plant irrigation," said Roming.

—continued on page 3 . . . SPRINKLERS

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

Telephone 762-0181

REBECCA CLINTON, Editor

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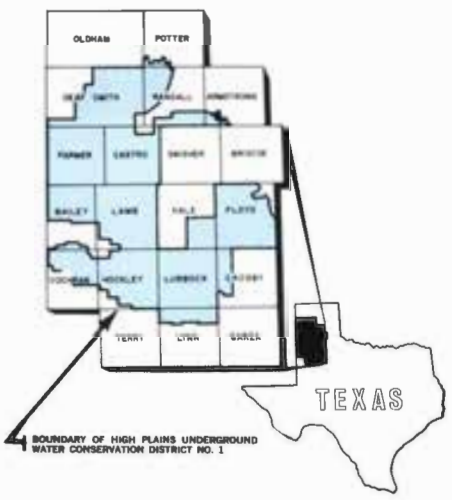

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The Water Committee of the Texas Society of Professional Engineers met in the District's Lubbock office May 27. The Agriculture Sub-Committee, chaired by District Manager Frank Rayner, hosted the meeting and program. Present (and pictured above) were Robert Lee Johnson of Dallas, Committee Chairman; Bill Sims, Dallas; Don McCoskey, Dallas; Andrew Williams, Houston; Terry Howell, College Station; Ed Hiler, College Station; John Holland, Houston; W. L. Guyton, Austin; Tate Dalrymple, McAllen; M. E. Sanders, Lake Jackson; James R. Nichols, Fort Worth, and Rayner.

GOOD MANAGEMENT INCREASES PROFIT FROM EACH ACRE-INCH OF IRRIGATION

High Plains farmers are becoming increasingly aware that, with fuel costs continuing to rise, wise use of irrigation water will make the difference between success or failure in the farming business. And, a recent two-year experiment at Texas A&M North Plains Research Field at Etter shows a way to get the most profit out of every inch of irrigation water pumped.

The research experiment was conducted on grain sorghum, with a five-inch preplant irrigation applied to assure a stand. This was followed by one, two, three or four irrigations at one or more of four sorghum growth stages.

Results showed that, at $4 per hundred pounds of grain, one well-timed irrigation paid $20 per acre-inch. Returns per acre-inch were reduced to $13 with the second irrigation, $8 with the third, and $6 with the fourth irrigation.

Yields Analyzed

Close analysis of the data revealed that the first four inches of irrigation water applied at the boot stage made 2,000 pounds of grain more than the preplant alone, or 500 pounds per acre-inch.

The second four inches of irrigation water applied at flowering increased yield an additional 1,300 pounds per acre, or 325 pounds per acre-inch of water. The third application made 200 pounds per acre-inch and the fourth only 150 pounds of grain per acre-inch.

"With fuel prices getting higher and higher, good management requires that we be fully aware of the return per acre-inch of water," stated Dr. John Shipley, Associate Professor and researcher with the Texas Agricultural Experiment Station, which operates the Etter facility. "This is especially true if a farmer has plenty of land and a limited water supply."

Water Need Can Be Calculated

Dr. Shipley pointed out that, as a rule of thumb, a farmer could calculate the acres he could cover in two weeks by dividing the gallons per minute of water pumped by six. For example, 100 acres could be covered once with a well that produces 600 gallons per minute.

Using this system, 400 acres could be irrigated once or 100 acres could be irrigated four times. Yield from the 400 acres at 4,000 pounds per acre would be 16,000 hundred weight, worth $64,000 at $4 per hundred.

Irrigating 100 acres four times would produce 6,800 hundred weight, worth $27,200. "The difference of $36,000 shows that good water management can do a lot for profit," states the report.

For more information about Bushland Research News Report No. 76-13, contact Dr. Shipley, Texas Agricultural Experiment Station, USDA Southwestern Great Plains Research Center, Bushland 79012.

CB RADIO SHOWS FARMERS WATER CONSCIOUS

When District field personnel were travelling through the District recently in one of the Water District vehicles newly-equipped with a citizen's band radio, the following message was overheard — *"Break 19, the Smokey Water Boys are in the area; watch you ditches."*

It would appear from this conversation that District farmers are conscious of the District's rules regarding tailwater waste and groundwater conservation!

Rural Families Spend More For Water

Rural families with incomes below $4,000 annually spend an average of three percent and sometimes as much as six percent of this income for water service, according to results of a survey conducted recently by the Commission on Rural Water.

The April, 1976, issue of *The Ground Water Newsletter* reports that the study involved analysis of 210 systems receiving grant funds from the Farmers Home Administration (FHA) programs designed to aid needy families.

Some of the findings of the survey were

Families with annual incomes of $5,000 constitute 44 percent of the population target for FHA support. These people received only 15 percent of the grant money allocated and 12

—continued on page 4 . . . RURAL

Harris-Galveston Subsidence District Created to "End" Subsidence

Land surface subsidence has become a critical problem in the Texas Gulf Coast area in recent years and a special purpose district has been created in an effort to "end" subsidence and the problems caused by it.

The Harris-Galveston Coastal Subsidence District was created by the 64th Texas Legislature in 1975. House Bill 552 empowers the District (comprised of all of the area located within the boundaries of Harris and Galveston Counties) "to provide for the regulation of the withdrawal of groundwater within Harris and Galveston Counties for the purpose of ending subsidence which contributes to or precipitates flooding, inundation, or overflow of any area within the District including, without limitation, rising water resulting from storms and hurricanes."

Plan Must Be Formulated

Under the Act, the District is required to formulate a plan to control subsidence within the District. Such a plan is required to accomplish this purpose by the reduction of groundwater withdrawals to amounts which will restore and maintain sufficient artesian pressure to control and prevent subsidence.

The most significant consequence of subsidence is loss of elevation to low-lying lands adjacent to the tidal waters of Galveston and Trinity Bays. A 1974 economic study estimated losses due to an additional five feet of subsidence with a six-foot, five-year, tide at over $109 million.

Land elevation changes due to subsidence have approached eight feet in the Pasadena-Deer Park area, six feet in Baytown and exceeded four feet in the Clear Lake, Johnson Space Center and Texas City areas since 1943.

Groundwater Pumpage Substantial

Groundwater pumpage in the area of concentrated emphasis (all of Galveston County and the eastern half of Harris County) is substantial and contributes to subsidence. An average of approximately 200 million gallons of water per day was pumped from within that area during 1974, or approximately 43 percent of the total 460 million gallons per day withdrawn in Harris and Galveston Counties.

Because of its low elevation, the land in the area of concentrated emphasis is critically affected by subsidence. This area, which can least afford a loss in elevation, has experienced the largest amount of subsidence.

The three principal centers of subsidence, Pasadena-Baytown, the Clear Lake Area, and Texas City, lie within the area of concentrated emphasis. As much as 7.5 feet of subsidence occurred in Pasadena between 1943 and 1973, and a decline of more than six feet was experienced in Baytown during the same period.

Total subsidence measured in the Clear Lake Area and Texas City between 1943 and 1973 was four feet. During the period of 1954 to 1973, the area within the District experiencing one foot or more of subsidence increased from 350 square miles to 2,500 square miles.

Surface Water Is Alternative

The Act acknowledges the utilization of surface water as a viable alternative for meeting the increasing water needs of Harris and Galveston Counties. The three principal sources of water available to the area within the District are the Trinity, San Jacinto and Brazos Rivers. A number of water users are using surface water and others are planning to convert to surface water in the future.

The need for additional surface water supplies has prompted the construction of Lake Livingston on the Trinity River and the Coastal Industrial Water Authority conveyance system. Water from Livingston, with its yield of 840 milion gallons per day, will become available to the southeastern part of Harris County this year.

To date, the activities of the Harris-Galveston District have been directed at reducing groundwater withdrawal. Future regulatory effort will be designed to quantify, by location, the maximum amount of groundwater withdrawal which may be permitted without causing subsidence.

Groundwater Levels Measured

To obtain the information needed to determine the maximum allowable withdrawal figures, the District is measuring groundwater levels and their affect on subsidence at eight monitoring stations within the District.

Two of the sites have installations designed to monitor subsidence, five of the sites have installations designed to monitor compaction, and all the monitors are capable of measuring changes in water levels.

The Act gives the District authority to grant permits for all wells already drilled and to be drilled within the District boundaries. All wells within the District, unless specifically excluded by the Act, are required to have valid permits or to have applied for, and been granted, an exemption by the District.

Well Permit Applications

Permits are issued upon application by a well owner and after review by the District at a public hearing. Owners of wells operating or being drilled on the effective date of the Act must have applied for a permit before September 30, 1975, and were allowed to continue to operate the well without a permit until the application had been acted on by the Board of Directors.

Permits are issued for a term of one year, unless the Board grants a longer term, not to exceed five years. A permit may be revoked or suspended, or its terms may be modified after notice and public hearing.

Permits may be renewed in the manner provided for obtaining the original permit. In granting permits, the Board must consider the District plan; the quantity, quality and availability of surface water at prices competitive with those charged by suppliers of surface water within the District, and the economic impact on the applicant from grant or denial of the permit in relation to the effect on subsidence that would result.

The Board may also provide for the spacing of wells and regulate the production of groundwater from the wells, taking into consideration the economic impact on well owners and the resulting effect on subsidence.

Regarding the ownership of groundwater, the Act states, "The ownership and rights of the owner of land and his lessees and assigns in groundwater are recognized, and nothing in this Act shall be construed as depriving or divesting the owner or his lessees and assigns of the ownership or rights, subject to rules and regulations and orders and other official actions of the district."

The Act also states that the laws and administrative rules relating to the use of surface water *"do not apply to groundwater"*.

While the District "may not sell or

—continued on page 4 . . . SUBSIDENCE

The home pictured above, once part of the Brownwood Subdivision, Baytown, Texas, is now permanently abandoned because of rising tidewater. This problem, caused by land surface subsidence, has led to the creation of the Harris-Galveston Coastal Subsidence District, the primary purpose of which is to "end subsidence".

Parmer County Committeeman Ralph Roming, Bovina, irrigates 165 acres under one circle and 180 acres with a corner system. He says he can do a better job of watering in eight days than he used to do in 21 days of row watering, with less water and better distribution of water. "With the sprinkler system, I can use one-half as much water and fuel and make an equal or better crop," says Roming. Pictured with Roming, left, is District Field Representative Obbie Goolsby. (See related photograph and story on page 1.)

SPRINKLERS . . . continued from page 1

Roming has been watering constantly at two inches in an eight-day circle, but plans to speed up the rotations with less water per application (one inch in six days) through the remainder of the growing season.

The farmer says he is pumping one-half as much water as he did row irrigating. With furrow irrigation, it took 21 days per watering (at five inches or six inches per application) with two wells pumping at 1,500 gallons per minute, and now he puts on the same amount of water in eight days, with only 900 gallons per minute required to do the job on 165 acres.

He also notes a savings in fuel. "It cost me $776 for electricity and natural gas for one sprinkler to water 165 acres, whereas, I paid more than that to pre-water the same number of acres last year," said Roming.

Roming believes that he will make an equal or better crop "with one-half the water and one-half the fuel bill" this year.

Roming's investment was $30,000 for one sprinkler (including tile hookup, booster pump, motors, panel boxes and two pivot pads) and $46,000 on a sprinkler with a corner attachment. The corner sprinkler will irrigate a 165-acre circle, as compared to 130 acres with the standard system.

Roming added that he feels another advantage of sprinkler systems is that they give you the option to run your rows either direction.

DRILLING STATISTICS FOR 1974

COUNTY	PERMITS ISSUED	NEW WELLS DRILLED	REPLACEMENT WELLS DRILLED	REPORTED DRY HOLES
Armstrong	0	0	0	0
Bailey	154	122	5	0
Castro	174	138	12	4
Cochran	33	15	0	2
Crosby	13	15	2	0
Deaf Smith	186	146	13	0
Floyd	126	104	8	3
Hale	38	32	7	0
Hockley	92	64	0	0
Lamb	167	174	14	0
Lubbock	163	120	3	1
Lynn	55	35	3	11
Parmer	177	166	8	1
Potter	2	3	0	0
Randall	36	37	0	0
TOTAL	1416	1171	75	22

DRILLING STATISTICS FOR 1975

COUNTY	PERMITS ISSUED	NEW WELLS DRILLED	REPLACEMENT WELLS DRILLED	REPORTED DRY HOLES
Armstrong	0	0	0	0
Bailey	91	72	13	0
Castro	132	94	8	0
Cochran	11	10	1	0
Crosby	1	2	0	0
Deaf Smith	181	125	8	2
Floyd	57	51	4	0
Hale	10	8	0	2
Hockley	50	36	1	2
Lamb	92	82	16	0
Lubbock	51	57	4	4
Lynn	6	6	0	0
Parmer	123	115	5	0
Potter	0	0	0	0
Randall	31	19	1	4
TOTAL	836	677	61	14

Farmers To Receive Acreage Questionnaires

In early July, about 24,700 Texas farmers will receive an acreage and production questionnaire from W. H. Walther, Agricultural Statistician for the Texas Crop and Livestock Reporting Service, Austin.

Information from this survey, a cooperative effort of the U.S. Department of Agriculture's Statistical Reporting Service and the Texas Department of Agriculture, will be used to determine harvested acreage and production of early harvested crops for the State of Texas and for each county.

Walther urges farmers who receive questionnaires to complete and return them by mail. All individual reports are confidential and will be used only for State and county totals.

SUBSIDENCE . . . cont'd. from page 3

distribute surface water or groundwater for any purpose," the District staff shall at least once a year make a complete study of the groundwater situation within the District and determine the water level, rates of withdrawal, amounts of withdrawal and other information which may effect the subsidence within the District.

Before March 31 of each year, the Board is also required to hold a hearing to determine the effects of the previous year's withdrawals on the subsidence of land within the District.

Board Of Directors

The District is regulated by a 15-member Board of Directors, appointed by the two counties and the major cities within the District. The first Directors were sworn in July 31, 1975, and the first permanent General Manager was hired in December, 1975. Permit fees to finance the operation of the District were first received in January, 1976.

The permit fee established by the District for permits granted during 1976 is 1.2 cents per thousand gallons of permitted withdrawal. The District has no taxing authority and receives no appropriation from the State or Federal government. Those who contribute to subsidence, the users of groundwater in Harris and Galveston Counties, finance the operation of the organization created to end subsidence.

Public Hearings Held

During the fourth quarter of 1975, the District received, processed and reviewed more than 1,500 well permit applications. Public hearings involving more than 600 well owners have been conducted since January 2, 1976. More than 173 billion gallons of groundwater withdrawal (approximately 470 million gallons per day) have been permitted during the first half of 1976.

As a part of its charge by the Legislature, the first District plan, currently being considered by the Board of Directors, concentrates regulatory action in the area of concentrated emphasis. The second phase of emphasis by the District will be to abate subsidence and the third phase will be to prevent a recurrence of subsidence.

For additional information about the District, contact Ed Wagoner, General Manager, Harris - Galveston Coastal Subsidence District, P.O. Box 58847, Houston, Texas 77058.

RURAL . . . continued from page 2

percent during the period July 1 through December 31, 1975—the time period chosen by the survey team.

Many poor families are paying more than $30 a month for drinking water—more than three times what the average urban family pays.

The Environmental Protection Agency estimates that compliance with the requirements of the Safe Drinking Water Act will add between $10 and $15 to monthly household water costs.

Studies by the Commission's National Demonstration Water Project group indicate that a family at the poverty level can only afford $4.50 a month for water from a centralized rural system. However, the monthly per-user cost in a 700-connection system would be more than $13.

MAILING LIST UPDATE REMINDER

As noted in the January and February, 1976, issues of The Cross Section, *the mailing list of this monthly publication is being purged of outdated and incorrect names and addresses. The District has mailed a stamped self-addressed post card to the nearly 12,000 names on its mailing list and asked that those interested in remaining on the list return the cards. If you have not returned the post card, but do wish to continue receiving* The Cross Section, *free of charge, please fill out the information below and return it to* The Cross Section, *High Plains Underground Water Conservation District No. 1, 2930 Avenue Q, Lubbock, Texas 79405, by July 15.*

Name ..... (If this is a change in name, please indicate the name by which it was previously addressed .....)

Addess ..... City ..... State ..... Zip Code .....

Is this a new address? .....yes .....no

If this is a new address, please indicate your previous address:

Address ..... City ..... State ..... Zip Code .....

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 22—No. 7 "THERE IS NO SUBSTITUTE FOR WATER" *July, 1976*

Three representatives of the Texas Department of Agriculture visited the High Plains Water District's Lubbock office July 7. Seated, left to right, are John Kelly, energy consultant with the Agriculture Department and Governor's Energy Commission, Austin; Ed Nichols, Assistant Commissioner of Agriculture, Austin, and Varner McWilliams, District 11 Assistant Supervisor, Lubbock.

Researchers Study Plant Water Requirements

Three Texas Tech University scientists are currently conducting experiments on crops commonly grown on the South Plains in order to investigate the effects of water quantity and quality on those crops.

The research project, entitled, "Quantity and Quality Considerations for Water Use Efficiency in Irrigation", is funded through a grant from the Office of Water Research and Technology, U.S. Department of the Interior.

The investigators, Dr. Joe R. Goodin, Associate Professor of Biological Sciences; Dr. Dan R. Krieg, Associate Professor of Agronomy, and Dr. Robert G. Stevens, Assistant Professor of Agronomy, are trying to determine when water may be restricted without harming the productivity of the crops grown in the area.

"There is evidence that in some areas up to three times more water is used than is necessary for irrigation," Stevens said.

"This is not necessarily true on the South Plains where there is a great awareness of the need to conserve a dwindling water supply.

Farmers Water Conscious

"Even with our water consciousness, we probably can do more to conserve water and to make more efficient use of all the types of water which are available" he said.

According to Krieg, "Most agricultural crops are capable of withstanding far greater water stress at certain times of their development than at other times. We are trying to identify those times for cotton, sorghum, corn, potatoes, soybeans, alfalfa, sunflowers, millet and four-wing saltbush."

The team is growing six test plots of each of the crops under study. The plots are on acreage belonging to Southwestern Public Service Company, which is cooperating in the project by providing recycled industrial water and acreage for the experiment.

Three of the plots for each crop receive fresh water at different intervals. Three plots receive treated sewage effluent from the power plant. The treated effluent contains seven to eight times the amount of total salts found in the fresh water.

Leaf Water Potential

Irrigation intervals are determined by measurement of leaf water potential—a measure of the free water status in the leaf.

When the crops are irrigated, only enough water is used to bring soil water to capacity within the top two feet. Soil water concentrations are determined by neutron probe analysis.

"Productivity in one of our test crops, alfalfa, is directly related to irrigation," Goodin said. "Any decrease in water quantity or quality results in reduced yields.

"We are looking at Atriplex canescens, or four-wing saltbush, as a possible alternate forage crop for arid areas," he said. "Four-wing saltbush is tolerant of less water and poorer qualities of water than alfalfa. It is a high-protein forage which has some potential as a cultivated crop."

The Atriplex test plots will be cultivated and harvested in the same manner as the alfalfa test plots throughout the experiment, Goodin said.

Crop Yields To Be Determined

The experiment began in January, 1975, and will continue through two

continued on page 2 . . . RESEARCHERS

U.S. Supreme Court Creates New Groundwater Law

The Federal government has become more deeply involved in the business of regulating groundwater — this time through a recent Supreme Court decision, Cappaert et al. v. United States et al. (Number 74-1107—Commonly referred to as the "Pupfish Case").

In that unanimous decision, rendered June 7, 1976, the Court held that water rights on Federal reserved lands (in this case, Devil's Hole National Monument in Nevada) are the jurisdiction and the property of the Federal government upon and beneath such Federal reservation.

According to Chief Justice Warren Burger, "The question presented in this case is whether the reservation of Devil's Hole as a National Monument reserved Federal water rights in unappropriated water."

The case in question involves Devil's Hole, a relatively small water-filled land surface depression on Federal land in Death Valley, Nevada, containing a pool of water that is maintained by an aquifer (a water table lake) that is inhabited by a unique species of desert fish—a small minnow commonly referred to as a Desert Pupfish. The pool was reserved as a National Monument by President Harry S. Truman in 1952, under an act authorizing a President to proclaim as National Monuments "objects of historic or scientific interest" situated on Federal land.

The Presidential proclamation says of the fish: "Whereas the geologic evidence that this subterranean pool is an integral part of the hydrographic history of the Death Valley region is further confirmed by the presence in this pool of a peculiar race of desert fish, and zoologists have demonstrated that this race of fish, which is found nowhere else in the world, evolved only after gradual drying up of the Death Valley Lake System isolated this fish population from the original ancestral stock that in Pleistocene times was common to the entire region."

In 1968, the Cappaerts, local landowners, began pumping groundwater onto their ranch from wells located two-and-one-half miles from Devil's Hole. The Cappaerts, the first to appropriate groundwater, pumped from the same aquifer which also served as the source of the surface water in Devil's Hole.

Applications For Permits Approved

Subsequently, the Cappaerts applied to the Nevada State Engineer for permits to change the use of water from several of their wells. Eventually, the Engineer granted the permits, stating *"there was no recorded Federal water right with respect to Devil's Hole, that testimony at the hearing indicated that the Cappaerts' pumping would not unreasonably lower the water table or adversely affect existing water rights, and that the permit would be granted since further economic development of the Cappaerts' land would be in the public interest."*

In August, 1971, the United States sought an injunction to limit, except for domestic purposes, the Cappaerts' pumping from six specific wells and from specific locations near Devil's Hole.

The Federal complaint alleged, "The United States, in establishing Devil's Hole as part of Death Valley National Monument, reserved the unappropriated waters appurtenant to the land to the extent necessary for the requirements and purposes of the reservation." The complaint further alleged that the Cappaerts had no perfected water rights as of the date of the reservation.

Pumping Lowered Water Level

The United States asserted that pumping from certain of the Cappaerts' wells had lowered the water level in Devil's Hole, that the lower water level was threatening the survival of the Pupfish and that irreparable harm would follow if the pumping were not enjoined.

The Cappaerts answered, admitting that their wells drew water from the same aquifer, but denying that the reservation of the Devil's Hole land reserved any water rights under adjacent lands to the United States.

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THE Cross SECTION

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

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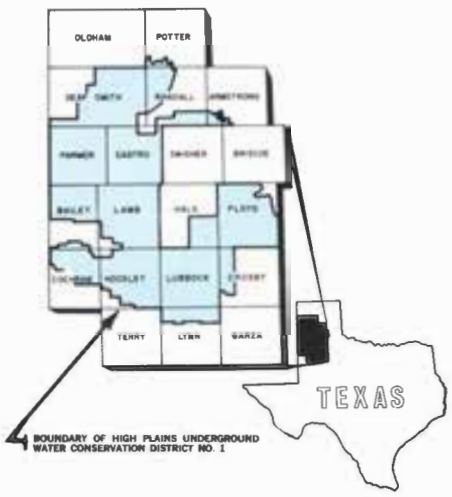

NOTICE: Information regarding times and places of the monthly County Committee meeting can be secured from the respective County Secretaries.

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.

Dr. Dan Krieg, Associate Professor of Agronomy, Texas Tech University, Lubbock, center, discusses water requirements of grain sorghum and irrigation timing with Travis Miller, technician, Texas Tech, and Dr. Robert G. Stevens, Assistant Professor of Agronomy, Texas Tech. The University is conducting a study of water requirements of eight different crops common to the High Plains in order to determine when and how much water can be restricted without harming the productivity of those crops.

RESEARCHERS . . . continued from page 1

growing seasons to December, 1976. Yields of each test crop will be determined with respect to dry matter production, leaf area and plant height.

The chemical composition of the harvest will be analyzed to determine the possible effects of the stress treatments on nutritional quality.

"We hope to define, to some extent, plant species responses to increasing levels of water stress and what aspects of development and yield are most sensitive to stress," Goodin said. "This information should help determine when to apply irrigation water to produce the best yield and quality under conditions of limited water supply."

"We also hope to determine the effects of water quality on plant response and yield," Krieg said. "Many semi-arid areas have available low-quality water that may be used if properly managed on certain crop types."

Plant Used As Indicator

Krieg explained that the irrigations are scheduled by using the plant as an indicator. "The plant is the best indicator because it integrates the soil conditions *and* the environmental demand.

"By looking at various physiological signs, such as nitrate reduction and yield, we are attempting to find out 1) if using the plant as an indicator is a good approach to irrigation timing, 2) the stress factor of the plant and 3) the stage of growth when stress occurs."

Krieg belives this type of approach to irrigation management can be generally adaptable to all parts of the country. "By measuring the plant, rather than the soil, you get an overview of the environment."

The researchers see the approach as a means of stretching the water supply and making all irrigations more efficient. "With rising fuel costs and declining water supplies, farmers will need to become more aware of plant water requirements," said Krieg.

"For example, research has shown that 50 percent more water is being applied to sorghum on the High Plains than the plant really needs," he added.

Krieg said, however, that he is fully aware that transferring research done on small-scale test plots to large-scale commercial farms will be difficult. "A compromise must be made because of the time it takes the water to reach the entire crop."

"I believe, however, that this type irrigation management offers a tremendous opportunity for sprinklers because sprinklers can cover so much ground so much faster than the row irrigation method," Krieg concluded.

SUPREME . . . continued from page 1

On June 5, the District Court ruled that the groundwater pumping on the Cappaerts' land was lowering the water level of Devil's Hole and that such pumping could be regulated to stabilize the water level and that methods suggested by the Cappaerts that would have preserved the Pupfish were not acceptable alternatives. The Court also found that if the Pupfish were destroyed, it would result in "irreparable injury to the United States".

On April 9, 1974, the District Court entered its findings of fact and conclusions of law in a final decree which permanently enjoined the pumping which would lower the water level below three feet.

The Court of Appeals for the Ninth Circuit affirmed, holding that *"the implied reservation of water doctrine applied to groundwater as well as to surface water."* The Court held that "neither the Cappaerts nor their successors had any water rights in 1952, nor was the United States estopped from asserting its water rights by exchanging land with the Cappaerts."

U.S. Not Bound By State Laws

In answer to contentions raised by the intevenor Nevada, the Court of Appeals held, "The United States is not bound by state water laws when

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SUPREME . . . continued from page 2

it reserves land from the public domain."

Said Burger, "This Court has long held that when the Federal Government withdraws its land from the public domain and reserves it for a Federal purpose, the government, by implication, reserves appurtenant water then unappropriated to the extent needed to accomplish the purpose of the reservation. *In so doing, the United States acquires a reserved right in unappropriated water which vests on the date of the reservation and is superior to the rights of future appropriators."*

Burger continued, *"The implied reservation of water doctrine, however, reserved only that amount of water necessary to fulfill the purpose of the reservation, no more."*

"No cases of this Court have applied the doctrine of implied reservation of water rights to groundwater. Here, the water in the pool is surface water, but Federal water rights were being depleted because, as the evidence showed, the groundwater and surface water are physically interrelated as integral parts of the hydrologic cycle."

"It appears that Nevada itself may recognize the potential interrelationship between surface and groundwater since Nevada applies the law of prior appropriation to both. Thus, since the implied reservation of water doctrine is based on the necessity of water for the purpose of the Federal reservation, we hold that the United States can protect its water from subsequent diversion, whether the diversion is of surface or groundwater."

According to the Texas Attorney General's office, eleven western states filed amicus curiae briefs backing the stand of the Cappaerts and the State of Nevada. However, the State of Texas did not file a brief. Doug Caroom stated that the Pupfish decision could not be applied to Federal land in Texas because Texas entered the United States as a Republic, and, therefore, the Federal reserved rights doctrine cannot be invoked for Federal lands in Texas.

Frank Rayner, District Manager and President of the Groundwater Man-

continued on page 4 . . . SUPREME

National Water Commission Reports to Congress

The National Water Commission, whose chief duty it was to examine the economic impact of Public Law 92-500 (Federal Water Pollution Control Act) and report to Congress its findings, has released its recommendations.

The 15-member Commission is headed by Chairman Nelson Rockefeller, with Senator Edmund S. Muskie as Vice Chairman. Four members are also members of the Senate Public Works Committee, five members also serve on the House Public Works Committee, and the remaining four members are nonpolitical appointees.

Significant Recommendations

According to the Commission, the most significant recommendations include amending the Act as follows:

1. Maintain the 1983 water quality goals, but postpone the requirement of applying uniform technologies by five to 10 years.
2. By 1985, have a new National Commission on Water Quality review the results.
3. Maintain the July 1, 1977 date for compliance with uniform treatment requirements, but provide flexibility to grant extensions and even waivers to applicants on a case-by-case and category-by-category basis.
4. Continue the 75 percent Federal financing of municipal treatment plants, furnishing not less than $5 billion nor more than $10 billion per year for this purpose for five to 10 years.

A summary of the report follows.

Summary

"The Commission recommends that Congress provide specific legislative directive to keep the nation's water pollution control program on an effective course toward the objectives of the Act. The recommendations in this report sustain and enforce most of the major goals and objectives of Public Law 92-500. They suggest alterations in the implementing strategy to give the program a stability and continuity of funding and facilities design, and the necessary flexibility for more effective implementation. Essentially, the recommendations would:

1. Maintain the July 1, 1977, date for compliance with uniform treatment requirements by both industry and publicly owned treatment works, but provide some flexibility to grant extensions, and even waivers, on a case-by-case and category-by-category basis.
2. A. Maintain the 1983 interim water quality goal, while postponing the 1983 requirements for application of uniform technologies five to 10 years, pending an assessment of progress in water quality improvement and review of these results by a new National Commission on Water Quality by 1985.
   B. Meet the 1983 interim water quality goal by application of the 1977 requirements to all dischargers, revisions of 1977 limitations, effluent limitations for the elimination of the discharge of toxic pollutants in toxic amounts beginning immediately, new source performance standards for all new point source discharges, periodic upgrading of permits for discharges into water quality limited waters, and application of control measures to combined sewer overflows, urban stormwater runoff, agricultural and nonpoint sources.
3. Decentralize regulatory and administrative functions of the national program by selective certification of states, based on satisfactory state plans and programs to control both point and nonpoint sources (including irrigated agriculture).
4. Stabilize the Federal construction grants program by assuring 75 percent Federal financing for priority treatment needs at a fixed amount (not less than $5 billion nor more than $10 billion per year) for a specified number of years (five to 10).
5. Redefine the goal of elimination of discharge of pollutants with one stressing conservation and reuse of resources.
6. Authorize flexibility in applying control or treatment measures to irrigated agriculture after an inventory of the problem, and support salinity alleviation projects to reduce salt loads from sources other than man's activities."

The Commission's recommendations regarding irrigated agriculture are reprinted below.

Irrigated Agriculture

The Commission recommends that:

A. The Congress recognize the variations in the physical, hydrological, institutional and economic characteristics of irrigated agricultural activities and authorize flexibility in the application of control or treatment requirements in this category of discharge, including discretionary authority to exempt certain dischargers or categories of dischargers from monitoring and permit requirements, provided that:
   1. a. An assessment of the irrigated territory of the U.S. be prepared identifying and classifying by basin and subbasin and severity of pollution problems, areas where the practice of irrigated agriculture alone or in conjunction with natural conditions and other consumptive water uses may impact water quality through changes in salinity, sediment, nutrient or pesticide concentrations or through other deleterious effects; *and*
      b. Physical, hydrologic, economic and institutional criteria for exemption from permitting and monitoring requirements are developed, *or*
   2. The water quality plan and program of a state, as well as areawide waste management plans, contain an acceptable strategy for mitigating the effects of irrigated agricultural discharges including a program for permitting and monitoring, as necessary, to achieve and maintain the water quality standards in a state or basin.

B. Congress explore and, where appropriate, support salinity alleviation projects to control or reduce naturally contributed salts to the nation's waters.

An excellent example of groundwater conservation often overlooked by many High Plains irrigators was observed by District field representatives on Parmer County farmer Joe Jesko's land recently. While in the process of pumping out a new irrigation well, overflow from the slush pit was used to prewater 25 rows of corn. Fred Burch of Friona, operator of the farm near Lazbuddie, says he would value that salvaged water at approximately $15 an acre. "I like to make beneficial use of the water rather than pump it down the bar ditch," says Burch.

SUPREME . . . continued from page 3

agement Districts Association (GMDA), noted that he believes *"this could grow to be the most far-reaching decision regarding groundwater rights that has ever been rendered by any court of this land."*

The Cappaert case is viewed by groundwater leaders to be important because of the precedent it will set; as an example, it has already been cited in the June 26, 1976, ruling of the 10th U.S. Circuit Court's decision regarding Indian water rights in New Mexico (State of New Mexico v. Lee Aamodt, 75-1106). Judge Breitenstein (10th Circuit Court) cited the Pupfish Case and noted that the subject case "rejected the contention that there must be a balancing of competing interests" when Federal (Indian) and the water rights of others were in contention.

Said Rayner in a July 7, 1976, letter to the Board of Directors and members of the GMDA, "It is *extremely* unfortunate that there was not adequate public information made available regarding this case *before* it was decided by the U.S. Supreme Court. *Every* state water agency, water district, river authority, and groundwater owner in the United States has an interest in this matter, and *all* such interests should have made their views known to the United States Supreme Court (or lower courts as appropriate) through *amicus curiae* briefs, and, *perhaps* through such widespread public interest, the courts could have been appraised of the far-reaching detrimental effects of such a decision, as was finally rendered by the U.S. Supreme Court."

He added that the Cappaerts and the State of Nevada do not plan to file a petition for a rehearing and that "this unfortunate decision can now only be amended or nullified by new Federal legislation."

IRRIGATION AND GROUNDWATER DEPLETION STUDIES RELEASED

Studies of how much water is in the Ogallala Aquifer and projections for future years in Lamb, Parmer, Castro, and Bailey Counties have been completed by the Texas Water Development Board (TWDB).

The "Analytical Study of the Ogallala Aquifer" charts the impact and future course of groundwater depletion through the next 44 years and its effect on irrigation water production. The studies and report were made by TWDB staff members A. Wayne Wyatt, Ann E. Bell, and Shelly Morrison.

Copies of the reports are available without charge from the Texas Water Development Board, P.O. Box 13087, Austin, Texas 78711. Report 204 concerns Lamb County; Report 205, Parmer County; Report 206, Castro County, and Report 207, Bailey County.

Generally, the study shows that if present water use and irrigation practices are continued, the aquifer will decline by about 50 percent by the year 2000 and a fourth to one-third of the water will be left by the year 2020.

"The continuation of the High Plains agriculture production to the State and Nation's economy is essential," states James M. Rose, Executive Director, TWDB. "Every means of conserving, stretching, and wise use of Ogallala water now and in the enusing years by agriculture, industry and the people must be taken," added Rose.

Guidelines provided in the reports were obtained by the use of electronic computers that simulate the aquifer's behavior and should provide the groundwater user in the county with reasonably good estimates by which future management decisions can be made.

Lamb County had about 10.9 million acre-feet of groundwater in 1974. The study shows that 59 percent, or 6.4 million acre-feet, will be left by the year 2000 if past water-use patterns and aquifer behavior are continued in the future.

Pumping lifts in wells, which now range from less than 25 up to 300 feet, will approach 350 feet in some areas of the county by 2000.

Compared to the 313,000 acre-feet of water produced in 1974, the amount expected to be produced in 2000 is about 217,000 acre-feet, a decline of 31 percent.

Parmer County Studied

In Parmer County, the study shows about 11.9 million acre-feet of groundwater in 1974; and following present water-use patterns, 49 percent, or only 5.8 million acre-feet, will be left by 2000.

Pumping lifts in wells now range between 175 and 425 feet and will approach 500 feet in some local areas by 2000.

Compared to the 311,000 acre-feet of water produced in 1974, the amount expected to be produced in 2000 is about 214,000 acre-feet, a decline of 31 percent.

In Castro County, there were 12.8 million acre-feet of groundwater in 1974. The study shows 52 percent, or 6.6 million acre-feet, will be left by 2000 if past water-use patterns and aquifer behavior are continued in the future.

Pumping lifts now range between 150 and 350 feet and will approach 450 feet by the year 2000. In 1974, there were 315,000 acre-feet of water produced, and the amount expected to be produucted in 2000 is about 215,000, a decline of 32 percent.

Bailey County had about 6.5 million acre-feet of groundwater in 1974. By the year 2000, if past water-use patterns and aquifer behavior continue, there will be 3.8 million acre-feet, or 58 percent, left.

Pumping lifts now range from less than 25 feet to 250 feet and will approach 325 feet in 2000.

Water produced in 1974 amounted to 199,000 acre-feet, and the amount expected in 2000 is about 150,000 acre-feet, a decline of 25 percent.

Nowhere in these counties is the water expected to be exhausted, but yields of wells will decrease and expense of irrigation pumpage will climb. The increased lifts will require more energy and, thus, greater cost in bringing the water to the surface.

During the past three decades, the withdrawal of groundwater has greatly exceeded the natural recharge of the aquifer. If this overdraft continues, the aquifer ultimately will be depleted to the point that it may not be economically feasible to produce water for irrigation, the authors state.

Future Findings Can Differ

These findings, the authors emphasize, are based on the continuation of past trends. Future events can be very different if these trends change. The most determinative factor may be the decisions of the water users themselves.

Each county report contains maps, charts, and tabulations which reflect estimates of the volume of water in storage in the Ogallala aquifer and the projected depletion of this water supply by decade periods through the year 2020.

The maps in the reports are intended for use as general guidelines only and are not recommended for use in determining water availability when buying and selling specific tracts of land. The TWDB recommends that a qualified groundwater hydrologist be consulted to make appraisals of groundwater conditions when such transactions are contemplated.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 23—No. 8 "THERE IS NO SUBSTITUTE FOR WATER" *August, 1976*

TWDB TO HOLD PUBLIC MEETING IN LUBBOCK

The six Member Texas Water Development Board will be meeting in the Lubbock City Council Chambers, City Hall, 916 Texas Avenue, Lubbock, commencing at 8:30 a.m. on September 21, 1976.

This is the first time the Members of the Texas Water Development Board have ever met in formal session in Lubbock, although some of the TWDB Members have participated in numerous public hearings and other public forums in the High Plains area in past years. This is a public meeting and the public is invited to attend and observe the proceedings.

Following the meeting at the Lubbock City Hall, the TWDB will again meet in public forum to receive public input to the ongoing revision of the Texas Water Plan, at 7:00 p.m. in the offices of the High Plains Underground Water Conservation District No. 1, at 2930 Avenue Q, Lubbock. The water development bonding issue before the voters this November, water importation plans, and water supply and water use conditions of interest to the High Plains area, and all of Texas, are expected to be topics of discussion.

Also, the Board of Directors of the High Plains Underground Water Conservation District No. 1 will be in official meeting at 1:00 p.m., on the 21st at the District's Lubbock office. This too is a public meeting and the public is welcome to attend same.

Don Marble and Solon Clements, President and Member of the Board of Directors of the High Plains Research Foundation respectively, and Dr. Bill Lyle, observe the (orafice plate) measurement of the pumuping rate (1300 gallons per minute) of the new irrigation well on the Texas A & M University Agricultural Research and Extension Service Halfway (Hale County) Station.

A NEW-OLD WATER CONSERVATION IDEA

The often quoted adage, "There is nothing new under the sun" will probably be recalled by some old-time dryland farmers when they encounter a "modified", dust bowl days, farm water conservation method that is now being highly touted by agricultural researchers.

Called by any name, furrow diking, furrow damming, furrow blocking, or basin listing, the practice of constructing small barriers within the furrows—making thousands of small ponds within the furrows—is not a new idea; but changes in farming practices, and the advent of herbicides and innovations in farming mechanization, is leading to a revision of the interest in an old (1930's) idea.

Furrow diking was first tried in this area in the 1930's and 1940's, as a dryland water conservation measure. However, the then common practice of planting *within* the furrow made it necessary to remove the dikes *before* planting; hence, they could only be used during the fallow season—the time of the year when this area receives very little, if any, moisture.

However, the now common practice of planting on top of the bed (made necessary to accommodate furrow irrigation) will allow the dikes to remain in place throughout the growing season. The use of herbicides—reducing the cultivation necessary to control weeds—and the improvement of old, and the invention of new, furrow diking and irrigation equipment by agricultural researchers, has led to a promising revision of the old furrow diking idea.

A U.S. Department of Agriculture Research Service Agronomist and Engineer have been studying the benefits and problems of furrow diking for

continued on page 3 . . . NEW-OLD

NOTICE TO LAMB COUNTY RESIDENTS

The Lamb County office of the High Plains Underground Water Conservation District No. 1 has been moved from 620 Hall Avenue, to 509 Phelps Avenue in Littlefield, Texas. As in the past, the new Lamb County office will accept applications for water well permits and provide the meeting place for the Lamb County Committee.

Robert Richards will succeed Mr. Calvin Price as the Lamb County Secretary. Mr. Price was the District's Lamb County Secretary for nearly 16 years. The District's Directors extend to Calvin their sincere appreciation for his long association with the District, and wish him every success in his expanded business venture. (See photograph page 2).

ENGINEERED IRRIGATION WELLS

The common practice of referring to an irrigation, municipal or industrial well, wherein there was some design criteria utilized in its drilling and equipping, as an "engineered well" has been a definite drawback to the acceptance of the practice properly designing irrigation and other types of wells in the High Plains area. The word engineering tends to connote something complex, and is more often considered an expensive operation.

However, the continued depletion of the aquifer (and the resultant decrease in well yields); with energy supply costs increasing monthly; with pumps, casing and other well hardware costs doubling every few years; with drilling costs rising; and with the scarcity of all three items (energy, well hardware, and well drillers and pump maintenance personnel) at the time of most critical need by the irrigator—at peak crop water demand—perhaps the time has come when the increased production, dependability, higher efficiency, and lower energy and well maintenance costs will make the "comparative costs" of an engineered well more palatable to the irrigation farmer.

In the past the comparative costs of a properly designed (engineered) well, and the type of well completion common to the High Plains area—a 18-inch bore hole, no gravel pack, 16-inch (thin wall) casing, with four to six "torch cut" slots per foot constituting the "screen"—were not attractive to the landowner. The hidden costs of the grossly poor efficiency of such relatively cheap wells was not of such a magnitude to interest the landowner in the much greater initial costs of a properly designed well.

Contributing to the continued rejection of the benefits of properly designing wells for the High Plains area, has been the type of competition engaged in between well drillers for the landowner's well drilling dollar. In an effort to attract business, the well drillers have engaged in a competitive race to cut costs by increasing their drilling speed and other shortcuts to quality in favor of quantity, hence, lower *initial* costs to the landowners.

In this competitive atmosphere, the potential well owner's inquiries as to the benefits of "designing" his well are often met with, "why pay for something you do not need, I can get you a well for half the price". Since the quality of the construction of a well is at best a "well" hidden value, the landowners all tended to choose the well he could get for "half price". And, for the first year, two years or five years,

continued on page 2 . . . ENGINEERED

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

Telephone 762-0181

FRANK RAYNER, Editor

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District Office at Lubbock

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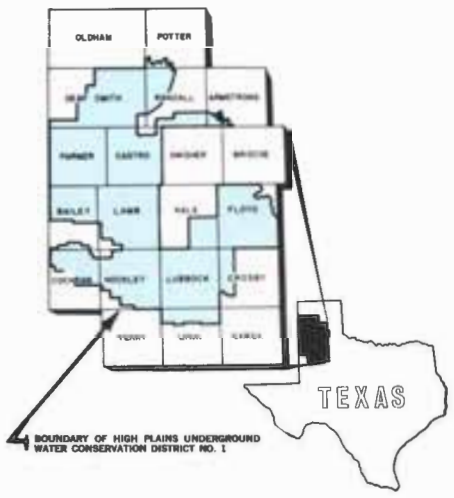

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Danny Key 1980	Star Route 2, Morton
H. H. Rosson, 1980	Star Route 2, Morton

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2930 Avenue Q, Lubbock

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Tommy McCallister, 1980	209 N. Van Buren, Lorenzo
Edward S. Smith, 1980	102 N. Van Buren, Lorenzo
Pat Yoakum, 1980	Box 146, Lorenzo

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Garland Solomon, 1977	Rt. 5, Hereford
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Bill Cleavinger, 1979	Star Rt., Wildorado
George Ritter, 1979	Rt. 5, Hereford

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Farm Bureau, 101 S. Wall Street, Floydada

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Fred Cardinal, 1978	Route 4, Floydada
C. O. Lyles, 1980	Route 4, Floydada
Connie Bearden, 1980	Route 1, Floydada
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Mayo Ins., 1617 Main, Petersburg

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Henry Scarborough, 1980	Route 2, Petersburg

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Jimmy Price, 1978	Route 3, Levelland
Billy Ray Carter, 1980	Route 5, Levelland
Leon Young, 1980	Route 1, Ropesville
Robert Phillips, 1980	218 Redwood, Levelland

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509 Phelps Avenue, Littlefield

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P. A. Washington, 1980	Box 124, Springlake
Jack Stubblefield, 1980	Box 397, Spade
Larry Lockwood, 1980	Star Rt. 2, Littlefield

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Floyd Reeve, 1979	Box 1196, Friona
Ralph Roming, 1979	809 Ridglea Dr., Bovina

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Jim Line. 1977	Box 87, Bushland
Albert Nichols, 1977	Rt. 1, Box 491, Amarillo
F. G. Collard, 1979	Rt. 1, Box 433, Amarillo
W. J. Hill, 1979	Box 53, Bushland

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Farm Bureau, 1714 Fifth Ave., Canyon

Harry LeGrand, 1977	4700 S. Bowie, Amarillo
Joe Albracht, 1977	Box 81, Bushland
Leonard Batenhorst, 1977	Rt. 1, Canyon
Bill Dugan, 1979	Rt. 2, Box 30, Happy
John F. Robinson, 1979	1002-7th St., Canyon

NOTICE: Information regarding times and places of the monthly County Committee meeting 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.

Robert Richards stands in front of his office at 509 Phelps Avenue, Littlefield, which will also serve as the Lamb County office for the District. Mr. Richards replaced Calvin Price as the District's Secretary to the Lamb County Committee.

ENGINEERED . . . continued from page 1

perhaps what he got for "half price" may appear to be a bargain; but, today the multitude of known and expected cost factors may make it advisable for the landowner to concentrate on quality, and the obvious long term economic benefits thereto, when he considers his initial investment in a "well" hidden asset that he must depend on to serve his needs for irrigation water for the ensuing twenty years.

The very favorable characteristics of the Ogallala formation and aquifer—the Cinderella of all aquifers—has, in its formerly "plush" years (before extensive depletion of same), made possible the use of relatively inexpensive wells, and there has not developed a need for the well drilling firms and well drillers to develop the expertise necessary to properly design a well to fit the aquifer at the specific well site. Therefore, at this time when it appears that the engineered well is about to come into its own, there are very few well drillers or well drilling firms in the High Plains area that can offer such "designed" well services.

The opportunity to utilize proper well design criteria was forced upon Dr. Bill Lyle, Associate Professor, Texas A & M University Agricultural Experiment Station, Halfway, Hale County, when the Halfway Station's two multipurpose (recharge and irrigation) wells malfunctioned after many years of pumping sand.

Faced with the necessity to replace both wells, Dr. Lyle sold the idea, to the directors of the Halfway Station and several cooperating well suppliers, of utilizing available "cookbook" well design criteria in the installation of the Station's new well.

Using only design criteria that are readily available in numerous publications specifying well design technology, and the free consulting and other services of some well equipment suppliers, Dr. Lyle proceeded to design his *first* "engineered" well. The result was the development of a well that surprisingly exceeded even the most optomistic design expectations.

Although Dr. Lyle has not completed his forthcoming detailed report

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The Johnson (commercial) well screen being installed in the new Halfway Station irrigation well by High Plains Drilling Incorporated.

ENGINEERED . . . continued from page 2

on the design criteria and testing procedures used in the construction and equipping of the new well, and the costs thereof, the following brief account, as supplied by Dr. Lyle and the Texas A & M University Agricultural Research and Extension Service, summarizes the major chronology of the construction of the Halfway Stations well:

The initial step consisted of drilling a test hole for taking samples of the formation and to obtain an electric log of the aquifer. Formation samples were taken every 5 feet within the saturated zone. The samples were analyzed by Johnson Well Screens Inc. of St. Paul, Minn., for the determination of particle size distribution which is necessary for the gravel pack design. Then, from a gravel pack design, a well screen may be selected which will effectively retain the gravel pack. The purpose of the electric log is to aid in accurately locating the most permeable sections of the aquifers with which to screen. A Johnson "Irrigator" well screen was chosen with a 50/1000-inch slot. This well screen provides about 10 times more open area per linear foot than does perforated (torch cut) casing and is of primary importance in maintaining the life and pumping rate of a well. The lower 40 feet of the aquifer, just above red bed, was screened as was determined from the information provided by the electric log and formation samples.

High Plains Drilling Inc. of Abernathy drilled the well, and ran the electric log. They were also responsible for obtaining the gravel pack and screen which had been specified. A sixteen-inch casing and well screen was set in a 24-inch drilled hole which allowed for a four-inch gravel pack. During the drilling an organic compound was used to obtain the correct drilling viscosity. The organic compound broke down in about three to four days, which minimized the presence of a filter cake on the bore hole.

A period of development followed the drilling. This phase was initiated with a high speed bailing operation. This was followed by high pressure jetting, in which water under 300 psi pressure was forced through jetting nozzles into the gravel pack to loosen any possible filter cake remaining. Next a dispersant was added to disperse and hold in suspension any re-

continued on page 4 . . . ENGINEERED

This center pivot irrigation system, on the Texas A & M University Halfway Research Station has been modified by Dr. Otto Wilke, to apply irrigation water at the land surface, curtailing the evaporation and temperature losses common to sprinkler irrigation. This system would be readily adaptable to furrow diked fields. This system is automatically controlled by moisture sensors.

Elmer Hudspeth inspects furrow diked plot on the Texas A & M University Lubbock Research Station. (Photograph courtesy of the Farmer Stockman Magazine.)

The rainfall runoff retained by the diked furrow (left) is markedly evident in this photograph, as compared to the failure to retain rainfall runoff by the normal listed beds (right). (Photograph courtesy of the Texas A & M University Research and Extension Service.)

NEW-OLD . . . continued from page 1

two years. Dr. J. D. Bilbro and Elmer Hudspeth, who are located at the Texas A & M University Agricultural Research and Extension Center at Lubbock, in 1975 obtained increases of 25 percent (49 pounds per acre) in lint yields of dryland cotton by diking the furrows during the growing season. The test was conducted on land that had a two tenths of one percent (two feet per 1000 feet) slope. In addition to the yield increase, the researchers noted that there was no runoff or soil erosion from the diked plots.

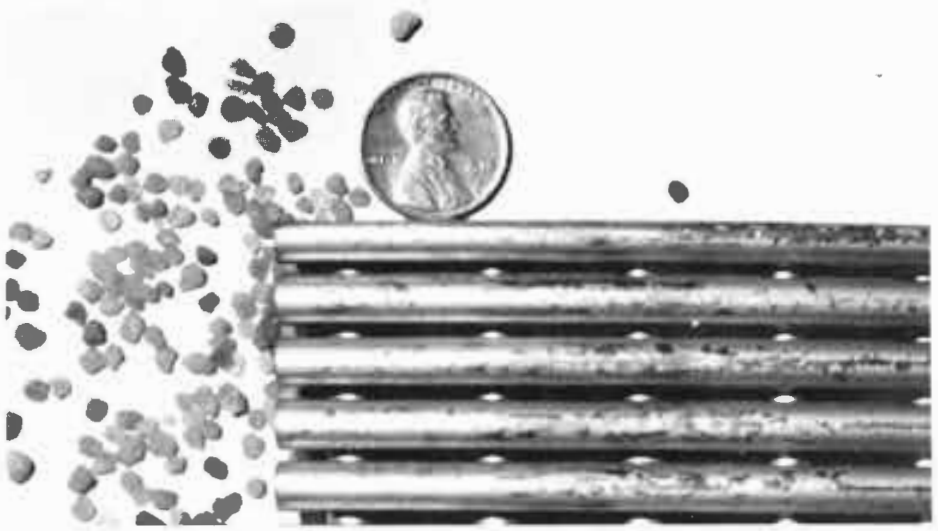
Research on furrow diking is also being conducted by Dr. Nolan Clark, Agricultural Engineer, U.S. Department of Agriculture, Southwestern Great Plains Research Center at Bushland (Potter County); and by Dr. Bill Lyle, Associate Professor, located at the Texas Agricultural Experiment Station at Halfway.

Dr. Lyle has invented a hydraulically operated dike builder—eliminating the malfunctioning, caused by crop residue, common to the older diking tool—and he has adapted a lister to the *front* of the tractor to remove the dikes for other land preparation operations. With the front mounted dike remover and the rear mounted hydraulic dike builder, high speed tractor operations are not impeded, and both operations can be accomplished in a one-time over operation.

Dr. Otto Wilke, Texas A & M University Agricultural Research and Extension Center, is experimenting with very ingenuous modifications of center pivot sprinkler systems, adapted to furrow diked fields. A uniquely modified and fully automated—controlled by moisture sensors—center pivot system (see photograph) is on demonstration in a furrow diked plot at the Halfway Station.

Furrow diking could be advantageous under certain irrigated conditions as well as under dryland conditions. With furrow-irrigation, the dikes could be removed just prior to irrigation and reestablished as soon as the furrows became dry enough to till. With sprinkler irrigation, the dikes need not be removed; they could prevent "runoff" in the sprinkled areas. Another advantage of dikes in sprinkler-irrigated fields could be that higher rates of water application would be possible, since runoff would be reduced or eliminated.

If you are interested in this new-old idea, attend the slide show presentation of same at the forthcoming Texas A & M University Agricultural Research and Extension Service Field Day at Halfway (see notice this issue), view the equipment and sprinkler demonstration, and talk to Messrs. Bilbro, Hudspeth, Lyle and Wilke.



The penny in this photograph illustrates the relatively small size of the well screen openings and the matching gravel pack used in the Halfway Station well.

ENGINEERED . . . continued from page 3

maining clay which was loosened by jetting. The dispersing agent was added and agitated by gently surging with a bailing bucket. The high speed bailer was again used as a final development operation to remove the dispersed clay and dislodged sand. Only very small quantities of sand were removed during developing. The well was completely sand free following the development period.

The well was next test pumped for approximately 72 hours to determine its discharge — drawdown relationships. This is accomplished by initially establishing a low flow rate and then making drawdown determinations until the drawdown remains constant for an adequate period of time. The flow rate is then increased and the drawdown again allowed to stabilize. The peak flow rate reached during the test pumping was 1,300 gpm. There still remained 30 feet of available drawdown at this pumping rate. As a striking contrast two other wells located at the center with identical aquifer characteristics pump 350 gpm and 400 gpm respectively along with large quantities of sand. Test pumping a new well is very important in order to select a pump which will match your exact pumping conditions of discharge and total dynamic pumping head.

While the construction of such a well is more expensive, the additional investment in a correctly designed well will definitely return dividends over the life of the well. One of the most important benefits is to prolong the effective pumping life of the well. It will greatly decrease or eliminate the well plugging due to encrustation and will substantially increase the life of the pump since the pumping of air and sand are eliminated This will also help maintain higher pumping efficiency over the life of the pump. This along with the fact that you are getting the greatest amount of water per foot of drawdown possible all add up to maximum operating efficiency.

The Secret To Success

The screening of only the lower 40-foot section of the aquifer resulted in a well with a straight-line specific capacity (production in gallons per minute per foot of drawdown) curve throughout the entire tested operating range of the subject well. Such a curve is characteristic of an artesian aquifer and may be interpreted—in conjunction with other observations—of efficient utilization of the well screen interval, and the elimination of water cascading into the well annulus (a bothersome problem typical of other wells in the High Plains area). It is apparent that the major difference between the Halfway Station's new well and the typical High Plains irrigation well is the use of a "commercial" well screen and a properly sized gravel pack.

The common practice of using torch cut slots does not provide for enough opening to the aquifer face within the well, resulting in a blocking-off of several square feet of productive interval. However, increasing the number of slots would also increase sanding problems, unless the well is properly gravel packed, *and it is doubtful* that a slotted-casing well could be *properly gravel packed.*

The common method now employed in so-called gravel packing a well is to dump what amounts to a concrete mix gravel in the well annulus between the drill-hole wall and the slotted casing. The effect of such improper gravel packing is to seal off from the aquifer the already limited openings in the casing.

Proper gravel packing requires a commercially sorted gravel. The High Plains resident would be most apt to describe an appropriately sized gravel as a sand (see related photograph)—it surely is *not* the poorly sorted *conglomerate, containing boulders,* that is most commonly used as a so-called gravel pack in the High Plains area.

Therefore, the primary "secret" to the producing success of the Halfway Station's well is the use of a properly designed *commercial* well screen, and the associated *matching gravel pack.* Aside from these two primary differences, the Halfway Station's well could almost be classed with most other wells in the High Plains area.

Engineer-Farmer To Drill Well

In addition to his Doctorate in Agricultural Engineering, and his employment at the Halfway Station, Dr. Lyle also owns and farms 500 acres of irrigated land in Crosby County. Bill has stated that the next irrigation well he completes on his farm will be of the "engineered" type, even though he concludes it may cost as much as two times that of a common well.

If you plan on attending the Texas A & M University Agricultural Research and Extension Service Field Day at Halfway (see related announcement), seek Bill out and ask him about his "engineered" well.

NOTICE TO WELL DRILLERS, PUMP, CASING AND WELL SCREEN SUPPLIERS, AND CONSULTANTS

If you or your firm supplies services or equipment that could be utilized by persons interested in the development of a properly designed water well (see the story, "Engineered Irrigation Wells"), please make the District appraised of such services, supplies and equipment.

Plan to attend the Texas A & M University Agricultural Research and Extension Service agricultural demonstration Field Day at the Halfway Station, located 14 miles west of Plainview, Hale County, on State Highway 70, from 1:00 to 5:00 p.m., Tuesday, September 14, 1976.

Cross Section Editor Leaves

With the mailing of the July issue of *The Cross Section,* Mrs. Rebecca Clinton ended her approximately five year employment as Director of Public Education for the High Plains Underground Water Conservation District No. 1.

Rebecca and her husband, Eddy, a well known local television sportscaster, moved to Dallas where Eddy will be the Assistant Director for Sports Telecasting for station KDFW (Channel 4).

As its editor, Rebecca and *The Cross Section,* received several awards and local, state and National recognition for the excellence of the District's official monthly publication.

The District's staff extend to Rebecca and Eddy our heartfelt wishes for every success in their new careers, with particular best wishes for happiness to Rebecca in her forthcoming role as a new mother.

MRS. REBECCA CLINTON

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 24—No. 9 "THERE IS NO SUBSTITUTE FOR WATER" *September, 1976*

Texas Water Development Board at the public forum in the District's Board of Directors room, September 21, 1976. Shown, left to right, is Dr. Herbert Grubb of the TWDB staff, and the six TWDB Members, George McCleskey, Glen Roney, A. L. Black (Chairman), Robert Gilmore, Milton Potts, and John Garrett. TWDB photograph.

Water Development Board Schedules Public Forums

The Texas Water Development Board has scheduled a series of 23 public meetings (forums) to present aspects of the revision of the Texas Water Plan, and to receive public response and input to water planning or any comments on any water matters of interest to the general public.

The TWDB's public forum in Lubbock was held in the District's Board of Directors room—over 200 people participated in this forum (see related photographs).

The schedule of the TWDB public forums is as follows:

September 10, Houston; September 13, El Paso; September 17, Galveston; September 21, Lubbock; September 28, Amarillo; September 29, Midland;

October 1, Beaumont; October 5, Dallas; October 6, Arlington; October 7, Sherman; October 8, San Antonio; October 11, Victoria; October 12, Corpus Christi; October 14, Laredo; October 15, Texas A & M; October 18, Texarkana; October 20, Tyler; October 21, Longview; October 22, Fort Worth; October 25, Wichita Falls; October 27, Abilene (morning); October 27, San Angelo (evening); October 30, Waco.

The general public is urged to attend the forums in their areas, to review the very informative presentations by the TWDB staff personnel, and other participants, and to present their opinions *directly* to the TWDB Members, (the chief executive officers of the TWDB) who are devoting their valuable time to attend these forums and participate in the public debate. The exact addresses of the locations for the forums can be secured by contacting the TWDB, or several local establishments, such as Chamber of Commerce, local newspaper, radio and television stations, etc.

WATER BOND ELECTION

Texas voters will have the opportunity to vote on the acceptance or rejection of two water bonding amendments to the Texas Constitution at the general election on November 2, 1976. The two amendments will appear on the ballot as Proposition 1;

The constitutional amendment authorizing an increase of $400 million in the amount of Texas Water Development Bonds that may be issued on approval of two - thirds of the legislature; amending and consolidating provisions of Sections 49-c, 49-d, 49-d-1 of Article III of the Texas Constitution; and repealing Sections 49-d and 49-d-1 of Article III of the Texas Constitution,

and Proposition 2;

A constitutional amendment to increase from $100 million to $200 million the amount of Texas Water Development Bonds that may be issued for water quality enhancement purposes.

The actual wording of the Texas Legislative authorizations for Proposition 1 (Senate Joint Resolution No. 49) and Proposition 2 (House Joint Resolution No. 99) are complicated by their dependence upon the voters' acceptance or rejection of the proposed new Texas Constitution—that *was rejected* by the voters on November 4, 1975—and the wording of the authorization of HJR 99 is further dependent upon the acceptance or rejection by the voters of SJR 49.

Since the voters rejected the proposed Texas Constitution, (in 1975) and *if* the voters reject SJR 49, then if the voters approve HJR 99, its implementation becomes an automatic (not to be further acted upon by the Texas Legislature) independent amendment to the Texas Constitution that would add another $100,000,000.00 to the original $100,000,000.00 (Constitutional amendment adopted by the voters in 1971), for a total of 200 million dollars, bond selling authorization to finance waste (primarily sewage) treatment facilities constructed by municipalities, river authorities and other types of districts, as authorized by the Texas Constitution.

Although the wording of Proposition 2 states that the authorization is for Texas Water Development Bonds, the bonding authorized thereby can only be used for construction for water quality enhancement purposes and not for *water development* projects. The water quality bonding is accomplished through the Texas Water Development Board, primarily due to that agency's established procedures for handling of such bonding, but such bonding and distribution of funds made available thereby are authorized only by the Texas Water Quality Board (TWQB).

The major difference of the bonds that can be sold under the "independent" provisions of HJR 99, and those that would be authorized under SJR 49, is the fixed interest rate of the HJR 99 provision—not to exceed 6 percent per annum—and the power of the TWQB to make *grants* with the income from the sale of the water quality bonds. However, the TWDB has *only made loans* to date and special legislative authorization would probably be necessary before water quality bond income could be granted.

Water Bond Opponents

The professed peoples' environmental representatives, the Texas Environmental Coalition—consisting of several organizations, such as the Texas League of Women Voters, the Sierra Club, Audubon Society, and the Texas AFL-CIO—has endorsed the water quality bonding issue (Proposition 2) but is vehemently opposed to the water development bonding proposal (Proposition 1). The group call-

continued on page 2 . . . WATER

EAST TEXAS WATER DISTRICT SUES TO ENJOIN WATER IMPORT CONCEPT

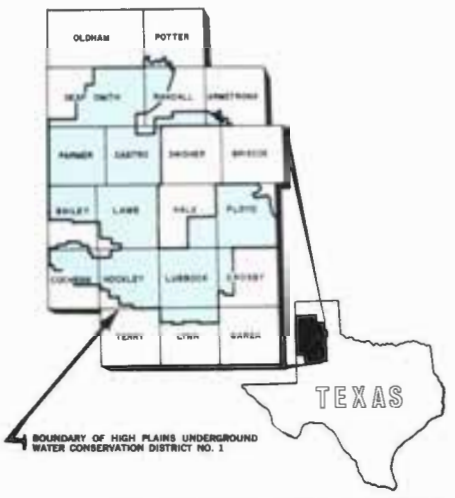
The North Texas Municipal Water District (the NTMWD consists of ten small member cities in the vicinity of Dallas) has filed suit to force the Texas Water Development Board to rescind their decision to provide for the possible eventual use of a proposed Northeast Texas lake—Cooper Reservoir—as a part of the inter-river basin transfer of Texas surface water. The use of Cooper Reservoir as a "pass through facility" for transfer of water was an integral part of the 1968 Texas Water plan—which has been approved by the Texas Legislature. The importance of the pass through provision for Cooper Reservoir was mandated because of its location in water-rich Northeast Texas; being on the Sulphur River, a major stream whose flow, originating near the northeast boundary of Texas, is, without the contemplated development in Texas, primarily beneficial to the State of Louisiana and the transportation interests of the Mississippi River Basin States.

The Cooper Project is a U.S. Corps of Engineers financed project (author-

continued on page 3 . . . EAST

THE Cross SECTION

A MONTHLY PUBLICATION OF THE HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
2930 Avenue Q, Lubbock, Texas 79405
Telephone 762-0181
FRANK RAYNER, Editor
Second Class Postage Paid at Lubbock, Texas
District Office at Lubbock



WATER . . . continued from page 1

ing itself Citizens Against Water Taxes has also been very vocal in opposition to Proposition 1, but without comment on Proposition 2.

Numerous water and other governmental, municipal and industrial leaders throughout the State have endorsed Proposition 1. Governor Briscoe, the Speaker of the Texas House of Representatives, Bill Clayton of Springlake, and the Lieutenant Governor, William Hobby, Houston, have strongly endorsed both Propositions 1 and 2. Governor Briscoe has appointed Paul Veale, McAllen, to head a coalition to promote the passage of Proposition 1.

Opponents to State loans for water supply development and quality of water improvement often cite the reportedly 25 million dollar drain (a debt of approximately 25 cents per person per annum) on the State treasury to pay the indebtedness of the $2,350,000.00 water development bonds that are presently outstanding.

Proponents are quick to point out that it is illogical to assume that the water development bonds could be repaid at the same rate they are loaned. They note that the State is borrowing on a relatively short-term basis and loaning on a long-term basis, therefore, debt and interest outgo cannot be expected to equal income *at the onset of such bond sales.* Proponents also point out that money must be loaned before construction can commence and water supply development, utilization and repayment cannot commence until construction is completed —hence, the inevitable repayment lag time.

Bonds Self Liquidating

There is considerable confusion as to how much water development bonding can be accomplished under the 400 millions already authorized, and the 400 million as proposed, since the procedures (as set forth by the Texas Legislature) for the disposition of the funds received in the State treasury as a result of the repayment of the principal, interest and service charges on the presently outstanding water development loans, provides that such funds will be placed in a "sinking fund", to repay the principal and interest on the bonds sold; hence, the fund appears to be perpetual, and for some time in the future—probably until the majority of the first 400 million, and/or the second (proposed) 400 million (an aggregate of 800 million) of bonds have been sold and the money made available thereby loaned —it will continue to appear to be so. However, after the first 400 million in bonds *has been sold,* the Water Development Board cannot sell additional, or resell any retired, bonds that were any part of the total 400 million authorization. The same limitation would apply to the second 400 million in bonding, if same is approved by the voters on November 2nd. This is to say that over time the entire principal, interest and service charges on all water development bonding *must* be repaid into the State treasury.

The present quandary raised by the opponents of State loans for water development, regarding the present so-called drain on the State treasury, could at some time in the future create a quandary for some other special interest group(s); when a similar fight could develop on how the "surplus" income from water development loans repayment will be spent, and on or by whom.

To aid *The Cross Section* reader to evaluate the merits of their individual support or opposition to Proposition 1, the applicable portion of SJR 49—the constitutional amendment to be voted on—is set forth below:

(a) Section 49-c of Article III of the Texas Constitution is revised to read as follows:

"Sec. 49-c. Texas Water Development Bonds and Contracts

"(a) The issuance of Texas water development bonds is hereby authorized in an aggregate principal amount not to exceed $400 million. The legislature by a record affirmative two-thirds vote of the membership of each house may authorize the issuance of all or any part of an additional aggregate principal amount of Texas water development bonds not to exceed $400 million. Bonds authorized under this subsection may be issued only for such water development purposes as prescribed by law.

"(b) The issuance of Texas water development bonds is hereby authorized in an aggregate principal amount not to exceed $100 million, which bonds may be issued only for such water quality enhancement purposes as prescribed by law.

"(c) Texas development bonds are issued in such manner and installments and upon such terms and conditions, bear such rates of interest, and mature as prescribed by law. The legislature shall provide by law for such other implementation of this section as the legislature determines appropriate.

"(d) Texas water development bonds are secured by the full faith and credit of the state, and there is hereby appropriated out of the first money coming into the treasury in each fiscal year, not otherwise appropriated by this constitution, an amount which is sufficient to pay the principal and interest on such bonds that mature or become due during such fiscal year, less the amount in the sinking fund at the close of the prior fiscal year. No bonds authorized under this section may be issued without prior approval of the attorney general and registration by the comptroller of public accounts; after approval, registration, and delivery to the purchaser the bonds are incontestable.

"(e) The legislature by law may provide for the execution of contracts in excess of two years duration between the state or a state agency and the United States or any of its agencies to acquire or develop storage facilities in reservoirs constructed or to be constructed by the federal government. Contracts executed under this subsection are general obligations of the state and are part of the state debt authorized under Subsection (a) of this section.

"(f) No state fund established for purposes of water development, whether funded by the sale of Texas water development bonds or from other sources, may be used to finance a project that contemplates or results in removing surface water from the river basin of origin if the surface water is necessary to supply the reasonably foreseeable water requirements of the basin for the ensuing 50 years. This subsection does not apply to a removal of water on a temporary, interim basis. However, no such state fund may be used for the development of water resources from the Mississippi River.

"(g) The aggregate amount of bonds and contracts authorized by this section includes Texas water development bonds and contracts issued before the effective date of this amendment. Texas water development bonds or other evidences of indebtedness issued before the effective date of this amendment remain valid and enforceable in accordance with their terms and subject to all applicable terms and conditions. The state or a state agency shall continue to provide for a source or sources of payment in accordance with the terms of these bonds or other evidences of indebtedness until the obligations are paid in full.

"(h) No single water development project requiring an expenditure of proceeds of Texas water development bonds in an aggregate amount in excess of $35 million may be undertaken unless:

"(1) the expenditure is approved by concurrent resolution adopted by a majority of the members of each house of the legislature; or

"(2) the project is a part of a statewide water development plan approved by concurrent resolution adopted by a majority of the members of each house of the legislature."

(b) Subdivisions (a) and (c) of the constitutional amendment proposed by this section do not become effective until implemented by law.

(c) Sections 49-d and 49-d-1 of Article III of the Texas Constitution are repealed.

(d) The constitutional amendment proposed by this section is to be submitted to a vote of the qualified electors at an election to be held on the first Tuesday after the first Monday in November, 1976, at which election the ballots are to provide for voting for or against the proposition: "The constitu-

continued on page 4 . . . WATER

A 25-member delegation, consisting of directors of Nebraska National Resource Districts, the Nebraska Association of Resource Districts, the Nebraska Agricultural Extension Service, the University of Nebraska and some individual irrigation farmers visited in the District offices on August 25th to review the District's groundwater management programs. This is the third such delegation from Nebraska to visit this District. The Nebraska delegation also travelled to Roswell, New Mexico, to review the groundwater programs of the New Mexico State Engineers Office in the Roswell basin.

Part of the audience attending the TWDB public forum, as viewed from the table where TWDB Members were sitting. TWDB photograph. (See related story page 1).

EAST . . . continued from page 1

ized by the U.S. Congress on September 3, 1954) to be constructed in cooperation with the Texas Water Development Board, and with three local (water user) sponsors, consisting of the North Texas Municipal Water District, Sulphur River Municipal Water District and the City of Irving (Dallas County).

The original 20-page TWDB- Corps contract for the Cooper Project—executed on March 29, 1968—also provided for the construction of two other downstream (of Cooper) reservoirs; the construction of pumpback facilities, to pump water upstream into Cooper Reservoir from the downstream reservoirs; State storage in and the use of the downstream (from Cooper) Texarkana Lake in the water transfer provision of the 1968 Texas Water Plan; and storage and release facilities for water quality maintenance (through dilution)—as required by the Federal Water Pollution Control Agency (now the Environmental Protection Agency); with all of the construction, maintenance and operating costs for same to be borne by the TWDB.

In their (TWDB) order rescinding the original and providing for a new TWDB - Corps contract for the Cooper Project, the water transfer provision (downstream reservoirs and other pumpback appurtenances) were eliminated; with the TWDB, by way of explanation, noting the "uncertainty" of the schedule for implementing the transfer of water envisioned by the Texas Water Plan. However, in its letter of transfer of the proposed TWDB - Corps contract, dated July 28, 1976, the TWDB pointedly noted:

By letter dated 15 April 1969 attached as Exhibit I in the aforementioned recision agreement the Board indicated its intent to reserve its right under the existing agreement to utilize the Cooper Project for the transport of water in conjunction with the Texas Water Plan or any valid modification thereof if and when a need for such transport arises. It is not intended therefore by the Texas Water Development Board in the execution of the enclosed recision instrument to relinquish, diminish, alter or release any right to pass water through Cooper Project.

The enclosure is therefore delivered to you upon the specific condition that it shall not be effective nor binding upon the State of Texas nor the Texas Water Development Board unless and until it is accepted by the United States of America with the agreement on the part of the United States that the enclosure shall never be construed as releasing, reducing or altering any right to move water through Cooper Project by the State of Texas or the Texas Water Development Board. Also, the enclosed recision agreement is not to be construed as precluding the negotiation of future agreements between the State of Texas or the Texas Water Development Board or its successor in interest and the government for the detailed implementation of such transport of waters by the State of Texas, the Texas Water Development Board or its successor in interest; provided, that such right shall be exercised without cost or expense to the United States, but at the cost and expense of the State of Texas, further that the exercise of the above right to transport water through Cooper Project will avoid reduction of either volume or quality of water assigned to conservation storage in the reservoir and will avoid adverse effect on flood control.

In essence the TWDB agreed to contract for the construction of the Cooper Project provided that they (TWDB) could at some time in the future, if ever appropriate, *negotiate to contract* for the use of the Cooper Project for transfer of the State's streamflow, *provided* that the *total costs* of this provision would be borne by the *State of Texas* (TWDB), and that such provisions *would not reduce the volume of storage or quality of water in storage and not adversely affect the flood control capabilities* of the Cooper Project.

In their suit the North Texas Municipal Water District questioned the TWDB's ability to actually use the Cooper Project as a pass through reservoir and still maintain the water storage provision of the proposed or original contract, and the TWDB's promises in their letter of transmittal of the proposed TWDB - Corps contract.

The water transfer pass through provisions of the letter of transmittal of the proposed (July 28, 1976) TWDB - Corps contract were hotly debated at the TWDB's monthly meeting held on September 21, 1976. With Mr. George McCleskey (the "law professional" Member of the six-Member TWDB) insisting that the pass through provision be retained in the letter of transmittal of July 28, 1976. Mr. McCleskey's efforts resulted in a vote of 4-2 to retain the pass through intent in the subject letter of transmittal.

In his letter of August 31st, advising the TWDB that the North Texas Municipal Water District intended to sue the TWDB if they did not rescind their order of July 20, 1976, the TWDB meeting at which they approved the revised TWDB - Corps contract and specifying that the pass through provision would be a condition for its acceptance by the TWDB, the executive director of the North Texas Municipal Water District, Carl Riehm, noted that *after* the TWDB would rescind their insistance for the pass through provision of the Cooper Project, the North Texas Municipal Water District, and other local sponsors, would *then* work ". . . to develop a program to pass water through Cooper Reservoir, or any other reservoir in this State . . ."—*at best a paradoxical statement of intent.*

WATER RIGHTS ADJUDICATION

Constitutional . . . .

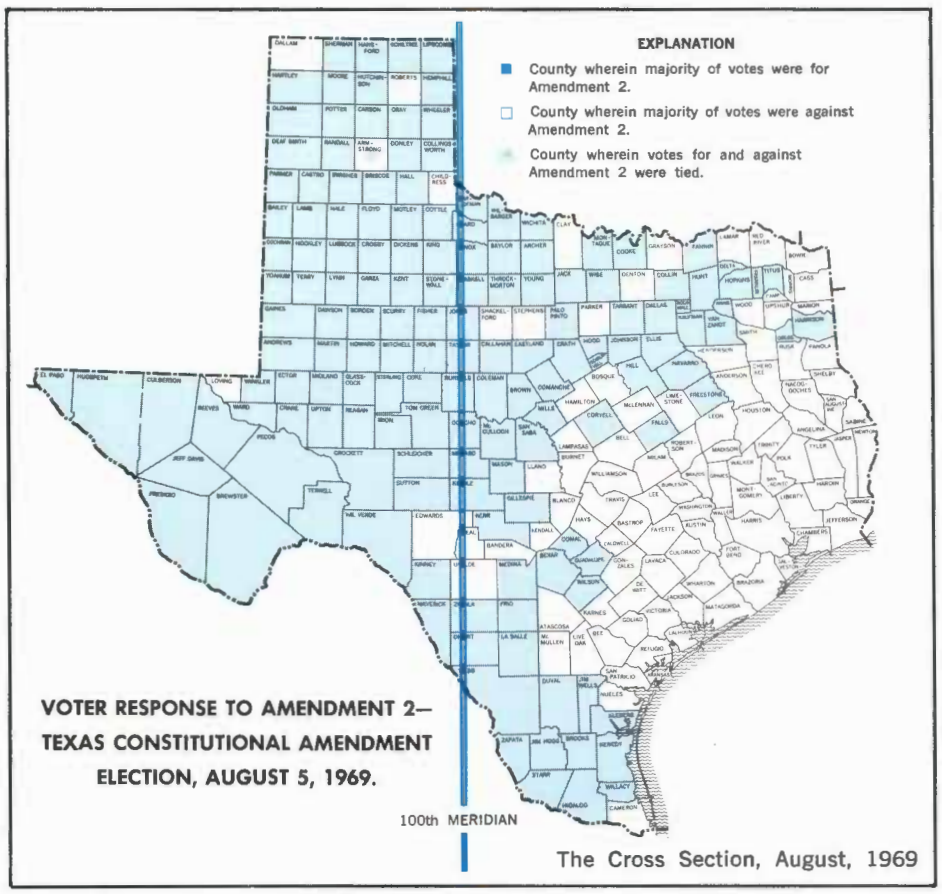
According to Tim Brown, Chief Legal Council for the Texas Water Rights Commission, the suit styled, *In The Matter Of The Adjudication Of The Cibolo Creek Watershed, San Antonio River Basin,* has, for the first time, been ruled on by the Bexar County District Court (subject to appeal) which may provide the resolution of the constitutionality of the water rights adjudication act.

The water rights adjudication act, passed by the Texas Legislature and signed into Law by Governor Preston Smith in 1967, provides that the Texas Water Rights Commission could, after public hearings, determine the absolute stream water rights both riparian (rights to use water from streams because of land ownership appurtenant to such streams) and appropriative (the right to appropriate water from a stream through permits issued by the State's water rights agency—the Texas Water Rights Commission and its predecessor agencies), by the majority vote (two) of three member Texas Water Rights Commission.

The adjudication (determining who has streamflow water rights) has long been the practice in most western states; however, Texans resisted allowing such broad powers to a State agency until there was a myriad of court decrees, and a breakdown of an understanding workability of the riparian doctrine. The final emphasis to accepting the concept of State agency water rights adjudication is often credited to the very complex, and far reaching inroad of the courts into administering water rights and water allocations, fostered by the very lengthy and costly (reportedly 10 million dollars), *State vs. Hidalgo County WCID No. 1,* case decided by Judge Starley in 1965.

Now, however, it appears that the power of the Texas Water Rights Commission to proceed with a program of settling water rights along all Texas intrastate streams has been established (subject to appeal), and it is expected that the Commission will abide by the mounting critique that they expedite adjudication proceedings.

Two former District employees, Bill Waddle, now the General Manager of the Texas Water Conservation Association, and Wayne Wyatt, now the Head of the Water Import Division of the TWDB, visit in the District office during the TWDB public forum. (See story page 1).



VOTER RESPONSE TO AMENDMENT 2— TEXAS CONSTITUTIONAL AMENDMENT ELECTION, AUGUST 5, 1969.

WATER . . . continued from page 2

tional amendment authorizing an increase of $400 million in the amount of Texas Water Development Bonds that may be issued on approval of two-thirds of the legislature; amending and consolidating provisions of Sections 49-c, 49-d, and 49-d-1 of Article III of the Texas Constitution; and repealing Sections 49-d and 49-d-1 of Article III of the Texas Constitution."

Analysis Of SJR 49

The Texas Legislature, the peoples' representatives in government, inserted provisions in SJR 49 that require Legislative approval, and other Legislative controls, over the amount of bonds authorized for sale and the magnitude of loans made by the Texas Water Development Board [Sec. 49c (a), (c) and (h) (1) and (2) and (2) (b)]. Therefore it is probable that the magnitude of the votes cast for and against Proposition 1 at the election of November 2nd *could* influence the Legislatures' future deliberation on implementing [the 2/3rds approval requirement, Sec. 49c, (a); and the majority vote requirement, Sec. 49c, (h) and (h) (1)] SJR49 should it be approved by the voters on November 2nd.

A Legislator representing a district wherein the proposition was defeated or approved by a narrow margin may find himself in a quandary as to how to cast his votes in implementing the many provisions of SJR 49. In any event the majority vote provision of Sec. 49c (h) (1) may result in the repeated revival of (the self destructing) sectionalism typical of water debates in the past, and/or unnecessary pork-barrelism. Therefore without an overwhelming voter approval of SJR 49, the swift and equitable implementation of the provisions of SJR 49 may be in jeopardy, and the economic, recreational and environmental interests of the entire State will suffer.

The sectional protectionism exhibited by Sec. 49c (f) is less than gratifying to the West Texan, as it should be to any Texan. The first question that confronts the voter is why they should approve state loans to entities outside of their particular area (or even in an adjacent river basin) under a program with such restriction that will probably prevent them from ever receiving any water developed thereby. And, the Mississippi River water development prohibition is particularly questionable to anyone seeing a need to import water to any part of Texas. However, the Texas Legislature in taking the pains to specify ". . . the Mississippi River", could be interpreted to be their recognition that importation from other rivers outside of Texas was a distinct possibility *and a probable necessity* to Texas' best (Statewide) interests.

How Voting Will Go

A review of the voting pattern of the hotly contested Statewide water development bonding election of August 5, 1969, may provide some insight into the water development philosophy of Texans.

The 1969 election concerned the possible issuance of $3.5 billion dollars in bonds to finance the 1968 Texas Water Plan. Since the 1968 Texas Water Plan contained a concept for import of surface water from the Mississippi River basin to West Texas, the opposition claimed the bonding provisions were to implement the West Texas import concept—*even though the proposed import concepts were not scheduled for State funding as set forth in the 1968 Plan.* The opponents to SJR 49 are making the same claim today, in spite of the prohibition for such funding as set forth by SJR 49. In actuality, the total aggregate of 800 million in Texas Water Development bonds could only totally finance the building of a fraction of even the limited number of water development projects recommended by the Governor's Water Conservation and Development Advisory Task Force, all such projects being located in Central, East, Northeast and Southeast Texas.

The map on page 4 shows the overwhelming support of the West Texas voter for the 1969 water bond issue. The repeated support of West Texans for water development projects, to be located anywhere in Texas, is historic, and their response to Propositions 1 and 2 can probably be expected to follow their historical trend.

An analysis of voter response in the 1969 water development bonding election is summarized in the table, "Summary of Voter Response to the 1969 Water Development Bonding Issue".

1976 Election Is Different

For the first time a major, contested water development election will be held in conjunction with the Statewide and National election.

Voters, even those totally unaware or uninformed of the water bonding issue, will be privileged to cast a vote on same, along with their choice for President and Vice-President of the United States, a U.S. Senator from Texas, several U.S. Congressmen and scores of Texas Legislators and other State offices (except the Governorship). In the previous water bonding elections the voter response was somewhat limited to the proponents for water development, *the water hustlers* and the opponents of water development, *the environmental hustlers.*

With this water bonding issue being held in conjunction with the general election, it would be fortunate if there were a sizable voter turnout, in order to establish a mandate to one faction or the other—*the water hustlers or the environmental hustlers.*

TAX INSTITUTE

Texas Tech University

The annual Texas Tech University Tax Institute will be held at Texas Tech University, Lubbock, Texas, on October 7 and 8, 1976.

Frank Rayner, the District Manager, will speak on, "Maintaining The Groundwater Tax Allowance Program", at the Friday (October 8th) luncheon.

Copies of the Tax Institute program can be secured from the District, or by contacting Haskell G. Taylor, Executive Secretary, Texas Tech Tax Institute, Box 4129, Tech Station, Lubbock, Texas 79409.

SUMMARY OF VOTER RESPONSE TO THE 1969 WATER DEVELOPMENT BONDING ISSUE [PROPOSED AMENDMENT (2) TO THE TEXAS CONSTITUTION]

Area In Texas	Average of Percentages of Votes Cast For	Against	Percentages of Registered Voters Who Voted	Percentages of Counties With a Majority Voting For Amendment 2
High Plains Underground Water Conservation District No. 1	83.87	16.13	29.33	100
West of 100th Meridian	73.59	29.11	22.02	93.9 (78 of 83 Counties)
East of 100th Meridian	48.73	51.27	20.44	45.0 (77 of 171 Counties)
Statewide	49.50	50.50	17.87	61.0 (155 of 254 Counties)

HIGH PLAINS UNDERGROUND WATER CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 22—No. 10 "THERE IS NO SUBSTITUTE FOR WATER" *October, 1976*

JUDGE DENT . . . A MEMORIAL

Otha F. Dent, a long-time veteran of the Texas Water Rights Commission, died October 1, 1976, in an Austin hospital.

Judge Dent served more than 20 years as county judge of Lamb County, before accepting an appointment by former Texas Governor Allan Shivers, to the Texas State Board of Water Engineers in 1953. He was reappointed in 1959 to the Board, which underwent a name change approved in 1962, to the Texas Water Commission. Judge Dent was reappointed in 1965 by former Texas Governor John Connolly, and the name of the commission was changed to Texas Water Rights Commission the same year.

In 1971, he was reappointed by former Texas Governor Preston Smith to a six-year term and served until his retirement on July 15, 1974. He served as chairman of the commission for more than three years.

Judge Dent was active in developing the present Ground Water Code and assisted in the enactment of the groundwater districts enabling legislation by the Texas Legislature in 1949.

A native Texan, he attended Southwestern State Teachers College in Weatherford, Oklahoma, and was married to the former Hettye Crawford in Olustee, Oklahoma, in 1925. The couple moved to the Springlake-Earth area in 1927.

At the time of his death, Judge Dent was 70 years of age.

In recognition of this well-known Texas water leader, the District's Board of Directors adopted the following resolution:

Whereas: Otha Dent, affectionately called Judge Dent, a distinguished and respected native of Lamb County, Texas, departed this life on Oct. 1, 1976, and,

Whereas: Judge Dent had dedicated nearly all his adult life to public service in the interests of water conservation, water development and water rights adjudication for the benefit of all Texans, and,

Whereas: Judge Dent was a viable force for the preservation of the principles of equitable and democratic development and management of ground and surface water supplies in the interests of all Texans, and,

Whereas: Judge Dent was an outspoken advocate for the continuation of private ownership of groundwater, and,

JUDGE OTHA DENT

Whereas: Judge Dent was a pioneering and long time advocate and supporter of the principle of groundwater management through local governmental districts, subject to administration by local elected officials:

Therefore Be It Resolved: That on this, the 19th day of October, 1976, the Board of Directors of the High Plains Underground Water Conservation District, No. 1, does respectfully recognize and eulogize the many accomplishments and contributions of this exemplary public servant, and,

Be It Further Resolved: That this resolution be made a permanent part of the records of the High Plains Underground Water Conservation District, No. 1, and that a copy of this resolution be presented to the family of Judge Dent.

GROUNDWATER MANAGEMENT DISTRICTS ASSOCIATION

1976 Conference

See Program on Page 3

New Well Rules Considered

The drilling and producing of large capacity water wells on small tracts of land has been a continuing problem within the District.

In the early 1950s the District adopted the attitude that developing large capacity wells on small land tracts was not an equitable manner in which to develop the aquifer, and that such practices were particularly injurious to the land owner-irrigator who must, by necessity, acquire large land tracts, and hence acquire large reserves of groundwater, in order to utilize (by crop irrigation) the groundwater reserves thus acquired. However, municipalities and industries need to acquire only enough land area upon which to place a large capacity well (sometimes as small as a few square feet), since usage of water extracted therefrom is usually at some distant point, and does not require adjacent land surface areas for application of the water pumped.

In the early 1950s, one city in the District acquired 17 widely spaced (along a gathering pipeline) one-acre tracts upon which they developed municipal supply wells.

Recently one city within the District purchased a one-acre tract upon which they developed a municipal supply well. At the maximum rated capacity of the subject well, the pumpage therefrom would extract a volume of water equivalent to the total amount of water in storage beneath the subject one-acre tract within 22 days. Since the subject city intends to operate this well for several years, it is obvious that the water pumped therefrom must be supplied from the water in storage beneath adjacent lands—that is, supplied by other groundwater owners.

The area of influence of a pumping well—the drawdown cone around a pumping well—in the Ogallala aquifer, is determined primarily by the rate and length of time of continuous pumping of such wells. That is, wells pumping at a high gallonage for extended periods of continuous pumping create a drawdown cone that causes water to move toward the pumping well from areas of relatively great distances from the pumping well. Therefore, if a large capacity well is operated for extended time periods

—continued on page 2 . . . RULES

MAILING LIST CUT

. . . Cross Section Addresses Needed

The task of revising the mailing list for The Cross Section will be completed with this issue. This will be the last issue of The Cross Section that will be mailed under the old mailing list; new metal plates are being embossed for use in mailing the November issue.

Revising of The Cross Section mailing list has been mandatory due to several factors, some of which are;

1) the present mailing list has not been revised (purged) since its inception in 1954, so numerous duplications, erroneous addresses and mailings to those now deceased are included in the present list; 2) address formats have been changed; 3) the present machines used for addressing are more than 25 years old, obsolete and worn, and they have been replaced by new automated equipment (to decrease addressing costs), and the new machines require new address plates; and 4) revision (reduction) of the mailing list to eliminate duplications and those no longer wishing to receive The Cross Section, will hopefully, result in some reduction in printing (paper) and mailing costs (or at least some stabilization of presently rising costs).

A self-addressed and postage-paid post card was included with the mailing of the January, 1976, issue for use by those desiring to continue to receive The Cross Section. Follow-up notices for inclusion in the new Cross Section mailing list were contained in the February and June issues of The Cross Section.

Since the new revised list contains approximately 30 percent of the 12,000 addresses on the old mailing list, it is evident that the majority of the present recipients of The Cross Section shall not receive the November and succeeding issues. Therefore the District *earnestly requests* that anyone wishing to continue to receive The Cross Section to supply to the District their present address to insure its inclusion on the new mailing list. If you have any doubts as to whether you are on the new list, *please submit your address. Do not be concerned with duplication,* the District will eliminate same by machine programming.

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

Telephone 762-0181

FRANK RAYNER, Editor

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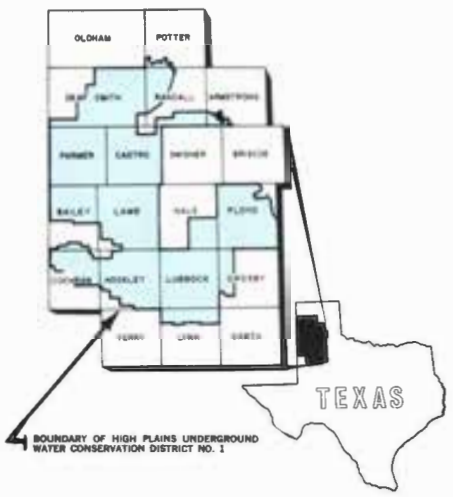

NOTICE: Information regarding times and places of the monthly County Committee meeting can be secured from the respective County Secretaries.

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.

RULES . . . continued from page 1

and the well is near the boundary of the property whereon located, it is probable that a large amount of water extracted from such a well would have been supplied by the owner of the groundwater beneath adjacent lands.

Since, as a general rule, municipal and industrial wells are subject to relatively long pumping cycles, as compared to that of the normal irrigation well, the District early recognized that the normal operation of municipal and industrial wells located adjacent to property lines would constitute an inequitable infringement upon the water rights of adjacent landowners. In consideration of this and other extenuating circumstances, the District adopted a policy that requires municipal and industrial wells to be located away from such property lines at least one-half the minimum spacing required between wells, as specified by the District's rules.

For several years such a *policy* operated with varying degrees of success; however, in more recent times as a result of increasing land prices, and the complexities created in several areas by severing the rights to the groundwater stored beneath land from the in-fee ownership of the land surface, there has developed several conflicts between the groundwater rights owners and overlying land surface owners, regarding the irrigation of the land surface over the water rights areas owned by others by the land surface owners acquiring small land tracts adjacent to such separately owned water rights areas and the development of large capacity irrigation wells thereon. This practice has prompted the municipal and industrial owners of large water rights areas to demand that the District's property lone space rule be reciprocative to irrigation wells in the subject areas of conflict.

As a result of the large number of wells that have been completed within the District during its 24-year history, and as a result of the district's well-spacing requirements, there is an ever increasing competition for legitimate well sites. The increasing conflicts over well sites have prompted the District's Board of Directors to develop for consideration and discussion drafts of possible rules to alleviate well site and groundwater-rights conflicts.

The new rules, and the related rule changes, presently under consideration are as follows:

RULE 8 A—Minimum Acreage Requirements

A. The minimum contiguous land-surface area, or contiguous groundwater rights area (acreages), shall be required for the drilling and operation of water wells of the pumping capacity rates as set forth below:

Individual Well Pumping Rate in Gallons Per Minute	Minimum Acreage Requirements
More than 69.4 to 265	20
More than 265 to 390	30
More than 390 to 560	50
More than 560 to 1,000	80
More than 1,000	100

For the purposes of this rule, land-surface area and groundwater rights area shall mean all contiguous land or groundwater rights owned or controlled by a person which is not separated from other land or groundwater rights owned or controlled by the same person. Any such area which is separated by land or groundwater rights owned or controlled by another person or by publically owned land or groundwater rights area shall not be considered contiguous. Any voluntary subdivision or parceling of land or groundwater rights areas for the purpose of circumventing the requirements of this Rule shall be considered a fraud upon the District.

The requirements of the Rule shall be cumulative to all well spacing requirements as set forth by Rule 8, and all other District rules.

RULE 8 B—Well locations from Boundaries

The acquisition of land or groundwater rights areas (tracts) for the purpose of locating water wells for any beneficial purpose, when such use is upon any other land or water rights area not a part of the tract from whence the groundwater is produced shall require that such wells be located at least one-half the minimum spacing distance required between wells, as set forth by Rule 8, from all boundaries of the subject land or groundwater rights area or at locations affording the maximum attainable distance from the boundaries of irregularly shaped or otherwise small land or groundwater rights tracts whereon these minimum boundary requirements are not attainable.

The requirements of this Rule shall be cumulative to all well spacing and minimum acreage requirements as set forth by Rule 8 and Rule 8 A, and all other District rules.

RULE 9—Exception to Well Spacing and Minimum Acreage Requirements

(Except for the title change this would be the same as the existing rule except for the additions of the minimum acreage provisions.)

The District *earnestly* solicits comments from all interested parties regarding the *draft for discussion* rules as set forth above. Any and all comments in any form will be most appreciated and all such comments will be given thorough consideration by the District's Board of Directors.

CROSBY COUNTY GROUNDWATER REPORT

The report, "Analytical Study of the Ogallala Aquifer in Crosby County, Texas," has been released by the Texas Water Development Board. This study was authored by A. Wayne Wyatt, Ann Bell and Shelly Morrison. Wyatt and Bell are former District employees.

Indicating the amount of groundwater presently available in the aquifer, the study also includes projections for future years, and the expected depletion rate for the next 44 years, with its anticipated effect on well pumping rates.

The conclusions of the study are that the depletion rate will ultimately result in reduced well yields, reduced acreage irrigated and expected reduction in agricultural production.

Copies of this report may be obtained from the High Plains Underground Water District No. 1 at 2930 Avenue Q, or by writing the Texas Water Development Board in Austin.

Kathy Redeker and Norma Fite display an oil painting purchased with funds given to the District by Mr. and Mrs. A. J. Malouf.

COURT DECLARES GROUNDWATER PUMPAGE FEE CONSTITUTIONAL IN TEXAS

The Harris-Galveston Coastal Subsidence District (HGCSD), consisting of the Texas Gulf Coast counties of Harris and Galveston, was created by the Texas Legislature in 1975 (HB 552, see the June 1976 issue of The Cross Section), for the purpose of abating the land surface subsidence caused by groundwater pumpage.

Well Permit Fee

Since there were no provisions in the law for a maintenance tax to provide operating revenues, the HGCSD established a *Permit Fee* at the rate of 1.2 cents per 1,000 gallons of groundwater withdrawn (through wells) from the aquifer. This fee, first established in January 1976, was to be paid in advance by all municipal, industrial and irrigation well owners or operators based upon their estimates of the quantity of their expected groundwater pumpage in 1976.

The 1976 prepaid fees amounted to $2,129,962.00, equivalent to $3.91 per acre foot of expected groundwater pumpage, or approximately $1,403.00 per permitted well. Based upon pumpage reports filed thus far in 1976, the HGCSD management expects that ten to fifteen percent of the prepaid pumpage fees will be rebated to the permittees, because of their failure to pump as much groundwater as they (the permittees) had originally estimated.

In recent action, the fifteen-member Board of Directors of the HGCSD set the 1977 *permit fee* at $0.69 per 1,000 gallons, or $2.25 per acre foot.

Rice Farmers Sue

Suits were filed against the HGCSD to prevent the district's assessing the permit fee on irrigation well pumpage by two (groups of) rice irrigation farmers in the Katy area (the subject suits were combined as Case Number 1,052,326, in the 215th Judicial District Court).

Courts Decision

After a lengthy trial, Judge Authur Lesher of the 215th Judicial District Court recently found for the HGCSD and declared the district's *permit fee* constitutional and collectable by the district. The Judge further noted, "Although the statute creating the district would have been more effective had the boundaries included counties other than Harris and Galveston, and although a more equitable order could have been drawn by the district's board, this court, based on the facts and the law, has no other alternative than to find the statue to be constitutional and the board's order not so unreasonable as to violate the substantial evidence rule".

This, a very important precedent setting decision, is subject to appeal. However, it has established, at least for the interim, some very noteworthy groundwater law in Texas.

AGRICULTURAL QUESTIONNAIRE IMPORTANT TO TEXAS ECONOMY

During the last half of November and in December, some 75,000 farmers and ranchers will receive either a crop or livestock questionnaire from the Texas Crop and Livestock Reporting Service. Accurate estimates have always been of great importance of producers and are even more important in light of the supply-demand situation facing agriculture today. Data collected in this survey will provide an accurate picture of agriculture for each country and for the state of Texas. Each farmer receiving a questionnaire is urged to fill it out carefully and return it promptly to the Agricultural Statistician in Austin. Individual reports are confidential and used only for state and county estimates.

GROUNDWATER MANAGEMENT MEETING
GMDA 1976 Conference

The first annual meeting of the Groundwater Management Districts Association (GMDA) is scheduled for December 8 and 9, 1976, at the Four Seasons Inn, Colorado Springs, Colorado.

The theme and program of the meeting is as set forth below. All persons interested in or affected by groundwater management are urged to attend this conference.

Copies of 1976 GMDA program and pre-registration form can be secured from the District and by contacting Mr. Mel Noffke, Box 195, York, Nebraska 68467. Additional information regarding the GMDA can be obtained from the District, Mr. Noffke or any other GMDA Director, and by reference to the December 1975 and March 1976 issues of The Cross Section.

ENERGY

The energy problems facing irrigated agriculture are many. How long will natural gas be available to irrigators? Diesel? Propane? What will electricity cost? Can we get it? Deregulation? FPC and priorities of use?

WHAT ARE THE ENERGY ALTERNATIVES OF THE IRRIGATORS IN YOUR DISTRICT?

LEGISLATION

As water becomes more scarce and competition for remaining supplies becomes greater—WHO will emerge as the dominant authority over groundwater? Federal—State—Area—Local? Industry—Municipal—Wildlife—Agriculture—Environment?

HOW AGGRESSIVE WILL YOUR DISTRICT BE?

MANAGEMENT

Regardless of the outcome of energy and water right battles, more efficient water management by users is a necessity. Efficient distribution systems, water metering, soil moisture monitoring, and irrigation scheduling are some of the options.

WHAT ROLE WILL YOUR DISTRICT PLAY IN IMPROVING ON-THE-FARM EFFICIENCY?

WEDNESDAY, DECEMBER 8

PANEL—ENERGY AND IRRIGATED AGRICULTURE

"National Trends for Agricultural Energy"
B. L. Clary

"Alternative Energy Uses in Irrigated Agriculture"
William Splinter

"Outlook for Energy Costs and Implications for Irrigated Agriculture"
Ronald D. Lacewell

"Availability of Power from Rural Electrics for Irrigation Pumping"
Delbert (Del) Hardy

"Protecting and Managing Agricultural Water to meet the world's food needs"
Donal D. Johnson

"Role of State Legislation in Groundwater Management"
Robert Emmett Clark

"Update on Rules and Regulations Affecting Groundwater"—Federal Level
John Hanlon

District Exchange Activities—Innovations—Problems (Member Districts of GMDA will be called to report)

State Caucuses

THURSDAY, DECEMBER 9

PANEL IRRIGATION SCHEDULING
"Production vs. Water Conservation vs. Energy"

"Implementing Scheduling—Why and Who?"
Darrell Watts and Dale Heerman

"Role of Consultant"
Fred Corey

"Experiences with Scheduling, Individual"
Jack Schneider

"Experiences with Scheduling, District"
Dennis Bejot

Jack Page, Internal Revenue Service Engineer; Don McReynolds; B. C. Selden, Internal Revenue Service Engineer; Don Smith and Frank Rayner review the District's cost-in-water-depletion income tax allowance program. Messrs. Selden and Page spent two days in the District's office discussing approaches to solutions of problems encountered in the long-term management of the tax allowance program.

GROUNDWATER MANAGEMENT
. . . The Views Of The People

The views of the people concerning the High Plains groundwater management districts activities have been compiled into a book by Frank L. Baird, associate professor of political science at Texas Tech University.

The report is titled "District Groundwater Planning and Management Policies on the Texas High Plains: The Views of the People." The results of Dr. Baird's research were first presented as a paper before the Groundwater Management Districts Association's annual meeting in Dodge City, Kansas, in December, 1975. It was subsequently reproduced in the proceedings of that conference.

Questionnaires focusing upon a variety of characteristics and attitudes toward alternate suggestions for groundwater management were administered to 1500 irrigation farmers in the Texas High Plains.

While the overall objective of the study was to determine attitudes toward conservation districts, specifically the project sought to ascertain if farmers believed that water management should be left to the individual, a local groundwater district, a state or federal agency, or a combination of such agencies.

The study also measured urban attitudes and recorded the feelings of college students toward water planning and management.

Research on Dr. Baird's report was financed by a grant from the Office of Water Resources Research of the U. S. Department of the Interior through the Texas Water Resources Institute of Texas A & M University. The publication was edited by Mrs. Rebecca Clinton, former Director of Public Education for the High Plains Underground Water District No. 1. Copies of the report may be obtained from Dr. Baird or the District.

NEW EPA RULES

The Environmental Protection Agency (EPA) published their proposed rules for, "Grants for State Underground Water Source Protection Program" and "State Underground Injection Control Program," in the Federal Register of Aug. 31, 1976.

The EPA held three public meetings — Washington, D.C., September 29; Denver, Colorado, October 6; and Dallas, Texas, October 13—to receive public comment on their proposed subsurface injection rules.

Although all the public hearings have been concluded, written comments will be accepted by the EPA through November 15, 1976. Written comments, in triplicate copy, should be addressed to the Office of Water Supply, Environmental Protection Agency, Washington, D.C., 20460, Attention: Comment Clerk, State Underground Injection Control Program Regulation.

Copies of the statement of the High Plains Underground Water Conservation District No. 1, presented by Don Smith, geologist on the district's staff, at the Dallas hearing will be supplied to anyone requesting same by contacting this district.

All groundwater interests are urged to secure a copy of the proposed EPA rules and submit any comments they deem appropriate to the EPA before November 15, 1976.

KATHY REDEKER

The first person to greet visitors to the office of the High Plains Underground Water Conservation District No. 1 is Miss Kathy Redeker, the District's congenial receptionist and secretary.

Although Kathy has been employed by the District since May, 1975, it has been noted that she has been previously overlooked in the Cross Section.

A 1973 graduate of Coronado High School, Kathy attended Texas Tech University as an art major before coming to work for the District. Her hobbies are drawing, skiing (both kinds), swimming, and sewing. She also loves to travel, especially if she can fly.

Since she has a brother who lives in Denver, she likes to go snow skiing in Colorado. She has friends in Shreveport, Louisiana, and goes there for water skiing.

Her drawings are still-lifes, she says, and animals are her favorite subjects.

VOTE ON CONSTITUTIONAL AMENDMENTS-- Proposition Numbers 1 & 2 NOV. 2

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 22—No. 11 "THERE IS NO SUBSTITUTE FOR WATER" *November, 1976*

Texas Supreme Court Rules For District

On November 3, 1976, the Texas Supreme Court found that there was no reversible error in the Court of Civil Appeals, Seventh Supreme Judicial District, Amarillo, Texas, decision of June 21, 1976, finding for the District in the suit styled Lewis Cox and Son, Incorporated vs. High Plains Underground Water Conservation District No. 1 (No. 8687).

The Cox case involved the District's ordering of the closing of an irrigation well on the Lewis Cox and Son, Incorporated (hereinafter referred to as the Cox Corporation), Floyd County farm. The acquiescence of the Texas Supreme Court in the opinion of the Court of Civil Appeals established some very far reaching and notable court case law that affects the governing structure of water districts, and other units of government throughout Texas, by its affirmation of such governmental units immunity to the *statutes of limitations, laches, and estoppel.*

History of Cox Case

On January 25, 1968, Mr. Cecil Cox, tenant for J. B. Cox, then the owner of the Cox Corporation farm (Mr. Cecil Cox and J. B. Cox are brothers to Mr. Lewis Cox) applied to the District (Application for Water Well Permit No. 3183) to drill, equip and operate a 6-inch (390 to 560 gallons per minute) well in the northwest corner of the now Cox Corporation property. Application 3183 stated that there was only one well within 440 yards of the proposed well location, that being a well (here identified as Application for Water Well Permit No. 1608, applied for on March 4, 1959, by Cecil and Lewis Cox) on the now Douglas Cox (a brother to Lewis Cox) property immediately west of the present Cox Corporation farm. The 1968 J. B. Cox application stated the well applied for under Application 3183 was located 440 measured yards west of the proposed location of the well applied for under Application 1608.

On March 15, 1968, a Registration and Log of Well report for the well reportedly drilled under Application 3183 was filed with the District.

On June 19, 1971, Mr. J. B. Cox amended Application 3183 to Application 3183-A, amending slightly the reportedly *measured* distance specifying the location of the well, and specifying that the now Douglas Cox well (Application 1608) was 446 *measured* yards from the well being applied for. Testimony at a later trial showed that the amendment to Application 3183 was requested by the lending agency reportedly financially involved in the ownership transfer of the property whereon the subject well was located.

County Surveys

As a part of the District's continuing groundwater studies, a survey of the location of all water wells in Floyd County was completed in January of 1974. This survey revealed that the Cox Corporation well (Application 3183 or 3183-A) was located only 149 yards from the well (Application 1608) now owned by Douglas Cox.

County Committee Hearing

A public hearing before the District's Floyd County Committee, with the Floyd County Member to the District's Board of Directors, staff personnel, and Mr. Lewis and Douglas Cox present, was held in Floydada on December 3, 1974, to try to resolve the Cox Corporation and Douglas Cox well spacing conflict. At the conclu-

continued on page 2 . . . COURT

VOTERS REJECT WATER BONDING

As was predicted in the September issue of The Cross Section, West Texans continued their traditional support of water development projects in the State, by voting quite favorably on the proposed water bonding amendments (1 and 2) at the general election on November 2nd.

Proposition 1 was defeated statewide 1,190,583 to 908,642, but Proposition 2 passed with a fairly slim margin.

Proposition 2, by Constitutional amendment, will authorize an additional $100 million in bonds (for a total of $200 million) for water quality improvement. Such bonds are authorized for grants and loans to local governments to improve or develop sewage treatment systems.

Proposition 1 would have amended the State Constitution to authorize an additional $400 million for water development bonds.

An analysis of voting records show that many voters simply ignored the water bond issues, and did not vote on them at all. There was a general feeling among water authorities that most voters did not understand the bond issue (Proposition 1), or that they were frightened by the $400 million figure and automatically voted no.

General James M. Rose of Austin, Executive Director, and A. L. Black of Friona, Chairman of the Texas Water Development Board, both expressed the opinion that Amendment 1 failed because of lack of voter understanding, and that the well-organized effort against Proposition 1 was certainly detrimental to a favorable vote.

In the 33-county area of West Texas, including the High Plains, voters accepted Proposition 1 with a count of 89,704 for and 54,268 against. Proposition 2, the one which passed statewide, had a count of 92,938 for and 48,699 against in the 33-county area.

One of the questions facing the West Texas voter was why he should approve State loans to entities outside his particular area under a program with such restrictions as to prevent his area from ever receiving any water developed thereby. Considering that Proposition 1 would have clearly prohibited any of the funds from being used to import Mississippi River water, Amendment 1 could have been logically questioned by West Texans, or anyone who sees a need to import water to West Texas.

Of the 15 counties in the High Plains Underground Water Conservation District No. 1, all except Armstrong County favored the Amendment strongly. Most of the county totals in the District favored Proposition 1 by margins as high as 75 percent. The vote in Armstrong County was almost evenly divided with 49 percent for the bonds and 51 percent against. In 1969, Armstrong County vote on the proposed Texas Water Plan Bonding was exactly tied, the only County in Texas to have such a distinction.

Although a complete analysis on the bonding issues has not been prepared by the water agencies, it is evident that the long-term history of West Texans' interest in water matters is influential to them in any water bonding issue and they overwhelmingly support water development issues even though the water development is outside their areas, but of benefit to all Texas. The particularly overwhelming vote for water issues in the District counties is probably an indication of the long-time water conservation educational programs of the District and other entities in this area.

Frank Rayner (left) accepts an oil painting from Irene and Webb Gober. The landscape, painted by Mrs. Irene Gober, was given to the District by the artist and her husband. Webb is the Member to the District's Board of Director representing Bailey, Castro and Parmer Counties.

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

Telephone 762-0181

FRANK RAYNER, Editor

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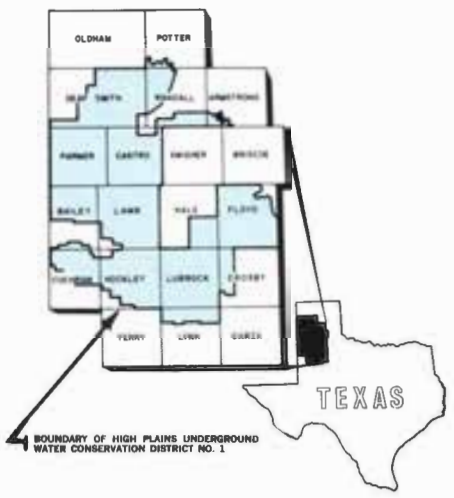
J. Dan Seale	Field Representative
Oscar Riemer	Field Representative
Butch Bates	Field Representative
Clifford Thompson	Head, Permit Section
Kenneth Carver	Asst., Permit Section
Mrs. Norma Fite	Secretary-Bookkeeper
Mrs. Pennye Newberry	Secretary
Miss Kathy Redeker	Receptionist



BOARD OF DIRECTORS

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James P. Mitchell — Wolfforth

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)

Selmer H. Schoenrock, President — Levelland

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)

A. W. Gober, Vice President — Farwell

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Billy Wayne Sisson, Secy.-Treasurer — Hereford

Precinct 5

(FLOYD and HALE COUNTIES)

Malvin A. Jarboe — Floydada

COUNTY COMMITTEEMEN

Armstrong County

Guy Watson, 1977	Wayside
C. D. Rogers, 1977	Wayside
Bill Heisler, 1977	Wayside
Charles Kennedy, 1979	Rt. 1, Happy
Cordell Mahler, 1979	Wayside

Bailey County

Doris Wedel, Secretary
H&R Block, 224 W. 2nd, Muleshoe

Eugene Shaw, 1977	Rt. 1, Muleshoe
Adolph Wittner, 1977	Star Rt., Baileyboro
Jessie Ray Carter, 1977	Rt. 5, Muleshoe
Marshal Head, 1979	Rt. 3, Muleshoe
Harold Layton, 1979	Rt. 2, Morton

Castro County

Garnett Holland, Secretary
City Hall, 120 Jones St., Dimmitt

Jackie Clark, 1977	Rt. 1, Box 33, Dimmitt
Joe Nelson, 1977	Box 73, Dimmitt
Bob Anthony, 1977	Rt. 4, Dimmitt
Anthony Acker, 1979	Rt. D, Nazareth
Glenn Odom, 1979	Rt. 4, Box 136, Dimmitt

Cochran County

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

Jessie Clayton, 1978	706 S. Main, Morton
Robert Yeary, 1978	Route 2, Morton
Hershel M. Tanner, 1980,	Route 2, Box 36, Morton
Danny Key 1980	Star Route 2, Morton
H. H. Rosson, 1980	Star Route 2, Morton

Crosby County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Donald Aycock, 1978	Lorenzo
Alvin Morrison, 1978	Box 6, Lorenzo
Tommy McCallister, 1980	209 N. Van Buren, Lorenzo
Edward S. Smith, 1980	102 N. Van Buren, Lorenzo
Pat Yoakum, 1980	Box 146, Lorenzo

Deaf Smith County

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

James E. Higgins, 1977	200 Star St., Hereford
Garland Solomon, 1977	Rt. 5, Hereford
W. L. Davis, 1977	Box 312, Hereford
Bill Cleavinger, 1979	Star Rt., Wildorado
George Ritter, 1979	Rt. 5, Hereford

Floyd County

Helen Bertrand, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

Joe Cunyus, 1978	Lockney
Fred Cardinal, 1978	Route 4, Floydada
C. O. Lyles, 1980	Route 4, Floydada
Connie Bearden, 1980	Route 1, Floydada
M. M. Smitherman, 1980	Silverton Star Rt., Floydada

Hale County

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

Henry Kveton, 1978	Route 2, Petersburg
Gaylord Groce, 1978	RFD, Petersburg
Clint Gregory, Jr., 1980	Box 98, Petersburg
Homer Roberson, 1980	Box 250, Petersburg
Henry Scarborough, 1980	Route 2, Petersburg

Hockley County

Jim Montgomery, Secretary
609 Austin Street, Levelland

J. E. Wade, 1978	Route 2, Levelland
Jimmy Price, 1978	Route 3, Levelland
Billy Ray Carter, 1980	Route 5, Levelland
Leon Young, 1980	Route 1, Ropesville
Robert Phillips, 1980	218 Redwood, Levelland

Lamb County

Robert Richards, Secretary
509 Phelps Avenue, Littlefield

Billy J. Langford, 1978	Box 381, Olton
Edward Fisher, 1978	Box 67, Sudan
P. A. Washington, 1980	Box 124, Springlake
Jack Stubblefield, 1980	Box 397, Spade
Larry Lockwood, 1980	Star Rt. 2, Littlefield

Lubbock County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Dan Young, 1978	4607 W. 14th St., Lubbock
Clifford Hilbers, 1978	RFD, Idalou
Don Bell, 1980	Box 114, Wolfforth
Ronald Schilling, 1980	Route 1, Slaton
Granville Igo, 1980	Route 1, Shallowater

Lynn County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Orville Maeker, 1978	Route 1, Wilson
Freddie Kieth, 1978	New Home
S. B. Rice, 1980	Route 1, Wilson
W. R. Steen, 1980	Route 2, Wilson
Wendell Morrow, 1980	Route 1, Wilson

Parmer County

Ken Horn, Secretary
Horn Insurance Agency, Bovina

Troy Christian, 1977	Rt. 1, Farwell
Joe Moore, 1977	Box J, Lazbuddie
Dalton Caffey, 1977	15th St., Friona
Floyd Reeve, 1979	Box 1196, Friona
Ralph Roming, 1979	809 Ridglea Dr., Bovina

Potter County

Henry W. Gerber, 1977	Rt. 1, Amarillo
Jim Line, 1977	Box 87, Bushland
Albert Nichols, 1977	Rt. 1, Box 491, Amarillo
F. G. Collard, 1979	Rt. 1, Box 433, Amarillo
W. J. Hill, 1979	Box 53, Bushland

Randall County

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

Harry LeGrand, 1977	4700 S. Bowie, Amarillo
Joe Albracht, 1977	Box 81, Bushland
Leonard Batenhorst, 1977	Rt. 1, Canyon
Bill Dugan, 1979	Rt. 2, Box 30, Happy
John F. Robinson, 1979	1002-7th St., Canyon

NOTICE: Information regarding times and places of the monthly County Committee meeting 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.

COURT . . . continued from page 1

sion of this hearing, the Floyd County Committee recommended to the District's Board of Directors that the Cox Corporation well (Application 3183-A) be required to be brought into compliance with the District's Rules and Regulations.

District Rules

The District's Rules specify that the minimum spacing required between wells of the capacity (6-inch wells) of the Cox Corporation and Douglas Cox wells is 300 yards—with the Cox Corporation well, the latest in time, being required to be spaced at least 300 yards from the Douglas Cox well.

Since the Cox Corporation well was even too close to the Douglas Cox well to permit it to be reduced to a 4-inch well (70 to 265 gallons per minute)—the minimum spacing between wells of the 4-inch size being 200 yards—the only other alternative, to comply with the District's rules, would be to reduce the size of the Cox Corporation well to produce no more than 69.4 gallons per minute; the maximum pumping capacity for any well not subject to the District's jurisdiction, or to abandon and plug the subject well in accordance with the Rules of the District.

Board Order

The District's Board of Directors, in public meeting in Lubbock, Texas, on December 17, 1974, received testimony from Mr. Lewis Cox and his attorney, Mr. Paul Lyle (of the Plainview, Texas, firm of Day, Owen and Lyle), and after deliberation, ordered that the Cox well was to be reequipped to produce less than 69.4 gallons per minute, or otherwise abandoned and plugged in accordance with the District's Rules.

Cox Sues

Mr. Lewis Cox and Son, Incorporated filed suit in the Hale County District Court, on January 15, 1975, seeking a temporary injunction to en-

continued on page 3 . . . COURT

Marshall Head (left), Bailey County Committeeman, confers with Webb Gober, Vice President of the District's Board of Directors, and James Wedel, husband of the District's Bailey County Secretary, Mrs. Doris Wedel, at the Bailey County Committee meeting with District personnel in Muleshoe, on November 15th.

Bailey County Committeemen Marshall Head and Jessie Carter confer during the Bailey County Committee meeting on November 15th. Also attending the Subject Meeting (not pictured) were Mrs. JoAnn Head, Mrs. Maxine Carter, Mr. and Mrs. Eugene (Donna) Shaw, Mrs. Doris Wedel, Mrs. Pat Nickell, and Messers. Butch Bates, Kenneth Carver, Frank Rayner, and Clifford Thompson.

COURT . . . continued from page 2

join the District from enforcing its order of December 17th. After a hearing on March 1, 1975, Judge John T. Boyd presiding, Judge Boyd ruled on May 13, 1975, that Lewis Cox and Son, Incorporated was not entitled to the injunctive relief sought in the Cox Corporation suit.

After the failure of the negotiation, between the attorneys for the Cox Corporation, Mr. Lyle, and the District's attorneys, Don Graf and Mack Swindle of the firm of Nelson, McCleskey, Harriger and Brazill, Lubbock, Texas, to arrive at a reasonable time frame for the reequipping or closing of the Cox Corporation well, the District, on September 22, 1975, filed a motion with the Hale County District Court for a summary judgment against Lewis Cox and Son, Incorporated. After hearing on October 22, 1975, Judge Boyd, on January 14, 1976, granted the District's petition for summary judgment.

When renewed negotiation between legal counsel representing the Cox Corporation and the District did not result in agreement as to the procedures for the Cox Corporation's compliance with the Court's orders, the Cox Corporation appealed Judge Boyd's decision to the Court of Civil Appeals, Seventh Supreme Judicial District, on February 22, 1976.

The appeal before the Court of Civil Appeals was heard on June 8, 1976, and the Civil Appeals Court entered their opinion, finding for the District, on June 21, 1976.

Opinion of the Court of Civil Appeals

In their suit the Cox Corporation contended that since more than seven years had passed from the time the irrigation well on the Cox Corporation, Floyd County farm had been drilled and the time the District ordered the well closed, the District's action was barred by: (1) statutes of limitation, (2) laches, and (3) estoppel. Statutes of limitation refer to statutes that bar or preclude the asserting of a right or claim because a specified number of years have elapsed. Laches refers to an unreasonably long delay in the assertion of a right, the consequence of which is the sufferance of damage or injury by the party seeking to invoke the doctrine of laches. Estoppel refers to a situation in which one party is precluded from asserting a right because of previous inconsistent conduct or actions. The appellant, Cox Corporation, contended that the District should be precluded from ordering the irrigation well closed because of these three legal theories.

The Court of Civil Appeals noted that the District was created pursuant to Article 16, Section 59 of the Texas Constitution and was ratified, confirmed and validated by a 1953 act of the Texas Legislature and that the District was given rule-making powers by Chapter 52.101, Vernon's Texas Civil Statutes, and declared that any rules, order or act of the District shall be prima facie (first view) valid (Chapter 52.303). The Court held therefore, that the District, like the State of Texas, cannot lose the right to protect the underground waters because of the three legal theories advanced by the Appellant. In short, the Court held that neither statutes of limitation, laches, nor estoppel can apply against the Water District to preclude it from enforcing its orders.

The Court of Civil Appeals concluded their opinion by stating:

"Because underground water conservation districts are governmental agencies or instrumentalities exercising state powers and stand upon the same footing as counties, and because governmental actions by counties are not subject to the general limitation statutes, the equitable doctrine of laches, or estoppel; it logically follows that the exercise of delegated state powers by underground water conservation districts is immune from these defenses. We hold, therefore, that neither the four years statute of limitation, nor the equitable doctrine of laches, nor estoppel is available to bar or estop the enforcement of the December, 1974, order of the High Plains Underground Water Conservation District."

Mr. Lyle, representing the Cox Corporation, petitioned the Court of Civil Appeals for a rehearing on July 6, 1976. The Court denied the appeal for rehearing on July 19, 1976, and Mr. Lyle filed application for writ of error before the Texas Supreme Court on August 18, 1976. The Texas Supreme Court refused to accept the appeal for writ of error, noting, on November 3, 1976, that they could find no grounds for reversal of the Court of Civil Appeals opinion of June 21, 1976.

Mrs. Bob (Pat) Anthony and Mrs. Glenn (Beth) Odom visit with Mr. Garnett Holland, the Secretary to the Castro County Commitee, at the Castro County Committee Meeting in Dimmitt, on November 22nd. Also attending the November 22nd meeting but not pictured on this page was Mr. Webb Gober, Vice President of the District's Board of Directors, Mrs. Garrett (Polly) Holland, Mr. and Mrs. Kenneth (Debbie) Stratton, Mrs. Pat Nickell, Mrs. Norma Fite, and Messers. Kenneth Carver, Clifford Thompson, and Frank Rayner.

District's Appeal to Well Applicants

Several Members of the District's Board of Directors have expressed regret that it has been necessary to order several wells closed over the past several years, and they have repeatedly appealed to landowners to make sure that their applications for water well permits are accurately and timely filed with the District, and that their water well drillers and pump suppliers comply with all provisions (location of well and pumping capacity of the equipment placed therein) of such well permits.

The District's immunity to—or capability to voluntarily adopt statutes of limitations, laches or estoppel—places a considerable burden upon the landowner and the District to make all reasonable efforts to comply with the District's well spacing and well capacity rules.

Although the prime, landowner-perferred locations for water wells are becoming increasingly unavailable with the notable historical, and continued, pace of water well development within the District, there are nevertheless nearly an unlimited number of alternative well sites still available to the landowners. Therefore it is a tragic economic burden, both upon the landowner and the District, to have to resort to court decreed arbitration of well location and well capacity suits, when such conflicts can be avoided by closer landowner-District cooperation *before* the drilling of water wells, where well spacing is so obviously a problem.

There is little reason for a landowner to risk losing the multi-thousands of dollars invested in a water well, without first making the nominal and very inexpensive efforts necessary to guarantee him a legitimate and protectable water well under the District's rules.

Pictured left to right are Bob Anthony, Glenn Odom, Louise Nelson, Joe Nelson, Sandra Clark and Jackie Clark. Messers. Anthony, Odom, Nelson and Clark are Members of the Castro County Committee. All were in attendance at the Castro County Committee Meeting, in Dimmitt, on November 22nd.

Selmer Schoenrock, President of the District's Board of Directors presents a plaque to Chester and Alice Mitchell honoring Mr. Mitchell for his 16 years service as a Floyd County Committeeman and as a Member and Past President of the District's Board of Directors.

Selmer Schoenrock, Laurena Kitten and Ray Kitten admire a plaque presented to Mr. Kitten honoring his service as a member and Past President to the District's Board of Directors.

EXERCISE YOUR RESPONSIBILITY
VOTE ON JANUARY 15, 1977

GROUNDWATER MANAGEMENT DISTRICTS TO MEET

The 1976 conference for Groundwater Management Districts Association is scheduled Dec. 8-9 at the Four Seasons Motor Inn in Colorado Springs, Colorado.

Discussions will cover such topics as energy and irrigated agriculture; protecting and managing agricultural water, legislation in groundwater management, and irrigation scheduling.

Program participants include Dave Pope, manager of Southwest Kansas GMD; Frank Rayner, manager of High Plains Underground Water District No. 1; Dr. B. L. Clary, associate professor of agricultural engineering at Oklahoma State University; Dr. William Splinter, Department of Agricultural Engineering at the University of Nebraska; Dr. Ronald Lacewell, Department of Agricultural Economics at Texas A & M University; Delbert L. Hardy, General Manager of the Y-W Electric Association, Inc.; Frank Dragoun, assistant manager of the Central Nebraska Public Power and Irrigation District; and Dr. Donal D. Johnson, dean of the College of Agriculture at Colorado State University;

Others are Dr. Robert Emmett Clark, Professor of Law at the University of Arizona; John Hanlon, District Coordinator for U.S. Representative Charles Thone; Dwayne Konrad, Extension Irrigation Engineer at Colorado State University; Dr. Darrell Watts, Extension Irrigation Engineer at the University of Nebraska; Dr. Dale Heerman, Agricultural Engineer for Agricultural Research Service; Fred Corey, Agricultural Technology Company; Jack Schneider, farmer from Yuma, Colorado; and Dennis Bejot, Agricultural Extension Agent from Seward, Nebraska.

Directors and officers for the Groundwater Management Districts Association are Frank Rayner, president; Frank Dragoun, vice-president; Keith Lebbin, secretary-treasurer; Ben Saunders, convention arrangements co-chairman; Gordon Thompson, convention arrangements co-chairman; Mel Noffke, program committee chairman; George Bergner, resolutions committee chairman; James McCray, director; Mrs. Bonita Hoeme, director; and Melvin Winger, director.

Cap and Ross Goodwin display the plaque awarded to him by the District honoring his participation in the development of the Texas groundwater districts enabling legislation, and his 14 years of service as a Bailey County Committeeman and as a Member and Past President of the District's Board of Directors.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT

THE Cross SECTION

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

Volume 22—No. 12 "THERE IS NO SUBSTITUTE FOR WATER" *December, 1976*

Members of the Board of Directors of the Groundwater Management Districts Association elected at the 1976 annual conference in Colorado Springs in December included, left to right, Ben Saunders, Holyoke, Colorado; Gordon Thompson, Wray, Colorado; James McCray, Panhandle, Texas; Mrs. Bonita Hoeme, Guymon, Oklahoma; Keith Lebbin, Scott City, Kansas; David Pope, Garden City, Kansas; Frank Rayner, (retiring President of GMDA) Lubbock, Texas; Mel Noffke, York, Nebraska; and Frank Dragoun, Holdrege, Nebraska. Frank Rayner congratulates Frank Dragoun on his assumption of the Presidency of GMDA for 1977.

DISTRICT ELECTION JANUARY 15, 1977

The High Plains Underground Water Conservation District No. 1 will conduct its annual election on January 15, 1977.

Elections will be held only in those counties located in Director's Precinct 3 and Precinct 4. Included in Precinct 3 are Bailey, Castro and Parmer Counties and those in Precinct 4 are Armstrong, Deaf Smith, Potter and Randall Counties. The elections will be conducted to elect two members of the District's Board of Directors, who will serve two-year terms, and 14 County Committeemen, who will each serve a four-year term.

A. W. Gober, Director representing Precinct 3, will be unopposed on the ballot. Ray Gerk of Hereford will be the candidate for Director for Precinct 4, replacing Billy Wayne Sisson of Hereford.

Absentee balloting, which began December 27 and will continue through January 11, will be conducted in the Office of the County Clerk in each of the seven counties involved.

Qualifications to Vote

A qualified voter in the District's election is any person possessing a valid voter registration card and residing within the delineation of the District and within the county where a vote will be taken. The election judges at each of the polling places will have maps depicting the Commissioner's Precincts (or voting precincts) within each of the seven counties.

Ballots

The names of all candidates will be listed on a ballot for each county. Voters may place an X in the box preceding the candidate's name or place an X in the box preceding the space provided for a write-in vote, and follow this procedure by writing in the name of the person for whom they wish to vote.

In accordance with the laws of Texas, the order of names on the ballot was determined by drawing lots.

Polling Places

For the 1977 election, a total of 12 polling places have been established in the seven counties.

The names and addresses of the candidates, the location of the polling places and the names and addresses of the election judges are listed below.

NOMINEES FOR DISTRICT DIRECTOR

Director's Precinct No. Three—Territory within the District which is situated in each of the following counties: Bailey, Castro and Parmer.

A. W. Gober, Route 1, Farwell, Texas

Director's Precinct No. Four—Territory within the District which is situated in each of the following counties: Armstrong, Deaf Smith, Potter and Randall.

—continued on page 3 . . . ELECTION

TAX ALLOWANCE INFORMATION .... Available January 17, 1977

The 1976 cost-in-water depletion, income - tax - allowance, decline maps and water depletion information for individual land parcels will be available January 17, 1977.

New cost-in-water values, up approximately two percent over last year, have been approved by the Internal Revenue Service for land acquired in 1976. Tables of cost-in-water allowables can be secured from the District's Lubbock office.

The District's Board of Directors voted at their December 17 meeting to add Deaf Smith County to the list of counties wherein annual water-table decline information is now provided on an individual land parcel basis. The other counties are Parmer, Bailey, Castro, Lamb and Floyd.

The cost of the maps, as set by the District's Board of Directors, will remain the same as in previous years—$7.50 for decline maps and $5.00 per parcel for the computerized decline data.

Landowners in the above-mentioned counties will not be furnished decline maps—they, or their agents, must contact the District's office (by telephone or mail) to supply the information needed in order to locate the individual land parcels and determine the decline thereunder.

Data necessary to determine the decline for the six counties listed above is as follows: 1) taxpayer's agent's name and address, 2) account number as assigned by the tax consultant, 3) landowner's name, address, and social security number, and 4) the legal description of the land parcel.

The correct legal description includes: the county in which the property is located, block and section, league and labor, township, range and section, numbers, or homestead preemption name and abstract number, or other descriptors as appropriate.

NOTE

Accountants are urged to promptly supply (prior to January 15, 1977) the District with all information necessary to compute their claimants' 1976 water-level decline.

The decline maps, depicting the decline of the water table by county, may be purchased by contacting the District's Lubbock office.

Accountants—Note changes in 1976 tax-allowance procedures for Deaf Smith County

Japanese scientists and educators visited the District's Lubbock office in December and are pictured with Don McReynolds and Don Smith, District geologists, and Ed Weeks, Project Chief for the U. S. Geological Survey at Texas Tech. The Japanese delegation included Dr. Soki Yamamoto, professor at Tsukuba University; Dr. Shigeru Aoki, associate professor at Niigata University; Dr. Shizuo Shindo, associate professor at Toyo University; Shigekatsu Naemura, counselor at the Technology Center for National Land Development; Akira Ishii, engineer for Chiba Prefectural Research for Environmental Pollution; Dr. Taijiro Konishi, director of Kajitani Engineering; Suekichi Hayakawa, director of Kowa-Chikakensetsu Co.; and Nagashige Yoshitake, director of the engineering department for Japan Water Well Drilling Co. (See story page 4.)

THE Cross SECTION

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

2930 Avenue Q, Lubbock, Texas 79405

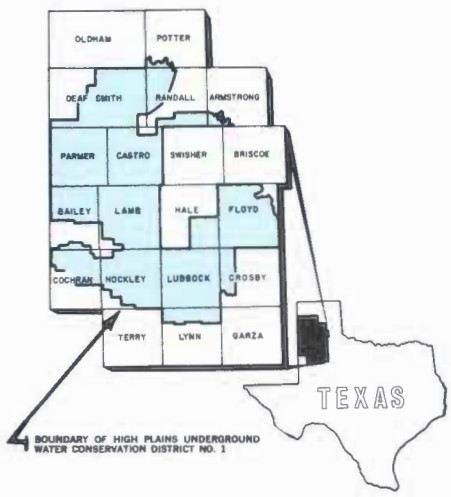
Telephone 762-0181

FRANK RAYNER, Editor

Second Class Postage Paid at Lubbock, Texas

District Office at Lubbock

Frank Rayner, P.E.	Manager
Don Smith	Geologist
Don McReynolds	Geologist
Tony Schertz	Draftsman
Obbie Goolsby	Field Representative
J. Dan Seale	Field Representative
Oscar Riemer	Field Representative
Butch Bates	Field Representative
Clifford Thompson	Head, Permit Section
Kenneth Carver	Asst., Permit Section
Mrs. Norma Fite	Secretary-Bookkeeper
Mrs. Pennye Newberry	Secretary
Miss Kathy Redeker	Receptionist



BOARD OF DIRECTORS

Precinct 1

(CROSBY, LUBBOCK and LYNN COUNTIES)

James P. Mitchell — Wolfforth

Precinct 2

(COCHRAN, HOCKLEY and LAMB COUNTIES)

Selmer H. Schoenrock, President — Levelland

Precinct 3

(BAILEY, CASTRO and PARMER COUNTIES)

A. W. Gober, Vice President — Farwell

Precinct 4

(ARMSTRONG, DEAF SMITH, POTTER and RANDALL COUNTIES)

Billy Wayne Sisson, Secy.-Treasurer — Hereford

Precinct 5

(FLOYD and HALE COUNTIES)

Malvin A. Jarboe — Floydada

COUNTY COMMITTEEMEN

Armstrong County

Guy Watson, 1977	Wayside
C. D. Rogers, 1977	Wayside
Bill Heisler, 1977	Wayside
Charles Kennedy, 1979	Rt. 1, Happy
Cordell Mahler, 1979	Wayside

Bailey County

Doris Wedel, Secretary
H&R Block, 224 W. 2nd, Muleshoe

Eugene Shaw, 1977	Rt. 1, Muleshoe
Adolph Wittner, 1977	Star Rt., Baileyboro
Jessie Ray Carter, 1977	Rt. 5, Muleshoe
Marshal Head, 1979	Rt. 3, Muleshoe
Harold Layton, 1979	Rt. 2, Morton

Castro County

Garnett Holland, Secretary
City Hall, 120 Jones St., Dimmitt

Jackie Clark, 1977	Rt. 1, Box 33, Dimmitt
Joe Nelson, 1977	Box 73, Dimmitt
Bob Anthony, 1977	Rt. 4, Dimmitt
Anthony Acker, 1979	Rt. D, Nazareth
Glenn Odom, 1979	Rt. 4, Box 136, Dimmitt

Cochran County

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

Jessie Clayton, 1978	706 S. Main, Morton
Robert Yeary, 1978	Route 2, Morton
Hershel M. Tanner, 1980,	Route 2, Box 36, Morton
Danny Key 1980	Star Route 2, Morton
H. H. Rosson, 1980	Star Route 2, Morton

Crosby County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Donald Aycock, 1978	Lorenzo
Alvin Morrison, 1978	Box 6, Lorenzo
Tommy McCallister, 1980	209 N. Van Buren, Lorenzo
Edward S. Smith, 1980	102 N. Van Buren, Lorenzo
Pat Yoakum, 1980	Box 146, Lorenzo

Deaf Smith County

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

James E. Higgins, 1977	200 Star St., Hereford
Garland Solomon, 1977	Rt. 5, Hereford
W. L. Davis, 1977	Box 312, Hereford
Bill Cleavinger, 1979	Star Rt., Wildorado
George Ritter, 1979	Rt. 5, Hereford

Floyd County

Helen Bertrand, Secretary
Farm Bureau, 101 S. Wall Street, Floydada

Joe Cunyus, 1978	Lockney
Fred Cardinal, 1978	Route 4, Floydada
C. O. Lyles, 1980	Route 4, Floydada
Connie Bearden, 1980	Route 1, Floydada
M. M. Smitherman, 1980	Silverton Star Rt., Floydada

Hale County

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

Henry Kveton, 1978	Route 2, Petersburg
Gaylord Groce, 1978	RFD, Petersburg
Clint Gregory, Jr., 1980	Box 98, Petersburg
Homer Roberson, 1980	Box 250, Petersburg
Henry Scarborough, 1980	Route 2, Petersburg

Hockley County

Jim Montgomery, Secretary
609 Austin Street, Levelland

J. E. Wade, 1978	Route 2, Levelland
Jimmy Price, 1978	Route 3, Levelland
Billy Ray Carter, 1980	Route 5, Levelland
Leon Young, 1980	Route 1, Ropesville
Robert Phillips, 1980	218 Redwood, Levelland

Lamb County

Robert Richards, Secretary
509 Phelps Avenue, Littlefield

Billy J. Langford, 1978	Box 381, Olton
Edward Fisher, 1978	Box 67, Sudan
P. A. Washington, 1980	Box 124, Springlake
Jack Stubblefield, 1980	Box 397, Spade
Larry Lockwood, 1980	Star Rt. 2, Littlefield

Lubbock County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Dan Young, 1978	4607 W. 14th St., Lubbock
Clifford Hilbers, 1978	RFD, Idalou
Don Bell, 1980	Box 114, Wolfforth
Ronald Schilling, 1980	Route 1, Slaton
Granville Igo, 1980	Route 1, Shallowater

Lynn County

Clifford Thompson, Secretary
2930 Avenue Q, Lubbock

Orville Maeker, 1978	Route 1, Wilson
Freddie Kieth, 1978	New Home
S. B. Rice, 1980	Route 1, Wilson
W. R. Steen, 1980	Route 2, Wilson
Wendell Morrow, 1980	Route 1, Wilson

Parmer County

Ken Horn, Secretary
Horn Insurance Agency, Bovina

Troy Christian, 1977	Rt. 1, Farwell
Joe Moore, 1977	Box J, Lazbuddie
Dalton Caffey, 1977	15th St., Friona
Floyd Reeve, 1979	Box 1196, Friona
Ralph Roming, 1979	809 Ridglea Dr., Bovina

Potter County

Henry W. Gerber, 1977	Rt. 1, Amarillo
Jim Line 1977	Box 87, Bushland
Albert Nichols, 1977	Rt. 1, Box 491, Amarillo
F. G. Collard, 1979	Rt. 1, Box 433, Amarillo
W. J. Hill, 1979	Box 53, Bushland

Randall County

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

Harry LeGrand, 1977	4700 S. Bowie, Amarillo
Joe Albracht, 1977	Box 81, Bushland
Leonard Batenhorst, 1977	Rt. 1, Canyon
Bill Dugan, 1979	Rt. 2, Box 30, Happy
John F. Robinson, 1979	1002-7th St., Canyon

NOTICE: Information regarding times and places of the monthly County Committee meeting 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.

ARMSTRONG, POTTER, RANDALL COUNTY COMMITTEEMEN MEET WITH DISTRICT PERSONNEL

. . . . Canyon, Texas, November 30, 1976

Estelle and Carroll Rogers and Aline and Guy Watson, County Committeemen, Armstrong County.

Barbara Nichols and Evelyn Hill

Albert Nichols and W. J. Hill, Potter County Committeemen

Dot and Jim Line, Potter County Committeeman

Harry LeGrand and Bill Dugan, Randall County Committeemen

VOTING IS A PRIVILEGED RESPONSIBILITY

. . . . Vote January 15, 1977

Oscar Reimer visits with Betty and Floyd Reeve, Parmer County Committeeman, at the Parmer County meeting on December 14th, in Bovina.

Troy Christian (Parmer County Committeeman) and Lillie, his wife, attend the Parmer County meeting with District personnel in Bovina on December 14th.

ELECTION . . . continued from page 1

Ray Gerk, Route 4, Hereford, Texas

NOMINEES FOR COUNTY COMMITTEEMEN

ARMSTRONG COUNTY

Residents will vote for four Committeemen-at-large.

Guy Watson, Wayside, Texas
Bill Heisler, Wayside, Texas
James Bible, Wayside, Texas
Leslie Adams, Wayside, Texas

BAILEY COUNTY

Two Committeemen-at-large will be chosen.

David Stovall, Route 2, Muleshoe, Texas
Ernest Ramm, Route 2, Muleshoe, Texas

Voters in County Committeeman Precinct 2 will choose one Committeeman.

Eugene Shaw, Route 2, Muleshoe, Texas

CASTRO COUNTY

Voters will select one Committeeman-at-large.

Frank Wise, Route 4, Dimmitt, Texas

Residents of Commissioner's Precinct 1 will vote for one candidate.

Jackie Clark, Route 1, Box 33, Dimmitt, Texas

Precinct 2 residents will select one Committeeman.

W. A. Baldridge, 608 W. Grant, Dimmitt, Texas
Clyde H. Dameron, Route 4, Box 34, Dimmitt, Texas

DEAF SMITH COUNTY

One committeeman-at-large will be elected.

Tom Robinson, 211 Cherokee Drive, Hereford, Texas

In Commissioner's Precinct 1, one Committeeman will be chosen.

James E. Higgins, 200 Star Street, Hereford, Texas

Residents of Commissioner's Precinct 2 will choose one Committeeman.

Garland Solomon, 303 Sunset Drive, Hereford, Texas

PARMER COUNTY

One Committeeman-at-large will be chosen.

Dalton Caffey, 15th St., Friona, Texas

One Committeeman will be elected from Commissioner's Precinct 3.

Troy Christian, Route 1, Friona, Texas

One committeeman will be elected in Commissioner's Precinct 4.

Ronald Elliott, Route 3, Muleshoe, Texas

POTTER COUNTY

Three Committeemen-at-large will be chosen.

Jim Line, Box 87, Bushland, Texas
Albert Nichols, Route 1, Box 491, Amarillo, Texas
Weldon Rea, Bushland, Texas

RANDALL COUNTY

Voters will select one Committeeman-at-large.

Jack Brandt, Route 1, Box 280, Canyon, Texas

One Committeeman will be chosen in Commissioner's Precinct 1.

Harry LeGrand, 4700 S. Bowie, Amarillo, Texas

Residents of Commissioners Precinct 2 will elect one Committeeman.

Joe Albracht, P.O. Box 81, Bushland, Texas.

POLLING PLACES AND JUDGES FOR 1977 ELECTION

ARMSTRONG COUNTY

Polling Place No. 1: Wayside Community Center, Wayside, Texas
Presiding Judge: Estelle Rogers, Box 150, Wayside, Texas

BAILEY COUNTY

Polling Place No. 1: Enochs Gin Office, Enochs, Texas
Presiding Judge: W. R. Adams, Route 2, Morton, Texas
Polling Place No. 2: Bailey County Courthouse, Muleshoe, Texas
Presiding Judge: B. H. Black, Route 2, Box 77, Muleshoe, Texas

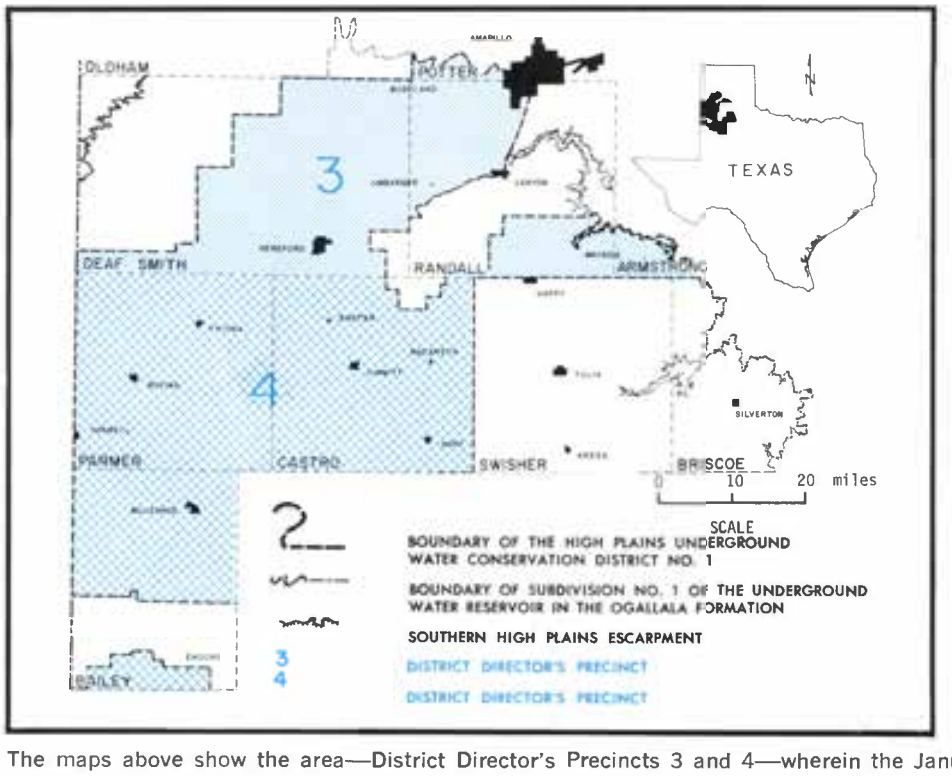
CASTRO COUNTY

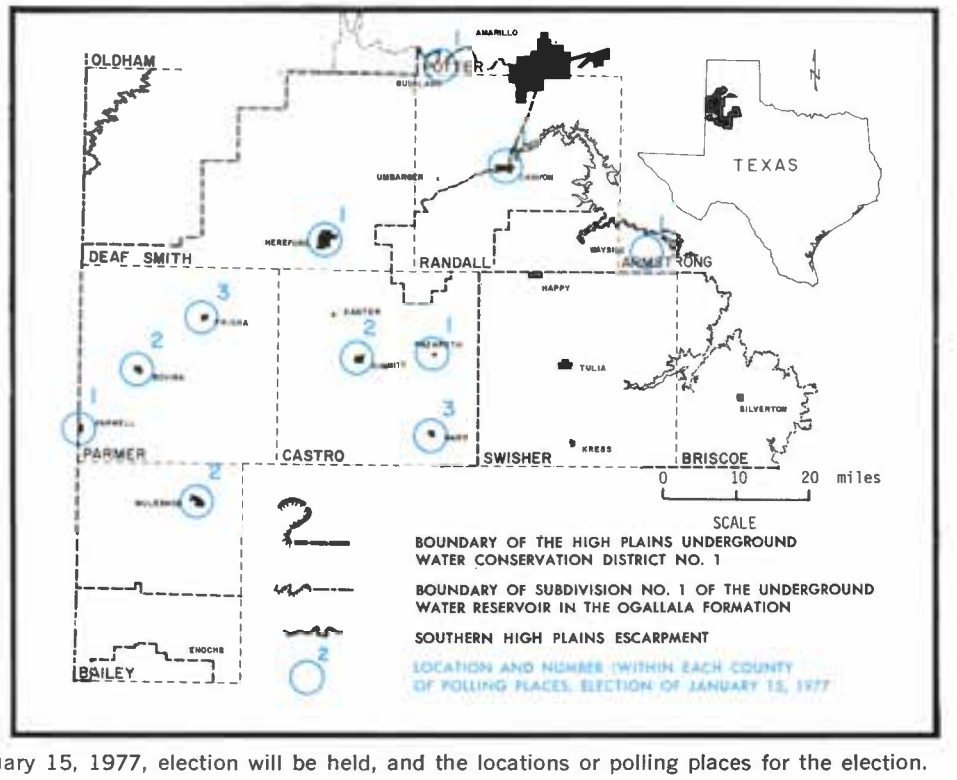
Polling Place No. 1: American Legion Hall, Nazareth, Texas
Presiding Judge: Mrs. Leo Ehly, Box 243, Nazareth, Texas
Polling Place No. 2: City Hall Community Room, Dimmitt, Texas
Presiding Judge: Noel Gollehon, 707 Maple, Dimmitt, Texas
Polling Place No. 3: City Hall, Hart, Texas
Presiding Judge: Percy Hart, Route 1, Hart, Texas

DEAF SMITH COUNTY

Polling Place No. 1: Hereford Community Center, Park Avenue, Here-

—continued on page 4 . . . ELECTION





The maps above show the area—District Director's Precincts 3 and 4—wherein the January 15, 1977, election will be held, and the locations or polling places for the election.

WATER LEVELS TO BE MEASURED

District personnel will begin measuring the depth-to-water in the more than 800 water-level observation wells within the District in early January, 1977.

A tan and white vinyl tag with the recorded measurement of the water level in the subject well will be placed upon the well head equipment for the owner's information.

Since most of the wells are operational irrigation wells and subject to the user requirements of the individual owners, January was originally selected as the period of time when the water table would most nearly reflect a "static" measurement. This assumption was based upon the probability that the wells had not been pumping for a two or three month period, and to delay measuring into February and March would increase the possibility that the wells would again be pumping for a new crop season. The widespread cultivation and irrigation of a winter wheat crop has disrupted the pumping and resting cycle of many wells. However, January still remains the optimum time to attempt to measure static water levels.

The information obtained from the observation-well-measuring program is utilized in assessment of remaining water in storage, long term projections of decline rates, and as a basis for the income-tax depletion allowance claims on land owners' tax returns.

The District and all area residents owe a vote of thanks to the individual well owners who, by allowing their wells to be used in the maintenance of this program, provide the means for the collection of this vital data.

ELECTION . . . continued from page 3

ford, Texas
Presiding Judge: Mrs. Clinton Jackson, 208 Centre, Hereford, Texas

PARMER COUNTY
Polling Place No. 1: County Courthouse, Farwell, Texas
Presiding Judge: Mrs. Albert H. Smith, Route 2, Farwell, Texas
Polling Place No. 2: Horn Insurance Agency, Bovina, Texas
Presiding Judge: Aubrey Brock, 704 Boyce, Bovina, Texas
Polling Place No. 3: Fire Station, Friona, Texas
Presiding Judge: J. L. Witten, 1602 W. 7th, Friona, Texas

POTTER COUNTY
Polling Place No. 1: Schoolhouse, Bushland, Texas
Presiding Judge: Mrs. James Walton, Box 76, Bushland, Texas

RANDALL COUNTY
Polling Place No. 1: Randall County Farm Bureau Office, 1714 5th Ave., Canyon, Texas
Presiding Judge: Marshall Rockwell, Jr., Route 2, Box 514, Canyon, Texas.

VOTE
January 15, 1977

JAPANESE DELEGATION VISITS DISTRICT

A group of Japanese scientists and educators with international reputations visited Lubbock in December to consult with representatives of the High Plains Underground Water Conservation District and the U.S. Geological Survey — Artificial Recharge Section. The visitors are in the U.S. to attend an International Symposium on Land Subsidence to be held in San Francisco later this month. The group's leader, Dr. Soki Yamamoto, is Co-Chairman of the Symposium which is sponsored by UNESCO.

Dr. Yamamoto explained that the group had arrived early in order to tour the U.S. and visit with selected individuals concerning mutual problems and research projects. He stated that approximately five percent of the total land area of Japan was experiencing some land subsidence problems and the bulk of these areas were in the highly populated metropolitan complexes. In most instances, the subsidence problem is caused by groundwater pumpage by municipal and industrial users.

One method, by which the Japanese hope to combat their problem, will be to construct artificial recharge wells to re-pressurize the aquifers.

The Lubbock visit with the High Plains Water District and Geological Survey was to learn the "do's and don'ts" of artificial recharge of groundwater by discussion of the experiences encountered in such High Plains activities over the last 25 years.

Dr. Yamamoto summarized their visit by stating that, while the technology necessary to successfully operate artificial recharge projects might be more complex than they had originally envisioned, he was certain that the guides and check list of workable solutions gathered in Lubbock would be of great value in designing effective projects for Japan.

The Well Being Of Those
We Serve Is The
Measure Of Our Success

Seasons Greetings

From The Board of Directors,
County Committeemen and Staff
of the High Plains Underground
Water Conservation District No. 1

1976

GROUNDWATER TO BE TOPIC OF FARM AND RANCH MANAGERS AND APPRAISERS MEETING

A sequence of topics to explain the Ogallala aquifer and its effects on appraising land values is planned for the winter meeting of the Texas Society of Farm and Ranch Managers and Appraisers January 20-22 at the Quality Inn in Amarillo.

The hydraulic effects of declining water supplies on well yields; the depletion rate and life expectancy; pumping costs; groundwater and land value and loan value relationships; economics of irrigated agriculture; and groundwater management principles which affect land values, will be among subjects covered by the speakers.

The speakers at the meeting will be Frank A. Rayner, P.E., manager of the High Plains Underground Water Conservation District No. 1 in Lubbock; A. Wayne Wyatt, head of the Import Division of the Texas Water Development Board in Austin; Dr. James Osborn, agricultural economist at Texas Tech University; and Marvin Sartin, Extension Economist-Management specialist in Lubbock.

Other speakers will be C. Brown Smith, Field Representative for Metropolitan Life Insurance Company in Amarillo; Rex McAnally, Manager of Moody Foundation Farms in Pampa; Rex Williams, retiring President of the Texas Society of Farm and Ranch Managers and Appraisers; Elbert Harp, Executive Secretary of the Grain Sorghum Producers Association in Lubbock; and Pat Messenger, area Loan Manager for Equitable Life Assurance Society in Amarillo.

HIGH PLAINS UNDERGROUND WATER
CONSERVATION DISTRICT NO. 1
2930 AVENUE Q
LUBBOCK, TEXAS 79405

SECOND CLASS PERMIT