

AN ASSESSMENT OF WATER CONSERVATION IN TEXAS

Prepared for the 78th Texas Legislature

**Texas State Soil and Water Conservation Board
and
Texas Water Development Board**



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EXECUTIVE SUMMARY

Senate Bill 312, 77th Texas Legislature, included a requirement that the Texas Water Development Board (TWDB) and the Texas State Soil and Water Conservation Board (TSSWCB) jointly conduct a study of the ways to improve or expand water conservation efforts, and to report their findings to the Legislature. This report has been prepared to fulfill that requirement. It discusses current and future conservation needs, existing activities and programs relating to municipal and agricultural water conservation efforts, as well as recommendations for programmatic approaches, funding and legislative changes that will further enhance opportunities for effective implementation of water conservation strategies and programs in Texas.

2.0 INTRODUCTION

Water is a finite resource that requires careful and proactive management: the era of plentiful and inexpensive water in Texas is ending. Water conservation, sound water management strategies, and effective and adequate investment in a range of solutions are essential to meet the water demands of Texas' growing population. For example, population and water demand projections utilized in the 2002 State Water Plan indicate that 43 percent of municipal demands in 2050 will not be met in a drought with current supplies. The 2002 State Water Plan is a long-term 50-year plan designed to meet State water demands during drought conditions. It is based on sixteen Regional Water Plans which recommended a number of different water management strategies to meet future water needs, including: water demand reduction, conservation, reuse, water supply development, and water supply acquisition.

Water is indeed Texas' most precious natural resource. Conservation and water use efficiency are important components of meeting future water demands. In their Regional Water Plans, the sixteen Regional Water Planning Groups (Planning Groups) recommended that new water conservation strategies be utilized to meet the needs, at least in part, of 205 water user groups (as defined in the 2002 State Water Plan, water user groups are cities having populations of 500 or more and an aggregate of demand by county for other sectors, including manufacturing, irrigation, steam-electric power generation, mining, livestock, and county-other). This represents approximately 21 percent of the water user groups with future needs for additional water supplies in the State. Fifty-nine of these are agricultural irrigation water user groups. The total projected savings from conservation-based water management strategies to meet agricultural and municipal needs are 987,914 acre-feet per year (AFY) by 2050. This represents approximately 13.5 percent of the volume of water that will be required to meet needs identified in the Regional Water Plans by 2050.

In addition, the Regional Water Plans project that, if the current conservation practices that are already in place are improved on an ongoing basis, municipal water demand statewide will decrease by an average of 22 gallons per capita per day (GPCD), from a statewide average of 181 GPCD in 2000 to 159 GPCD in 2050. This 12 percent reduction in municipal demand, resulting in part from the installation of more efficient plumbing fixtures, is equivalent to 976,000 AFY annually by 2050. When combined, the recommended new conservation water management strategies and the required existing conservation efforts are projected to result in savings of almost 2.0 million AFY annually by 2050.

Even with the savings identified to be achieved through conservation-based water management strategies in the 2002 State Water Plan, there still remains potential for additional savings through additional water conservation. This was acknowledged by Senate Bill 2, enacted by the 77th Legislature in 2001, which further heightened the requirement for conservation as a water management strategy in the second round of regional water planning. Texas Water Development Board (TWDB) rules (Texas Administrative Code §357.7(a)(7)(A)) have been amended to require the Planning

Groups to consider water conservation practices as water management strategies for each water supply need identified in their Regional Water Plans. In addition, conservation practices must be included in the Regional Water Plans for each water user group that has already developed a conservation plan for a Texas Commission on Environmental Quality water rights permit. Finally, the Planning Groups must also include a conservation strategy resulting in the highest practicable level of efficiency achievable if an interbasin transfer is proposed as a water management strategy to meet a need.

Beyond the development of conservation strategies is an even more important issue, namely, how to ensure that these conservation strategies and programs are implemented. The following sections discuss important ongoing activities and programs relating to municipal and agricultural water conservation efforts, as well as recommendations that are believed to further enhance opportunities for effective implementation of water conservation strategies and programs.

Awareness and understanding of water conservation and water-use efficiency have grown in recent years due to drought conditions impacting many regions of the State. Water-rich regions of the State often could not meet higher than usual seasonal demands, and arid regions were pushed to extreme limits with extended periods of hot, dry weather. This awareness can be a starting point in ensuring efficient water use to meet future water demands in Texas.

3.0 MUNICIPAL WATER USE AND CONSERVATION PROGRAMS

The following sections briefly discuss municipal water use, and municipal conservation programs and activities administered by TWDB and by other agencies and entities.

3.1 Municipal Water Use

According to the 2002 State Water Plan, municipal water demand is projected to increase by 67 percent between 2000 and 2050, from 4.23 million AFY to 7.06 million AFY. During the same time period, the State's population is projected to increase by approximately 90 percent, from nearly 21 million to about 40 million. The relatively slower increase in municipal demand is associated with increased water conservation. Average per capita water use varies greatly around the State. Although most Planning Groups project a future decrease in per capita water use, water use can change because of population growth and changes in the socioeconomic characteristics of a community. Although water demand may increase, ensuring that water is being used as efficiently as possible is still prudent. Many communities around Texas have taken great strides to ensure efficient water use and have found conservation programs to be a cost-effective method of meeting increased water demands while postponing more expensive water supply or capacity expansion. Austin, Corpus Christi, El Paso, Houston, and San Antonio all have active conservation programs that promote water use efficiency. Each of these cities has implemented water conservation programs for different reasons: Austin wants to lower demand to meet a growing customer base; Corpus Christi wants to postpone the need for additional supply; El Paso has a limited long-term supply; Houston

needs to control subsidence; and San Antonio has limited water availability, especially during drought conditions. Recently, Dallas has also taken significant steps towards establishing an effective water conservation program.

It is important to recognize that water conservation is not limited to the larger cities. Many small and medium-size systems are also committed to increasing water use efficiency. Programs such as bill explanation, plant tours, school programs, and working with local Cooperative Extension offices in educational and outreach activities have proven beneficial. Many systems have partnered with neighboring water systems in public-awareness campaigns to increase exposure, limit confusion, and reduce costs by providing a unified water conservation message.

3.2 TWDB's Municipal Water Conservation Programs and Activities

TWDB conservation staff provides training and workshops on many topics, including Water Conservation Plan and Drought Contingency Plan development, institutional, commercial and industrial water-use efficiency workshops, as well as seminars and workshops on alternative water resource strategies. Another area of responsibility of the TWDB is to provide data on municipal and agricultural water use and water savings in Texas.

TWDB conservation staff also provides services to help cities, districts, and utilities establish effective water conservation programs. They provide training for leak detection and meter testing, loan equipment to assist with leaks and metering, assist with water audits, and provide technical and educational resources regarding rainwater harvesting, desalination, and water reuse. In addition, the TWDB provides information regarding water conservation to local entities and professional and trade organizations.

TWDB also develops and provides printed materials for public awareness and school educational programs. One such program is "Major Rivers," a fourth-grade curriculum focusing on Texas river basins and water resources that the TWDB had previously partially funded. This program has recently undergone revisions by the Lower Colorado River Authority, which has provided the TWDB with a version that can be utilized statewide. TWDB will manage distribution of this curriculum to interested entities for the next school year on a cost-reimbursement basis. The TWDB develops and produces printed material such as brochures and guidebooks for use by water suppliers and individuals. Water suppliers are eligible to obtain up to 500 items free each year, with additional items available at minimum cost. The TWDB also coordinates the on-going "Water Smart" program developed by the TWDB and the Texas Commission for Environmental Quality.

As part of the State water planning process, TWDB conservation staff is involved in regional and statewide water demand and water supply studies. Conservation staff provides technical assistance and data to the Planning Groups on how to utilize water conservation as a water management strategy and reviews submitted reports and contracted research studies.

Over 500 water supply entities have developed a water conservation plan to meet statutory and regulatory requirements. The TWDB requires each entity that applies for financial assistance greater than \$500,000 to develop and implement a Water Conservation Plan. The Water Conservation Plan must, at minimum, address a customer awareness program, a conservation-oriented rate structure and a metering/leak detection program. The Water Conservation Plan should contain quantifiable goals and a timeline for program implementation. The Water Conservation Plan should remain active for the life of the loan. Currently, there are approximately 410 entities required to have active conservation programs. In addition, the entity receiving financial assistance is required to submit an annual report on the status of its conservation program for a minimum of three years. Presently, there are 171 entities providing annual reports to the TWDB.

Conservation staff provides technical assistance to entities in developing Water Conservation Plans as part of above financial assistance programs administered by TWDB, and conducts an annual review of conservation plan implementation. In addition, during the past two years, conservation staff has also been involved in direct outreach to those entities with conservation plans and high unaccounted-for water use. Staff has found that, because of frequent internal personnel changes within the entities, many did not realize that they had a conservation plan or were to have an implemented program. This outreach has allowed TWDB staff to provide not only copies of the entities' Water Conservation Plan to them, but also to discuss the conservation services available from the TWDB.

One of the questions that entities are requested to respond to as part of their required annual report relates to improvements that they or the TWDB could do to increase the effectiveness of their conservation program. The response to this question varies significantly. However, common themes that have emerged over time are the expressed need for more water conservation information, the need for tools for public awareness campaigns, the need for conservation training and workshops, and the need for information on rebate/retrofit programs. The TWDB also continues to receive requests for funding of conservation and retrofit programs.

The benefits of implementing municipal water conservation programs are clearly evident. A review of historical municipal water use has shown that cities with water conservation programs required by TWDB financial assistance programs consistently realize a reduction in per capita water use as compared with cities that do not have conservation plans in place. This is illustrated graphically in Figure 1. This figure depicts a decreasing trend in per capita water use for cities that have implemented conservation plans because of receiving financial assistance from the TWDB, while the trend for cities without conservation plans has increased.

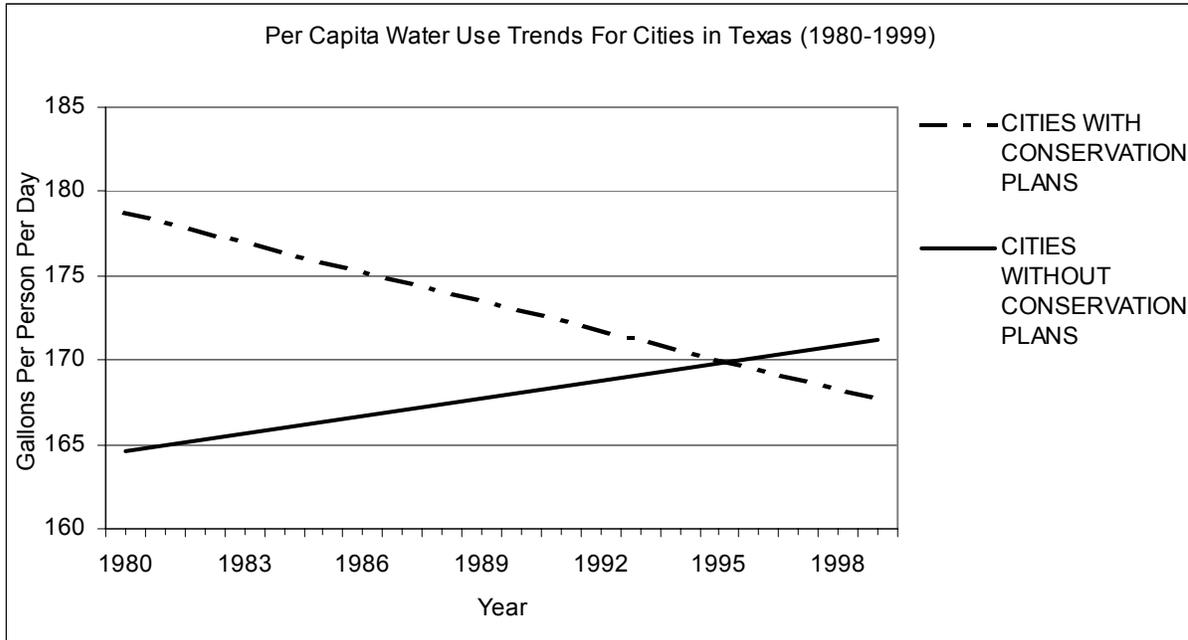


Figure 1. Water use trends for cities with conservation plans required by financial assistance programs administered by TWDB and for cities without conservation plans.

3.3 Municipal Water Conservation Programs and Activities Administered by Other Agencies or Entities

The Texas Commission on Environmental Quality (TCEQ) requires those entities applying for a new or amended water right to submit a Water Conservation Plan that adopts reasonable conservation measures and that is consistent with the applicable Regional Water Plan. In addition, certain holders of current water right permits have had to implement TCEQ-approved Water Conservation Plans. They include municipal and industrial users with a surface water right of 1,000 AFY a year or more and irrigation users with 10,000 AFY or more.

In the summer of 2002, the TCEQ surveyed more than 500 entities that: (a) hold a municipal use surface water right permit issued by the TCEQ for more than 1,000 AFY; or (b) had obtained financial assistance from the TWDB in excess of \$500,000. All of these water suppliers should have an active conservation program in place. The survey was to determine to what degree the conservation programs had been implemented. Of the 502 attempted surveys, 378 surveys were successfully completed. While 93 percent of the 378 water suppliers that completed their survey asserted that their plans were effective, 27 percent noted that they take no action to monitor the effectiveness of their conservation programs. If a program is not routinely monitored or evaluated, the entity's justification for effectiveness cannot be accurately verified. Of the 378 water suppliers surveyed, 88 percent could not identify their quantifiable water conservation goals and/or the time frame for achieving those goals.

The participating entities were asked what resources would be beneficial to them to ensure an effective program. They had the following responses:

- 66 percent would like to see grants available for facility improvements that would result in conservation;
- 58 percent favored a state-sponsored media and public awareness campaign;
- 58 percent favored grant funding for conservation programs; and
- 41 percent supported state-sponsored assistance programs, such as technical assistance to identify and implement programs.

The Texas Section of the American Water Works Association (TAWWA) is a professional trade organization whose mission is to promote public health and welfare, and to assure drinking water of unquestionable quality and sufficient quantity. The association is dedicated to advancing the technology, science and governmental policies relative to safe drinking water. Their Conservation and Reuse Division has over 140 active members from municipal utilities, water suppliers, water districts, and consulting firms that work together on advancing conservation efforts in the State through networking, training, and legislative action.

The WaterWise Council of Texas is a non-profit organization comprising public and private entities. Its mission is to promote water conservation practices in Texas through a public-private partnership that fosters awareness and implementation of sound water management. The Council is composed of representatives from the nursery, landscape, and irrigation industry, water suppliers and water agencies. They have developed training opportunities for the nursery industry, as well as brochures on sound landscape water use.

4.0 AGRICULTURAL WATER USE AND CONSERVATION PROGRAMS

The following sections briefly discuss agricultural water use, and agricultural conservation programs and activities administered by the TWDB, the Texas State Soil and Water Conservation Board (TSSWCB) and other agencies and entities.

4.1 Agricultural Water Use

Irrigated agriculture has historically been the largest user of fresh water in Texas. In 1999, farmers used approximately 9.7 million AF of water to grow a variety of crops on about 6.3 million acres of irrigated land. The value of irrigated crops accounts for more than half of the total value of crops grown in Texas, yet only about one-third of all crops harvested (based on acreage) are irrigated. Groundwater resources provide approximately 75 percent of the water used in irrigation, with surface water supplies accounting for the remaining 25 percent.

According to the 2002 State Water Plan, irrigation water demand is projected to decline from 9.7 million AFY in 2000 to 8.5 million AFY in 2050. This is due to reductions in groundwater supplies, more water-efficient irrigation practices, and the voluntary transfer

of surface water rights from agricultural users to municipal users. The 16 Regional Water Plans identified 867,000 AFY in demand reduction through agricultural water conservation strategies by 2050. The cost of implementing these strategies is estimated to be \$542 million. Recommended irrigation water management strategies include changing of crop varieties and types, utilizing genetic engineering, voluntarily converting irrigated acreage to dry-land production, utilizing conservation tillage methods, installing efficient irrigation equipment, metering of irrigation water use, and lining of irrigation canals to ensure efficiency of delivery systems for meeting future irrigation demands. Additional conservation techniques included laser leveling of fields and automated water delivery control systems.

4.2 TWDB's Agricultural Water Conservation Programs and Activities

As discussed above, agriculture is the largest user of water in Texas and, as such, there is great potential for increasing water use efficiency and reducing water use through advanced conservation efforts. The TWDB Agricultural Water Conservation Programs have operated since 1987 and serve the agricultural community through public education, technical assistance, data collection, loans for water conserving equipment, and matching grants to political subdivisions for water conservation equipment.

Conservation staff provides information on water-use efficiency and technology to irrigators and is involved in agricultural water conservation educational activities for schools, 4-H Water Camps, Farm and Ranch Shows and other events related to agriculture and agricultural trade shows.

Conservation staff also works closely with the United States Department of Agriculture (USDA) -Natural Resource Conservation Service (NRCS), the TSSWCB, and local water conservation districts in providing technical and financial assistance. In order to verify and track water conservation in the agricultural sector, it is critical to know how much water is being applied. However, few agricultural operations have irrigation meters to quantify actual water use. Therefore, in order to estimate and plan for this use, the TWDB, in conjunction with the USDA-NRCS, has performed a detailed irrigation survey every five years. Since 1958, this survey has provided data on irrigated acreage, crop types and estimated water use. In the intervening years since 1985, the TWDB and the NRCS have been involved in estimating irrigation water use for planning purposes. This data is the best available, but may not accurately reflect actual water use.

In recent years, the TWDB has provided in excess of \$276,000 in grant funds to install over 435 meters to voluntarily measure irrigation water use. The goal of this effort is to locate and install a sufficient number of meters geographically spaced in order to develop more statistically rigorous estimates of water use in irrigated agriculture.

In addition, the TWDB administers several funds and programs that offer financial assistance for agricultural water conservation. The TWDB's Agriculture Water Conservation Loan Program provides funds for more efficient irrigation water delivery and application systems. Applicants eligible for loans must be a political subdivision of

the State. These lender districts may make conservation loans to individual irrigators for capital equipment or materials, labor, preparation costs, and installation costs in order to:

- improve water use efficiency of water delivery and application on existing irrigation systems;
- prepare irrigated land to be converted to dryland conditions; or
- prepare non-irrigated land for more efficient use of natural precipitation.

Eligible equipment for loans for irrigation water delivery systems include underground pipe, above ground pipe, concrete-lined open ditches, inline flow meters, and remote controlled gates in open canals. Eligible equipment for loans for irrigation application systems include Low Energy Precision Application (LEPA) sprinkler systems, low pressure systems, drip systems, surge flow valves, soil moisture measuring devices, computer software, furrow dikers, and levee gates. The loans are usually limited to 80 percent of the purchase price of the capital equipment. The loans may also be made to irrigation districts for improvements in their distribution facilities. The loan programs can also provide loans for other agricultural water conservation purposes, including capital equipment purchases, brush control, and precipitation enhancement projects.

Repayments and an appropriation from a Pilot Loan Program (subsequently transferred to the Bond Program) and a constitutional authorization to sell \$200 million in general obligation bonds provide the funding for the loan programs. To date, TWDB has issued \$35 million in bonds for this program which includes \$16 million as grants to the Texas Department of Agriculture and the TSSWCB to fund brush control programs, as was legislatively directed by the 77th Legislature. Since 1987, TWDB has closed 78 loans totaling \$44.7 million for agricultural water conservation equipment. The current value of the loan program portfolio is \$7.8 million in securities and outstanding loans. Current customers are mostly repeat patrons.

The Agricultural Trust Fund was originally provided by a one-time state appropriation of \$10 million. As of October 1, 2002, the value of the fund was approximately \$16.5 million in securities and loans. By statute, one-half of any interest earnings must be returned to the fund. The other half of the interest earnings are disbursed by Legislative appropriations and are currently shared equally by TWDB, TSSWCB, Texas Agricultural Experiment Station, and Texas Cooperative Extension Service. In 1997, the 75th Legislature, authorized the TWDB to utilize the Agricultural Trust Fund to make loans under existing loan program rules. Repayments must be returned to the fund.

The TWDB utilizes funds provided by the Agricultural Trust Fund to fund the Agricultural Conservation Grants Program. The grants can be used to:

- measure and evaluate irrigation systems and agricultural water conservation practices;
- demonstrate efficient irrigation systems and agricultural water conservation practices;
- measure, sample, test, and evaluate water quality and the suitability of water from groundwater or surface water resources for irrigation, rural domestic, livestock, or agricultural industry use; or

- demonstrate efficient or sound chemical application and evaluate or demonstrate systems that will prevent contamination of groundwater and surface water from chemicals and other substances used in agriculture.

Entities eligible for grants are Groundwater Conservation Districts, Irrigation Districts, Soil and Water Conservation Districts, and political subdivisions. The grants have matching grant requirements limited to a maximum State share of 75 percent of the cost of the equipment. Each recipient of a grant provides reports for three years to the TWDB on the utilization of the equipment. Funding is limited and there is an application and priority ranking procedure. Currently, the allocated amount for grants is limited to \$100,000 per year, depending on interest earnings. Since inception, the TWDB has provided 273 grants. A total of \$1.89 million has been provided with the average grant being approximately \$6,900.

4.3 TSSWCB's Agricultural Water Conservation Programs and Activities

The TSSWCB was created in 1939 by the Texas Legislature to organize the State into Soil Conservation Districts (now known as Soil and Water Conservation Districts) based on a need expressed by local landowners. The TSSWCB was designed to serve as the State-level administrative agency for local Soil and Water Conservation Districts (SWCDs) once the districts were organized. Today, there are 216 SWCDs organized across the State. Each district is an independent political subdivision of State government that is governed by five directors elected by landowners in the district. The TSSWCB provides assistance to the districts through field representatives that meet regularly with districts, through TSSWCB regional offices and through programs administered by the TSSWCB.

The TSSWCB has four major programs that address agricultural water conservation issues: the Technical Assistance Grants Program, the Subchapter H Technical Assistance Program, the Water Quality Management Plan Program (WQMP), and the Brush Control Program. While neither the Technical Assistance Grants Program nor the Water Quality Management Plan Program are designed specifically or solely for water conservation, each includes water conservation in its implementation. The Subchapter H Technical Assistance program and the Brush Control Program, however, have water conservation as their main objective.

Since 1984, the Texas Legislature has appropriated funds annually to the TSSWCB for the purpose of assisting SWCDs in their efforts to provide technical assistance to agricultural producers. These grants may be used to pay employees for performing the duties of a SWCD soil conservation technician. A SWCD soil conservation technician works with owners and operators of agricultural or other lands on the installation and maintenance of various conservation practices. Some of these practices are water conservation practices. In 2002, the TSSWCB provided \$1,033,000 to SWCDs for technical assistance.

The Subchapter H Technical Assistance Program, created by §201.201 of the Texas Agriculture Code utilizes funds from the agricultural soil and water conservation fund for providing technical assistance to landowners and operators for installing soil and water conservation plans developed jointly by landowners and local soil and water conservation districts. \$79,000 was available to SWCDs for water conservation technical assistance in 2002.

The passage of Senate Bill 503 in 1993 directed the TSSWCB to implement water quality management plans (WQMPs) in Texas. The TSSWCB has been implementing water quality management plans since and has completed approximately 6,000 plans in Texas. A WQMP is a site-specific plan developed through and approved by SWCDs for agricultural or silvicultural lands. The plan includes appropriate land treatment practices, production practices, management measures and technologies or combinations thereof. The purpose of WQMPs is to achieve a level of pollution prevention or abatement determined by the TSSWCB, in consultation with local SWCDs, to be consistent with State water quality standards. While this program is designed for water quality, many of the practices that are included in a WQMP are effective at conserving water as well. Water conservation practices include: conversion to more efficient irrigation systems, irrigation land leveling, irrigation tailwater recovery, and pond sealing.

In 1985, Senate Bill 1083, created the Texas Brush Control Program. The goal of this program is to enhance the State's water resources through selective control of brush species. The TSSWCB is designated as the agency responsible for administering the program and is given authority to delegate responsibility for administering certain portions of the program to local SWCDs. The following paragraphs briefly summarize significant brush control projects.

The North Concho River Brush Control Project has as its objective to enhance the amount of water flowing from the North Concho River watershed into O.C. Fisher Reservoir. O.C. Fisher Reservoir is a water supply for the city of San Angelo where water levels have fallen to critical levels (as of September 1, 2002, 4 percent of capacity). The North Concho River watershed was selected for this project because of the demonstrable changes in the watershed brought about by brush infestation and the dramatic negative effects of these changes on surface water yields. Currently, 325,000 acres of the 950,000-acre North Concho River watershed are targeted for brush control by the TSSWCB. Over 125,000 acres have been cleared to date using State funds. Modeling studies indicate this project will yield an average of 16,600 AFY over ten years upon completion.

Additional brush control projects were established as a result of the positive outcome of feasibility studies completed by the TSSWCB in 2000. These projects were funded from \$15 million provided by the 77th Legislature. Based on water needs and the results of these feasibility studies, the TSSWCB allocated \$3.7 million for brush control in the Pedernales River watershed and \$11.3 million for brush control in the Upper Colorado/Twin Buttes Reservoir watershed. Taking information from the feasibility studies, it is estimated that over 45,000 acres of brush will be treated in the Pedernales River watershed and almost 200,000 acres will be treated in the Upper Colorado/ Twin

Buttes Reservoir watershed. The feasibility studies estimate that over the next ten years the program will yield over 33,800 AFY in the Pedernales watershed and over 23,000 AFY in the Upper Colorado/Twin Buttes Reservoir watershed. The Pedernales River is a tributary to Lake Travis, which provides water to the city of Austin and other areas. The Upper Colorado/Twin Buttes Reservoir watershed provides water to the City of San Angelo and portions of West Texas. These projects began in September 2002.

The feasibility of using brush control to enhance water yield is currently being studied in the Lake Arrowhead, Lake Brownwood, Lake Fort Phantom Hill, and Lake Palo Pinto watersheds. The 77th Legislature provided \$500,000 to initiate these brush control feasibility studies. These watersheds are identified in the State Brush Control Plan as reservoirs where brush control could enhance water supplies. The users of the water supplies in these watersheds have been drastically impacted by recent droughts resulting in the institution of water-use restrictions. These brush control feasibility studies were initiated in September 2001 and are nearing completion. The final reports will be delivered to the Texas Legislature in December 2002.

4.4 Agricultural Water Conservation Programs and Activities Administered by Other Agencies or Entities

The TSSWCB cooperates, through its SWCDs, with the USDA-NRCS in implementing its Environmental Quality Incentives Program (EQIP). EQIP was reauthorized in the Farm Security and Rural Investment Act of 2002 (Farm Bill) to provide a voluntary conservation program for farmers and ranchers that promotes agricultural production and environmental quality as compatible national goals. EQIP offers financial and technical assistance to eligible participants to install or implement structural and management practices on eligible agricultural land. EQIP offers contracts with a minimum term that ends one year after the implementation of the last scheduled practices and a maximum term of ten years. These contracts provide incentive payments and cost-shares to implement conservation practices.

EQIP activities are carried out according to an environmental quality incentive program plan of operations developed in conjunction with the producer. This plan identifies the appropriate conservation practice or practices to address the resource concerns. As with the WQMP Program, EQIP includes numerous practices that achieve water conservation as well as water quality enhancement. The EQIP program also includes \$5.6 million for water conservation in the Ogallala aquifer region of Texas. In addition, NRCS has recently established an irrigation team consisting of an engineer, agronomist, technician, and a team leader in Hondo in the Edwards aquifer area. The team will be working with producers to evaluate and improve their irrigation systems to increase efficiency.

The Texas Department of Agriculture is currently working on a project to control salt cedar on the Pecos River to conserve water in the river. Approximately 118 of 346 river miles have been treated to date. Preliminary estimates of water savings from eradication efforts in 1999 and 2000 range from 5,000 to 13,500 AFY.

The Texas Agricultural Finance Authority was created in 1987 as a unit of the Texas Department of Agriculture to provide financial assistance through lending institutions to producers and providers of goods and services in rural areas. The Linked Deposit Program provides for commercial loans at below-market rates of up to \$250,000 for water-conserving equipment or projects.

The Texas Cooperative Extension has an educational program focused on water conservation. These activities differ from county to county, but include a conservation web site, training, and partnering with local sponsors.

The Texas Water Resource Institute (TWRI) coordinates the water-related research and extension programs in the Agricultural Program of the Texas A&M University System. Irrigation efficiency is a major activity in its programs. Two new programs impacting agricultural water conservation and irrigation efficiency are the Rio Grande Basin Initiative and the Irrigation Technology Center. The Rio Grande Basin Initiative is a federally funded joint effort of the Texas A&M University System Agriculture Program and the New Mexico State University College of Agriculture and Home Economics. It is a three-year federally funded initiative to increase irrigation efficiency and water conservation in the Rio Grande Basin through research and Extension activities. The recently established Irrigation Technology Center in the San Antonio area will be a facility for education, testing, and applied research to promote water conservation and efficient water use, while preserving quality urban landscapes and profitable agricultural production.

5.0 RECOMMENDATIONS, PROGRAMMATIC APPROACHES, AND FUNDING FOR ADDITIONAL CONSERVATION EFFORTS

Water conservation is a very critical element to meeting the State's long-term water supply needs. As discussed previously, conservation is an important factor in limiting total future water demand in the State. Additional water conservation is possible and necessary, and can be a cost-effective strategy for meeting current and future Texas water needs. The following recommendations are respectfully submitted to further water conservation efforts in the State.

5.1 Municipal Water Conservation Recommendations

Water demands in cities are primarily a function of per capita water use. A local approach to conservation allows local impacts of climate, economy, and availability of water supply to be considered when setting reasonable conservation targets. Conservation will hold a more fundamental role in future regional water planning, as recent rule changes now require the Planning Groups to consider conservation water management strategies for all identified water needs before other strategies are considered. If conservation water management strategies are not recommended to at least partially meet these needs, the Planning Groups must explain why.

A possible mechanism for funding municipal conservation programs and strategies, such as those identified during the regional water planning process, is the Water Infrastructure Fund (WIF). Although the WIF was created by Senate Bill 2 in the 77th Legislature, no funds were appropriated to allow implementation. Conservation has been documented to be cost effective compared to certain other water management strategies, but unfortunately adequate funding assistance for these efforts is not currently available. Municipal conservation programs, such as incentives for plumbing fixture replacement (which can lessen the capacity needs of water and wastewater treatment plants) and educational programs should be available and funded by the State.

- **Funding for conservation water management strategies using funds deposited in the WIF will be an important and effective tool to ensure their implementation.**

2002 State Water Plan Municipal Conservation Policy Recommendations

In addition to the above, the following policy recommendations were brought forward by the TWDB regarding municipal water conservation in the 2002 State Water Plan:

- **The Legislature should support and finance increased educational and technical assistance to implement advanced conservation technologies.**
- **Water suppliers at the local level should establish minimum levels of water conservation. TWDB should modify its rules to require that water conservation plans and TNRCC (now TCEQ) should modify their rules to require that drought contingency plans include locally set quantified goals, such as in GPCD. One goal should be a target amount for “unaccounted for” water. Goals set by specific entities should recognize past efforts and local circumstances. TNRCC (now TCEQ) and TWDB should jointly identify quantified target goals for water conservation and drought contingency results that water suppliers and other entities may use as guidelines in preparing water conservation or drought contingency plans. These target goals should not be mandates. The Legislature should provide sufficient funding to assist entities in implementing plans that are consistent with quantified target goals.**
- **TNRCC (now TCEQ) and TWDB should jointly develop model water conservation programs for different types of water suppliers that would suggest best management practices for achieving the highest practicable levels of water conservation and efficiency achievable for each specific type of water supplier.**
- **TNRCC (now TCEQ) and TWDB should jointly develop model drought contingency programs for different types of water suppliers that would suggest best management practices for achieving the highest practicable levels of water use reductions achievable during drought situations for each specific type of water supplier.**
- **The Legislature should encourage new public buildings to include alternative technologies such as rainwater harvesting systems and gray-water systems to provide water for secondary uses, such as cooling towers, toilets, and landscape irrigation.**

5.2 TWDB's Agricultural Water Conservation Recommendations

Consolidation of TWDB's Agricultural Financial Assistance Programs

Conservation in irrigated agriculture has and will continue to account for significant water savings. Efforts to maintain agricultural production using less water will help alleviate potential adverse effects of reduced water availability for agricultural use on rural areas that support agriculture. Efforts to provide agricultural water savings generated through conservation can also help provide additional supplies to municipalities while simultaneously preserving agricultural production and mitigating negative impacts that a loss of production might cause.

A number of agencies and groups have existing programs that address the various components of agricultural water conservation in Texas, but the needs are large and so are the corresponding costs. Various agriculture initiatives have been established by separate pieces of legislation and appropriations over the years resulting in multiple programs and funds. Collectively, these programs and funds compliment the TWDB's mission relative to serving the needs of the agricultural community. The TWDB administers 10 separate funds and sub-funds associated with the agriculture conservation programs. While the TWDB's programs can address the identifiable needs, they are difficult to administer and independently lack the flexibility to address increasingly diverse opportunities for agricultural water conservation initiatives. Often, available funds are not in the right programs at the appropriate time.

The TWDB proposes to seek legislative changes to combine the separate programs and funds into one encompassing agricultural water conservation program. This would eliminate many of the administrative burdens of the various funding programs. In addition, elimination of certain restrictions would allow the TWDB flexibility in administration of the funds to put resources to work more effectively, such as by assisting with implementation of the 2002 State Water Plan.

- **To simplify management and improve product delivery in the TWDB's agricultural financial assistance programs, the TWDB recommends Legislative changes to consolidate these agricultural financial assistance programs.**

Agriculture Conservation Demonstration Initiative

The purpose of this initiative is to demonstrate how the need for water conservation in irrigated agriculture may be addressed programmatically in Texas. The goal of the initiative is to develop comprehensive data, utilizing large-scale demonstration sites, to assess the cost-effectiveness of selected technologies, their impact on productivity and groundwater levels (supplies). By demonstrating the economic viability of these technologies, the State would help overcome the agricultural community's reluctance to consider them as alternatives to maintain their productivity and help them in their inability to finance the utilization of water conserving technology. The State could then provide strong financial incentives for efficient use of water and energy by means of sustainable lending programs designed to increase the affordability of the technologies.

- **The TWDB recommends that the Legislature provide authorization for TWDB staff and funding to be used to implement the Agriculture Conservation Demonstration Initiative.**

2002 State Water Plan Agricultural Conservation Policy Recommendations

In addition to the above, the following policy recommendations were brought forward by the TWDB regarding agricultural water conservation in the 2002 State Water Plan:

- **The Legislature should support and finance increased educational and technical assistance to implement advanced conservation technologies.**
- **The Legislature should consider creating new financing mechanisms to support agricultural water conservation in general, but especially to support the voluntary conversion of a portion of the water saved to provide water to other uses.**
- **The Legislature should support and finance implementation of efficient irrigation systems and research on crops and landscape plants that are drought and saline tolerant.**

5.3 TSSWCB's Agricultural Water Conservation Recommendations

Water Conservation Technical Assistance

Providing technical assistance to landowners and operators through SWCDs is an effective and successful program to implement water conservation practices in agricultural areas of the State. It is also an effective way to leverage funds from federal conservation programs, such as EQIP, which provide cost-share funds to implement conservation practices. However, much more technical assistance is needed to get the level of conservation implanted to meet the State's water conservation needs.

- **Expanding the funding for technical assistance would increase the level of water conservation implementation in agricultural uses.**

Water Conservation Cost Share

Sec. 201.302 of the Texas Agriculture Code authorizes the TSSWCB to provide cost-share assistance to agricultural landowners and operators for water conservation practices. However, no funding has been provided for this purpose. The TSSWCB has a program infrastructure in place through its WQMP Program, which could be expanded to implement a similar cost-share program focused on enhancing water conservation. The voluntary cost-share program model has proven to be one of the more effective means to effect adoption of conservation practices by agricultural landowners and producers.

- **Funding a cost-share program to assist and encourage irrigators to adopt more efficient conservation technology would ensure the implementation of water-conserving practices.**

Brush Control

Results of feasibility studies show that brush control can yield substantial water over significant portions of the State. Current brush control funding will realize only a portion of the water yield potential.

- **Additional funding for additional brush control projects and additional feasibility studies would increase water yield to the State. This should include funding to complete the salt cedar control program on the Pecos River.**