Texas Water Resources

Texas Water Resources Institute

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Introducing Texas Water Resources Institute

By Lee Pilgrim, Editor, Texas Water Resources
The Texas Water Resources Institute (TWRI) has been in existence 12 years now helping Texans with their water resource problems.

Texans do have their share of water problems. Nearly every potential water resource problem is encountered somewhere within the state's boundaries.

Folks in Texas talk a lot about water. They brag about the worst flood, the longest drought, the dustiest rivers, and the soggiest coastland. They worry about when it will rain--or when it will stop raining. They argue about ownership of water and about how clean it should be.

There is no such thing as a "typical" climate for the state. The average annual rainfall ranges from less than 9 inches in El Paso to 55 inches in Beaumont. In a single year, 1970, Texas qualified for federal disaster relief in Corpus Christi for Hurricane Celia, in Central Texas for flooding, in Lubbock for a major tornado, and in West Texas for a winter drought.

Problems caused by human activities are just as varied. Burgeoning urbanization and population growth as well as industrial, agricultural, and tourism developments have made great demands on present Texas water sources.

Studying Problems

Researchers across the state associated with TWRI listen to Texans and their water resource woes. The Institute provides funding for research needed for effective planning and management of Texas water resources. This research, analyzing both current and potential problem areas, provides a constant flow of needed information to the state's decision makers.

Even though abundant water flows from the tap today, researchers must find new water sources and new technology to assure Texans of an adequate future water supply. Potential problems 20 years in the future are viewed with a sense of urgency because it takes a generation to develop a major water project from inception to operation.

TWRI, located on the Texas A&M University campus, is one of 54 such research agencies in the U.S. created by the Water Resources Research Act of 1964 "to assist in assuring the nation at all times of a supply of water sufficient in quantity and quality to meet requirements of its expanding population." Each institute receives an annual research allotment from the Office of Water Research and Technology (OWRT), U.S. Department of the Interior. Additional grants for specialized projects have been provided by state and other federal agencies.

The TWRI program falls into 4 broad categories: (1) identifying and evaluating water problems; (2) funding and directing pertinent water-related research; (3) providing training opportunities in research for scientists in water-related fields; and (4) collecting and distributing information on water resources.

Dr. J. R. Runkles has served as director of the Institute for the past 8 years. He is actively involved in research projects as well as directing the activities of the Institute. Runkles serves as chairman of an advisory committee of leading water resource officials in Texas which focuses the Institute research program.

Regional Studies

A regional coalition of five state water institutes from Arkansas, Louisiana, New Mexico, Oklahoma, and Texas is directed by Runkles. Two joint projects have been completed--one dealing with water allocation in the upper Rio Grande Basin between Texas and New Mexico and the other concerning groundwater depletion from the Ogallala Formation between Texas and Oklahoma.

According to Runkles, "Water resources cross state boundaries. Groundwater aquifers often spread across more than one state, and many river basins include parts of several states. Thus, some water resources problems need to be examined on a regional basis. The national network of state water resources research institutes provides a good mechanism to conduct regional research."

Research proposals come from faculty members at public and private colleges and universities throughout the state. Current researchers represent an interdisciplinary cross-section including engineering, geosciences, agriculture, recreation, sociology, and business.

Faculty members at Baylor University, Lamar University, Texas A&M University, Texas Tech University, the University of Houston, the University of Texas at Austin, and the University of Texas at San Antonio have participated in Institute-sponsored research projects.

Training Scientists

Trained manpower, like research results, is an important product of the Institute's program.

The Institute has been instrumental in bringing new staff members to Texas universities and has helped attract many new graduate students into water resources fields. It has assisted in the establishment of new graduate study curricula and has sponsored research seminars. Students working on TWRI projects gain valuable practical experience with Texas water resource problems.

Research results and other water-related information are reported by the Institute in an annual report each July, a bulletin series on completed projects, an annual Water for Texas Conference held on the Texas A&M campus, and this newsletter, Texas Water Resources.

The annual report contains a description of each research project currently funded by the Institute with findings, results, conclusions, and applications. General activities of the Institute are reported as well as activities conducted in cooperation with other institutes and research organizations.

The Water for Texas Conference addresses a water-related issue each year and attracts approximately 200 participants. Representatives of federal and state water resource agencies, private enterprise, and public action groups have the opportunity to hear experts in the field as well as to share expertise.

Texas Water Resources is written monthly to present objective, non- technical accounts of research applications or water-related issues in Texas to its 7,000 subscribers.

Research Needed

"The U.S. is clearly the envy of the world in food and fiber production. A major factor in achieving this position has been the research base provided by the network of Agricultural Experiment Stations. We need a similar research base for water if we are to have the science and technology to solve present and future water resource problems," according to Director Runkles.

Research alone rarely solves water problems; implementation is required. Research can provide insights and data needed by planners and administrators for proper management of water resources. Fundamental data must be systematically compiled and analyzed to fill gaps in current technology.

The ever-increasing competition for available water supplies already is raising serious political, legal, institutional, technical, and economic questions. Research is needed to resolve present water supply availability problems and to alleviate future problems created by growing demands.

It is estimated that 72 percent of the water used in the state goes for producing food and fiber. In view of this, extensive research is needed to improve irrigation efficiency in the major irrigated areas, especially those drawing groundwater.

Texas faces three major problem areas with regard to groundwater resources: subsidence, pollution, and depletion. Research on groundwater management is needed to develop methods for optimum management and utilization. Where opportunities exist, the surface and ground water should be used conjunctively for optimum management.

Floods cause greater damage and loss of life than any other natural hazard. Research leading to even minute reductions in flood damages could save millions of dollars per year. Flooding is a natural occurrence, but the damages and losses incurred are enhanced by man's encroachment upon the flood plains.

Although excess water is usually considered from the negative standpoint, consideration should be given to the potential beneficial uses of such waters. Serious study needs to be given to techniques for detention and utilization of storm runoff.

Water-based recreation is expanding greatly in most regions of the state. The related problems which need study are the demand for water-based recreation, the effect of recreation on water quality, and the impact of water-based recreation on the state economy.

One of the most difficult and challenging problems with a broad and diverse research program such as the one conducted by the TWRI is how to judge the extent to which the results are applied. The results of some research projects may be more easily and more quickly applied to "real world" problem solving than the results from others, yet each project adds to the basic store of knowledge.

Without the needed quantity and quality of water, Texas in the future will have serious limitations on the development of the state and the quality of life of its citizens. Having the right water in the right place at the right time depends to a large extent on research and development of new technology.

Texans today are talking about and studying their water resources problems. Present and future generations in Texas depend upon it.

Who's Who at TWRI

Jack Runkles ..... Director
Evelyn Teaff ..... Secretary
Theo Doerge ..... Bookkeeper
Lou Ellen Ruesink ..... Editor
Debbie DeBruin ..... Secretary
Darla DeLay ..... Clerk

Batista Horton ..... Clerk
Karlene Hertel..... Clerk

Everybody Talks About Water Problems . . . TWRI is Doing Something About Them

The following contributions to the water resources field have been made by Texas scientists funded by the Texas Water Resources Institute. The broad spectrum of interests testifies to the fact that the state has not only an abundant variety of water resources and water-related problems, but also a wide range of competent water resource scientists. For additional information on any TWRI research, contact the Institute Director.

- The city of Lubbock is using data gathered by Texas Tech researchers on quantity and quality of urban runoff to look at potential water management problems for the proposed city lakes to be filled with reclaimed water.
- The tremendous increase in trickle irrigation systems for Texas tree crops is largely due to the Institute's research showing trickle to be more water efficient than conventional irrigation methods.
- A Baylor biologist has identified critical temperature and productivity for several biological systems affected by thermal circulation in a reservoir.
- Civil Engineers at Texas A&M University are using aerial photography to standardize and simplify environmental assessment techniques in water resource development studies.
- Guidelines for urban river development were presented in a San Antonio River Walk study and have been implemented by other cities.
- A researcher at the University of Texas at Austin developed a practical and effective strategy for the optional expansion of a complex water resource system such as a portion of a major river basin.
- A study to evaluate property loss attributed to subsidence in the Houston-Galveston area was used in developing a law to create a land subsidence control district.
- Federal and state agencies are considering the results of a project on the High Plains which found that, with present commodity prices, if farmers have to pay more than $1.30 per thousand cubic feet for natural gas it will not be economically feasible to irrigate.
- Texas A&M researchers have developed a computer model to simulate buried irrigation sources and have developed new technology to use mobile trickle systems for row crops.
- Nine hundred tons of manure from cattle feedlots can be deep plowed into an acre of farm land without causing serious surface or groundwater pollution. As a result of this finding by TWRI scientists, large manure stockpiles--once a storage and disposal problem for Texas feedlot managers--are rapidly vanishing.
- According to Texas Tech political scientists, when High Plains farmers recognize that groundwater is limited they are more inclined to join an Underground Water Conservation District.