

Texas Water Savers

News of Water Conservation and Reuse in Texas



Texas Agricultural Extension Service

Texas Agricultural Experiment Station

Historic industry–stakeholder clothes washer agreement to boost water and energy savings

Stringent new energy-efficiency standards for clothes washers reached in an historic agreement between stakeholder groups and the U.S. Department of Energy are expected to save 6.4 trillion gallons of water by 2030 and to save consumers \$13 billion on their water bills.

“These standards will save billions of dollars and trillions of gallons of water,” said Tony Gregg, Water Conservation Manager for the City of Austin and the American Water Works Association member who signed the agreement. “While these standards are a large step forward, there are already front-loading machines, such as the Frigidaire Gallery and Maytag Neptune, on the market today that use 40% less water than average.” Gregg served on an advocacy group that negotiated the standards with the U.S. Department of Energy.

Although water-efficiency standards proposed by water utilities and environmental groups are not specifically included in the new rules, consumers and water suppliers will nonetheless benefit from more efficient machines. In new homes, the clothes washer is the appliance that uses the most water, averaging 40 gallons per load. With the new standards, by 2007, clothes washer water use should be reduced to 30 gallons per load.

The historic agreement was negotiated between the home appliance industry and major stakeholders, in-see Clothes washer, p. 6



photo courtesy Tony Gregg

Tony Gregg (foreground), City of Austin Water Conservation Manager, speaks at the announcement of an historic clothes washer efficiency standard announcement. Pictured (l. to r.) are Larry Johnson, President, GE Appliances; Lloyd Ward, Chair Chief Executive Officer, Maytag, Jeff Fettig, Chief Operating Officer, Whirlpool.

Baker's conservation efforts recognized with two prestigious awards this spring

Two recent awards lauded the far-reaching impacts of the efforts of Carole Baker, public information director for The Harris-Galveston Coastal Subsidence District.

She was given the designation of Water Conservationist of the Year at the Texas Water Conservation Association's (TWCA) 56th Annual Convention in March.

Baker was also recognized with the George Warren Fuller Award at the annual conference of the Texas Section–American Water Works Association (AWWA)



Carole Baker

in April and later at the AWWA National Conference in Denver.

The Water Conservationist of the Year award is recognizes water conservation efforts on behalf of a recipient's community. Baker's enthusiastic promotion of the *Learning to be Water Wise & Energy Efficient* program has left a legacy of water conservation in more than 100,000 homes in the Harris-Galveston area. And thanks to Baker's efforts outside The Subsidence see Baker, p. 10

—Inside—

Watersmart campaign	2
AWWA WC&R Awards	3
Ag lab: partners in conservation	4
Modern-age tinkerer recycles-wastewater	4
SAWS announces Watersaver awards	5
Rangelands: Texas' watersheds	7
Schertz ordinance bans thirsty turf	8
Water Puzzle conference	9
WaterWise Council BMP brochures for consumers	10
El Paso conservation agenda	9
Meetings and conferences	12

Global paper industry soaks up water, electricity

Per ton of product, paper manufacturing uses more water than any product in the world. Not steel, not aluminum, not concrete, not textiles.

According to *Paper Cuts*, mills in the United States use between 11,500 and 22,000 gallons of water per ton of virgin fiber paper. Bond paper, the fastest growing grade, uses more water than other grades due to the need for bleaching and washing.

Paper production also uses high levels of air and water pollution "all to make a product that is usually used once and thrown away," according to a *Paper Cuts: Recovering the Paper Landscape*, a Worldwatch Institute paper by Janet N. Abramovitz and Ashley T. Mattoon.

The most important step to reduce the quantity of natural resources and energy poured into paper production is recycling of paper waste. Recycling

can exploit what Abramovitz terms the "urban forest," the vast amount of waste paper generated by cities. Despite a tripling of volume of paper recycled since 1975, only about 43% of that paper is sent to recycling facilities. Increases in overall volume of paper, it seems, have outpaced the growth in recycling.

Some of this progress in throttling back the water needed to produce paper is a result of increased use of recycled fiber, some as a result of improved processing methods spurred by regulations," according to Abramovitz. Producing new paper from old uses far less chemicals and energy than producing virgin paper, because recycled paper has already been processed. In the United States, water used in paper manufacturing has fallen by 50% to 90% per ton since 1950. (During this same time frame, however, paper consumption in this country has increased six-fold.) Japanese factories have cut the amount of water

used per ton of paper by two-thirds in the past 10 years.

Further advances in water use efficiency look promising. A paper mill under construction in a refurbished industrial site in Bronx, New York will create paper solely from recycled newspaper and will use reclaimed wastewater for industrial process water. In the process it will use half the energy and create far less pollution than a conventional paper mill.

One mini-mill in the New Mexico desert processes corrugated boxes, taking steam and water purchased from an nearby steam electric power plant and recycling it in a closed loop, using only about 50,000 gallons per day. Similar plants consume 2.5 million gallons per day.

The economies and standards of the industrialized world could be maintained without losing the benefits of the services paper provides: reducing ephemeral use, creation of office forms electronically, adding value and services while reducing energy use and materials, Abramovitz concludes.

The Worldwatch Institute (<http://www.worldwatch.org>) is a nonprofit research organization whose mission is to foster a sustainable society.

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Texas AWWA announces C&R award winners

For the seventh year, the Conservation and Reuse Division of the Texas Section, American Water Works Association recognized utilities, companies, and others who have found effective, innovative, and transferable ways to conserve and recycle water. Awards were announced at the Section's annual conference in April.

Direct Program for Large Utility
San Antonio Water System

Conservation Department
Program: Commercial Conservation Programs

The multifaceted San Antonio Water System commercial conservation program is designed to reduce water use by SAWS' general-class customers by 15% per year, as part of the attempt of the utility to reduce per capital consumption to 140 gallons by 2008. Representing 8% of the customer base but accounting for 49% of consumption, general class customers represent a good target for incentive-based conservation programs.

Eight current programs were introduced in a series of phased kickoffs, with the most encompassing programs, such as the toilet retrofit and high-efficiency washing machine rebate programs, introduced first. Funded by a monthly conservation fee based upon meter size, the programs are expected to be fully implemented in 10 years.

Other program entities include a shared-cost water audit, large-scale retrofit, landscape rebate program, car wash certification, and workshops and education.

SAWS pursued an aggressive publicity campaign including quarterly mailouts of applications, press releases, print advertisements, speaking engagements, and one-on-one contact.

Indirect Program for a Large Utility

City of Austin Planning, Environmental and Conservation Services Department

Program: Waterwise Irrigation Program

The City of Austin Planning, Environmental, and Conservation Department

conducts annual Waterwise irrigation seminars designed to—

- (1) Reduce peak-day water demands.
- (2) Educate licensed irrigation system installers, landscape contractors, and lawn maintenance personnel in the long-term effects of high water use.
- (3) Show the benefits of providing good customer service and low-water-use landscapes.
- (4) Promote the City of Austin Water Conservation Programs.
- (5) Offer 8 continuing education credits required for relicensing of irrigators.
- (6) Certify and recognize participants as City of Austin WaterWise Professionals.

The idea of an annual one-day seminar arose from the demonstrated need for making the licensed irrigators and landscapers aware of limited water resources, current city ordinances, and water conservation strategies.

See Conservation, page 8



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State-of-the art Lubbock lab promotes partnerships in ag production research

With a mission to improve commodity production in the semiarid High Plains, the state-of-the-art Plant Stress and Water Conservation Laboratory opened its doors last year in Lubbock.

Partnering in research in the 64,000-square foot laboratory are the Agricultural Research Service of the US Department of Agriculture (USDA-ARS), Texas A&M University, and Texas Tech University. The unique partnership was struck at a summit meeting in December 1998 giving each entity an equal stake in coordinating and developing new food and fiber research programs.

Scientists at the Laboratory will conduct fundamental and applied research on remote sensing to determine irrigation deficits or nutrient deficiencies and finding means to move stress protection genes into plant germplasm.

Also among the laboratory's research goals is precision agriculture—the use of remote sensing to help farmers determine optimum application of irrigation water, fertilizer, and insect control.

The new facility replaces the USDA-ARS Plant Stress and Water Conservation Laboratory built north of Lubbock in 1970s. The older facility will continue to house the Cotton Production and Processing Research Laboratory.

The dedication of the lab is the culmination of 45 years of planning and effort, starting when the need for the lab was recognized by Congress during the devastating drought of the 1950s. That event renewed interest in the effects of erosion and the importance of water conservation in production agriculture.

The new Lubbock lab is one of 19 USDA-ARS research facilities in the Great Plains. It will house the Plant Stress and Germplasm Development Unit and the Wind Erosion and Water Conservation Unit.

Dan R. Upchurch, laboratory director, quoted in *The Cross Section*, the monthly publication of the High Plains Water Conservation District, said, "This is the greatest time in history to be a scientist! There are three unique scientific revolutions occurring at this time, and

the facility is designed to take advantage of them."

The three scientific revolutions to which Upchurch referred are molecular biology, advances in computer modeling, and new mathematical theories.

The High Plains is an ideal location for the lab due to its semiarid climate, and the fact that every major US crop except for rice is grown within a 50-mile radius of Lubbock, Upchurch said.

US Rep. Larry Combes, chairman of the House Agriculture Committee, helped secure funding for the lab, and introduced the 1987 legislation to build the facility.

Congress authorized construction of the lab in 1988, but receipt of the full

appropriation to build the research facility was not received until 1997. A total of \$16 million was spent on the facility, \$13.5 million of which was federally funded. The total was well under the original estimate, due to special cost-cutting construction techniques, including burnished block in hallways and furniture purchased from the Federal prison system.

The Cropping Systems Research Laboratory web site is <http://www.csl.ars.usda.gov/> Upchurch can be reached at (806) 749-5560 or at dupchurch@lbk.ars.usda.gov,

Modern-age tinkerer irrigates with on-site-treated wastewater

Atreus Clay is a modern-age tinkerer living in a house in historic Independence, 10 miles north of Brenham, built in 1883. He heats his indoor swim-

scoop through a wine cellar.

Instead of installing a typical on-site septic system to serve an 18-unit mobile home park on land he owns near his homestead, Clay instead contracted with Austin engineer David Venhuizen to build a sand filtration wastewater reclamation system to irrigate his pecan orchards.

Wastewater from the tenants' mobile homes is gravity-fed first to a receiving tank. A controller pumps water in rotation to each of five tanks filled with sand media. After filtration, the cleansed water is pumped to a final tank, where it serves as a subsurface drip irrigation system in the pecan orchard.

With 18 mobile homes, the system now handles about 5,000 gallons per day. Clay has installed 24,000 total feet of drip irrigation tubes and laterals.

"My hope is the system will apply nutrients as well as irrigation water," said Clay. "And as more and more tenants move in, this system will allow me to cut back on the use of well water for irrigation."

Venhuizen can be reached at (512) 442-4047 or waterguy@ix.netcom.com

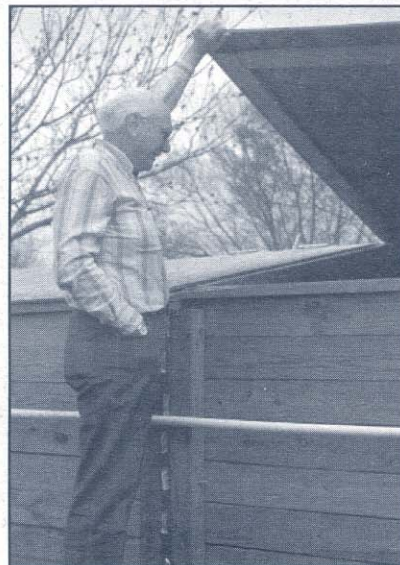


photo by Jan Gerstner

Atreus Clay checks one in a series of sand filters, a component of the wastewater treatment system for a small mobile home park.

ming pool in the winter with solar panels and cools his house in the summer with air routed via a huge ground-level

SAWS recognizes water-saving entities

The San Antonio Water System (SAWS), in cooperation with KTSA radio, *The San Antonio Business Journal*, and KENS-TV, announced the recipients of the Fourth Annual Watersaver Awards. These awards recognize local and regional businesses and public institutions who are leading the way in conserving water by implementing water conserving practices, curricula, or technologies.

The 2000 Watersaver Award winners represent more than 570 million gallons in annual water savings. The awards this year break new ground—for the first time, two school curricula promoting water conservation were recognized.

Proceeds from ticket sales to the breakfast award ceremony are earmarked for two scholarships for Bexar County high school graduates majoring in an environmental field at a Texas university. SAWS plans to offer internships to the scholarship winners, said Ruby Perez, a SAWS conservation planner.

It is the hope of the sponsors that by highlighting the accomplishments and innovation in water conservation, other local and regional entities may find a means for reducing their water consumption in years to come.

Rock and gravel supplier **Vulcan Materials** completed construction on their Fines Recovery and Water Recycling System which allows Vulcan to recover between 72% and 85% of the water used for aggregate washing. Data compiled since completion in January shows a water savings of between 389 million and 504 million gallons (1,193 to 1,548 acre-feet) annually.

The **Sony Semiconductor of America** plant installed a chiller condensate collection system incorporating a network of piping and pumps that allow Sony to collect condensate from three outside air conditioning units for use as cooling tower makeup water. By capturing this "free water," the system decreases consumption of potable Edwards Aquifer water. Projected annual water savings are 1,871,000 gallons (5.7 acre-feet).

Water conservation and pollution control measures at **Six Flags Fiesta Texas** include the installation of a filtration system that allows reuse of more than 1 million gallons of water on popular

rides, the operation of a series of pollution abatement lagoons that capture runoff to be reused for irrigation and wash-down purposes, and a drought-tolerant landscape.

In its ongoing effort to reduce water consumption, the **City of San Antonio Fleet Maintenance and Operations Division** installed an automatic car wash with an above-ground water-reclamation system. This system saves more than 30 gallon per car wash. Based upon 2,400 monthly washes, the system is expected to save approximately 72,000 gallons per month for an 85% reduction in water consumption.

The **Kimberly Clark Corp.** implemented a concentrate recovery system. With the use of ultraviolet light, and ozonation, and reverse osmosis, the new system recovers process water that would have normally been released to the sanitary sewer. By implementing this system Kimberly Clark Corp. has achieved 100% recovery of concentrate water, thereby reducing annual water consumption by approximately 12% or 1.6 million gallons.

As part of its ongoing water conservation efforts, **The Alamo** grounds are scheduled to start receiving recycled water in August 2000. Total annual recycled water use will replace 3,910,000 gallons (12 acre-feet) of Edwards Aquifer water annually. Other water-conserving improvements at the Alamo include replacement of more than 1 acre of St. Augustine grass with Zoysia, installation of a drip irrigation system for landscape beds, and the addition of a recirculating water system for the Memorial Well and Acequia aqueduct system. The Daughters of the Texas Republic are charged with maintenance of the Alamo.

Trinity University underwent significant retrofits and improvements that will allow them to annually replace 58 million gallons (177 acre-feet) of potable water with recycled water for irrigation and cooling tower operations.

The **Presa Vista Apartments**, an

eight-unit complex, present a good example of the functionality and beauty of a well-designed drought-tolerant landscape. Using native plants, drip irrigation, and recycled materials, the complex has managed not only to beautify its neighborhood, but also to reduce further landscape watering requirements.

The purpose of the **Clark High School AGUA project** is to promote water-saving efforts among high school students in their environments, at school, and at home. The project started with a pledge from geology students to reduce water consumption in their



photo by Jan Gerston

SAWS Board of Trustees member Norman Dugas, Jr., left, presented a Watersaver Award to Tina Carrola and Edwina Phearse of John B. Connally Middle School for the Earth Avengers Project.

homes by 10%. Later in the year, the student council sponsored "Aqua Week" promoting water conservation through announcements, posters, and solicitation of pledges from students to save water in their own homes.

Thomas Jefferson High School students participated in the Every Drop Counts program aimed at educating students, faculty, and parents about the need for water conservation and other environmental issues. The Green Space program involved calculations by students of the volume of water needed to irrigate landscapes with 1 inch of water every week during the summer months. Using these calculations, students were able to vividly demonstrate the benefits *see Watersaver. p. 6*

Clothes washer standards

continued from page 1

cluding environmental groups, energy efficiency advocates, utilities and state governments. The agreement was announced in a ceremony in Washington, D.C. attended by Secretary of Energy Bill Richardson, Sen. Charles Grassley of Iowa, and executives from major appliance manufacturers.

The standards go into effect in 2004 and become more stringent in 2007. The first standard is 20% higher than the current standard; the second, a 35% improvement in energy consumption. To provide a marketing incentive, the agreement makes available two tiers of tax credits of \$30 million at each efficiency level to any manufacturer who markets the improved models prior to the 2004 deadline and then to those who meet the more stringent 2007 levels. The first-tier credit will be \$50 per unit meeting the 2001 standard before 2004; the second-tier will provide a credit of \$100

per unit meeting more stringent standards before 2007.

The energy efficiency standards are based upon a combination of lower electricity requirements and less hot water use.

Products that meet the 2007 standards are already available, and can be identified by the Energy Star label (<http://www.energystar.gov>). Energystar appliances use nearly 50% less water and 30% to 40% less energy per load.

The initial cost to consumers, however, is general, higher than that of conventional clothes washers. To partially offset this difference and to boost markets for these machines, a few Texas urban utilities—the City of Austin, San Antonio Water Systems, Bexar Metropolitan Water System, and El Paso Water Utilities, offer rebates on the purchase price.

High-efficiency washers make up just 4% to 6% of all laundry appliances sold in this country.

In related news, the Federal Trade Commission will now make no distinction between horizontal-axis and the traditional top-loading vertical-axis machines on Energy Guide labels. In the past, the horizontal-axis models were placed in a separate category, meaning that the least efficient of these high-efficiency washers appeared at the high end of the energy range on the Energy Guide label. This placement was misleading, because the least efficient of the horizontal-axis machines uses about half the energy and about 40% of the water of a front-loader. With the new, unified label, all clothes washers will be evaluated and ranked on their energy consumption.

Watersaver

continued from page 5

of a drought-tolerant landscape. In honor of Earth Day, announcements on proper landscaping, endangered species, recycling, water conservation and hazardous waste disposal were broadcast over the school's public address system.

Watersaver Too awards recognize entities who have also made strides in fostering awareness of means to achieve water conservation.

After completion of a professional water audit, the **University of Texas at San Antonio Health Science Center** completed the first phase of recommended water conservation projects by retrofitting 627 toilets and urinals with ultralow flush fixtures, to yield a projected 18 million gallons in water savings.

RC Management Inc. completed a retrofit of all showerheads, faucet aerators, and toilets in 11 apartment complexes, for an expected savings of 13 million gallons annually.

For the third consecutive year, the efforts of **Northside Independent School District** continue as an example of responsible and well managed water

conservation practices. Continuing efforts include water audits of older district schools, a policy of installing only drought-tolerant landscapes, a well managed cooling tower program, and a community awareness campaign. The water savings from the combined programs is projected at 14 million gallons per year.

Alamo Area Mutual Housing, a nonprofit organization, retrofitted three apartment complexes with new low-flow fixtures. The retrofit, involving replacement of more than 1,000 faucet aerators, 500 showerheads, and 500 toilets, is projected to yield an annual water saving of more than 6 million gallons.

Graywater Recycling continues to design and build graywater recycling systems for business and residential customers. Most notably, Graywater Recycling recently completed the installation of a graywater system for a new 5,000-square-foot residence. This system is anticipated to save 90,000 gallons over its projected 50-year lifetime.

The **Salado Intermediate School Ecology Club** participated in the planting of a water-wise garden to beautify

the campus and accent its mascot. Twelve parents, two teachers, and 24 students participated. Funding from the SAWS Mini Grant program was supplemented with donations from Armadillo Flats Nursery.

The purpose of the **Earth Avengers Project of John B. Connally Middle School** is to promote water-saving efforts among middle school students, their parents, and their teachers. Sixth-, seventh-, and eighth-grade students were able to take advantage of a SAWS Mini Grant to develop their own water-wise garden.

The purpose of the **Riverside Park Elementary Project** is to provide students with an opportunity to learn about the environment, conservation, and pollution prevention, while fostering the idea that students should take pride in their school and community through beautification and conservation. The project involved the establishment of a mini-garden by each grade level, preparation of units of instruction by each grade level relating to the mini-gardens, and a science fair with projects based on environmental issues.

Rangelands serves as Texas' watershed

Rangelands—grasslands, shrublands, marshes, deserts, and woodlands not in commercial production—account for 60% of Texas' land. Although they support livestock production and provide habitat for native wildlife, the most important function of rangelands is serving as the state's watershed. The bulk of Texas' water supply—surface flow and aquifer recharge—comes from the precipitation that falls on Texas rangeland. The manner in which these areas are managed, therefore, has a great impact on water quantity and quality.

Traditionally, Texas rangelands were managed for wildlife, livestock, and environmental benefits, but maximizing rangeland products and water yield cannot be achieved simultaneously.

Healthy rangeland provides a high-quality water source, promotes infiltration, filters overland flow of water, provides forage for livestock production, and functions as a wildlife habitat. Rangeland in an unhealthy state will have increased runoff with high nutrient and sediment content, and will not retain as much soil moisture to grow forage needed for domestic livestock and native wildlife and to recharge the aquifer.

As part of its Water for Texans program partially funded by Senate Bill 1, specialists from the Texas Agricultural Extension Service, are comparing side-by-side plots to demonstrate overland flow and infiltration resulting from various management strategies.

To date, the Rangeland Ecology and Management Unit has installed 28 rangeland watershed demonstrations in 7 counties, with 12 more under construction in 4 counties. Each of the 1/100-acre or larger demonstration sites represents rangeland with different soils, vegetation, and management.

After a calibration period, the landowner implements a rangeland best management practice on one plot to demonstrate effects of good management on runoff quantity and quality compared with the companion plot under traditional management, according to Extension Assistant Brian Hays.

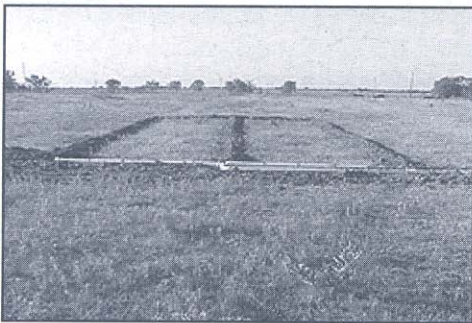


photo courtesy Brian Hays

In this 1/100-acre paired rangeland demonstration plot, best management practices will be compared with existing landowner management on runoff at the La Copita Demonstration Ranch near Alice.

Other demonstrations involve the use of shallow groundwater monitoring wells to determine the effect of salt cedar on groundwater along the Pecos, Colorado, and Canadian rivers.

Again using the paired-plot technique, two plots infested with salt cedar and both with monitoring wells are calibrated. After the calibration period, herbicide is applied to kill

the salt cedar on one plot, and groundwater will be monitored to see if there is an increase in water levels after treatment.

According to Hays, some demonstration sites are public-private partnerships. Several sites are joint efforts between Texas Parks and Wildlife Department and Texas Agricultural Extension Service. Other demonstration sites include Armand



photo courtesy Brian Hays

Using two similar plot both infested with mixed brush, Extension Service personnel study the effects of brush on runoff quality and quantity.

Bayou Nature Center in Houston, La Copita Demonstration Ranch near Alice, Texas Wildlife Cooperative in College Station, and Southwest Texas State University's Freeman Ranch.

It is interesting to note that Senate Bill 1 adds "brush control" to the list of projects eligible for conservation loans from the Texas Water Development Board. Other practices eligible for low-interest loans include precipitation enhancement and conversion to dryland agriculture.

Rangeland factors that influence the amount of water that evaporates, infiltrates, or runs off are type and density of vegetative cover, soil moisture, intensity of rainfall event, soil water-holding capacity, and slope.

It is estimated that in an average rainfall year, 42% of the precipitation falling in Texas evaporates into the atmosphere and 47% is lost through plant transpiration. Only a little more than 1% of the annual precipitation recharges aquifers, and the remaining 10% runs off to become stream flow.

According to Hays, "Properly managed rangeland has adequate vegetation cover to protect the soil from raindrop impact, promote infiltration, and slow and filter overland flow to minimize erosion."

To assist landowners in properly managing rangeland, the Rangeland Ecology and Management Unit is in the process of creating seven two-page publications in the Water for Texans series, including the four listed below.

Healthy Range Watersheds Critical to the Future of Texas, contains photographs of healthy, at-risk and unhealthy rangeland examples.

Rangeland Watersheds: The Major Source of Water for Texans is a fact sheet about the contributions of rangeland Texas' water supply.

Major Rangeland Watershed Issues Affecting Texans describes rangelands' effect on the quality and quantity of the state's water resources.

Publications in progress are *Know Your Plants to Protect your Watershed*, *Reading Your Landscape: Are Your Pastures See Rangeland*, page 8

Schertz turf ordinance means reduced demand

By virtue of its location, between I-35 and I-10 20 miles northeast of San Antonio, the City of Schertz bills its location as Corridor to the Future. By becoming the first, and so far the only Texas city to adopt a turfgrass ordinance, Schertz finds itself leading the way in a water-conservation sense as well.

In 1996, the City of Schertz adopted an ordinance requiring that all new landscaping turf be low-water-use or drought-tolerant. Turf varieties allowed by ordinance are buffalograss, blue grama, Zoysia, and bermuda. Although the city, population 17,500, adopted the ordinance during the 1996 drought as an emergency measure, it is in effect all-year-round, making it, in effect, a water-conservation practice. The nearby city of Converse considered but rejected a similar measure earlier this year.

Since then, Public Works Director John Bierschwale has found that both peak demand and daily use during drought years runs close to normal de-

mand during nondrought years.

"I thought our pumping would be pretty high by now, but we've found demand is close to that of a normal, non-drought year, about 3.5 million gallons per day, since the ordinance was passed," Bierschwale said. "I'm very proud of our citizens; they have done a fantastic job."

In fact, it was a citizen who first brought to the attention of the city council the idea of low-water-use turf as a means of cutting back on demand.

Now, since the ordinance states that other low-water-use varieties will be considered, Bierschwale is considering for acceptance a low-water-use St. Augustine variety being tested by the Texas Agricultural Extension Service in Dallas.

As Schertz draws its water from the Edwards Aquifer, it is also subject to the rules of the Edwards Aquifer Authority. Schertz' irrigation ordinance, activated by Stage I of the Edwards Aquifer

Authority, calls for one day per week watering based on address, before 10 a.m. and after 8 p.m.

Landscape irrigation during the summer can account for 60 percent of urban water use, according to Texas Water Development Board.

Rangeland

continued from page 7

Healthy?, Increasing Bare Ground Indicates Poor Rangeland Watershed Health, and Are Your Streams Healthy?

Further information can be found on the Texas Natural Resource web site, <http://texnat.tamu.edu>.

For more information contact Brian Hays at k-hays@tamu.edu or (979) 845-2755.

Conservation and Reuse Awards

continued from page 3

Indirect Program for A Nonutility

Turner Collie & Braden

Sun City Georgetown by Del Webb

Water Conservation Plan

Concerned about higher-than-expected water usage in this planned community of 10,500 homes at build-out and recognizing that a development of this size would strain the City of Georgetown's water distribution system, Sun City Georgetown turned to Turner Collie & Braden to develop a plan for guiding development policies and landscape and irrigation design practices.

Some of the innovative approaches to meet the target 20% reduction of annual residential water use include—

- (1) Soil moisture sensors for each zone hardwired to master irrigation valves.
- (2) Injection of polymers into the soil of newly constructed speculative residences.
- (3) Use of low-water-use landscapes.
- (4) Installation of low-flow devices

on all indoor plumbing fixtures.

(5) Rain sensors tied to irrigation controllers.

(6) Initiation of a "Water Ambassadors" Program, in which residents are trained in conservation methods to serve as resource persons in their neighborhoods.

Direct Program for A Nonutility

The Subsidence District

Learning to be Water Wise & Energy

Efficient

The program *Learning to be Water Wise & Energy Efficient* combines a curriculum teaching water efficiency and conservation with the distribution of high-quality plumbing equipment for installation in students' homes.

A study funded in part by The Subsidence District, *Effectiveness of Retrofit in Single-Family Residences*, found that water savings resulting from retrofit of the three plumbing devices in each home kit (showerhead, bathroom fau-

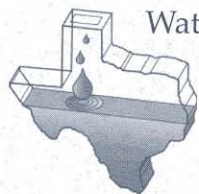
cet aerator, and kitchen sink aerator) were estimated at 1,400 gallons per month, or 18% of average water use. Water savings realized as a direct result of the program, therefore, total more than 133 million gallons per month.

Since its initiation as a pilot program in 1993, this public-private partnership has reached almost 200,000 fourth and fifth grade schoolchildren and their families in the Harris-Galveston Coastal Subsidence region of south central Texas.

Carole Baker, public information director of the Subsidence District, coordinated the recruitment of public and private sponsors from throughout The Subsidence District's jurisdiction to fund the purchase of the \$31 home plumbing and educational packages distributed to schoolchildren.

Conference helps solve the 'water puzzle'

The impact of water planning decisions made at the beginning of this new millennium will define the water supply—and to a certain extent, demand—for the next 50 years, a time during which the state's population will double, and the distribution of the population will continue to migrate from rural to urban areas. As part of its ongoing efforts to give water planners and other



Water Supply and Conservation Education Programs

Texans information necessary for making informed decisions, the Texas Agricultural Extension Service, District 10 sponsored a conference, Water Puzzle: Putting the Picture Together, in April.

About 250 state agency and extension personnel, regional planning group members, private individuals, environmentalists, lawyers, and consulting engineers participated in the conference's sessions.

District 10 staff, in an effort to learn from the examples of other water-lean states, invited speakers to give case studies from Nevada and Florida, as well as speakers from Texas.

Chris Brown of Chris Brown Consulting, formerly of Nevada, spoke of how protests by an alliance of rural farmers and environmentalists caused failure of a presumptuous bid of Las Vegas Valley Water District for water from 26 rural water basins to the north and east. Lessons learned from the 11-year process were that projects receiving consensus support are more likely to be built, and that public support of recommendations from a citizen's advisory panel, rather than from professional planners, is more likely. Also, large urban areas will not win water fights by virtue of greater resources. Rural communities and environmental interests can muster both public sympathy and action, even from urban areas.

In Florida, it has been found that low stream flow events, and therefore, as-

simulative capacities of streams occur in the summer when irrigation demand is the highest, according to David Ammerman, Camp Dresser & McKee, Maitland, Florida. It became almost impossible to permit new surface water discharge, so over a period of time, the idea of disposal via land application shifted to beneficial reuse agreements. Forging its own reuse policy, the State of Florida hit upon the notion of allowing the utilities to continue to deal with regulatory issues and allow the uses to manage on-site concerns, a logical division of labor which paralleled existing functions.

Fundamentally, the utility must understand that, unlike land application, beneficial reuse must deliver water in varying quantities to serve the water use needs of the customer. On the other hand, provisions must be made to allow the reclaimed water supplier to inspect the site periodically for compliance with state regulations.

For delivery to publicly accessible areas such as parks and golf courses, a higher degree of treatment is required than for delivery to a utility-owned land application site. As reclaimed water becomes more widely accepted, people will consider it a commodity rather than a waste product.

Through an aggressive residential and commercial conservation program and integrated resource planning campaign to meet strict pumping limits, San Antonio Water System has reduced water consumption from 200 gallons per capita per day (gpcd) to just over 150 gpcd. Mike Thuss, CEO of SAWS touched upon the utility's long and short-term strategies, all driven by a citizen's advisory council. Short-term strategies include conservation and recycling and acquisition of surface water and other groundwater. Long-term solutions include importing water from Alcoa mining operations in Bastrop County and pursuit of existing surface water in the Guadalupe Basin.

Amplifying Thuss' message were the simple solutions offered by integrated resource planning (IRP). According to Chris Brown, former conservation director of SAWS, IRP requires the balancing of costs, environmental considerations,

and reliability. Senate Bill 1 planning in Region L (South Central Texas) has taken into consideration the simpler solutions of lining irrigation canals to reduce conveyance losses and funding replacement of less-efficient agricultural irrigation equipment with high-efficiency center pivot or drip systems.

For urban conservation, SAWS, Bexar-Met, and most municipal purveyors in the Bexar county area have achieved the dramatic urban cuts with a combination of aggressive leak detection and repair, metering of previously unmetered accounts, and the introduction of block rates.

Suppliers have also pursued conservation education programs, plumbing retrofits aimed at both residential and industrial customers, and landscape replacement rebates. Planned aquifer storage and recovery and enhancement of recharge have the potential to bridge the gap between demand and supply.

On the hot topic of bed-and-banks transfer to facilitate reuse, attorney Brian Sledge outlined the legal ramifications and Cindy Loeffler, Water Resources Team Leader of Texas Parks and Wildlife Department (TPWD) spoke about environmental water needs.

Some conflicts in reuse provisions exist between the Texas Water Code and Texas Natural Resource Conservation Commission (TNRCC) rules. Although reuse is encouraged as a viable means of extending the water supply in SB1, the reduction of return flow may lessen the availability of water downstream, Sledge said. Regional water planning groups should be prepared to balance both.

Senate Bill 1 cleared up a murky area regarding indirect groundwater reuse. Diversion of existing groundwater return flows of groundwater may be authorized for the amount discharged, less conveyance losses assuming no downstream water right was dependent upon return flows.

Loeffler said the TPWD supports the reuse of treated wastewater, but only after efficient use at its original diversion and after instream flows and inflows to bays and estuaries have been met.

Baker

continued from page 1

District, the High Plains Underground Water Conservation District and schools in the Lower Rio Grande Valley have also adopted the kits and school curriculum. About 3 billion gallons of water per year are saved as a result of the plumbing fixtures and consumer education. (*Texas Water Savers*, Summer 1998, <http://twri.tamu.edu/twripubs/WtrSavrs/v4n3/>).

The George Warren Fuller Award is presented annually by the AWWA to the section's respective selected members for distinguished service to the water supply field in commemoration of the engineering skill, diplomatic talent, and leadership that characterized the life of George Warren Fuller.

Baker and other sections' Fuller awardees accepted their awards at the AWWA national conference in Denver. The Fuller Award is the most significant award an AWWA section can bestow, and the selection is carried out by the last five previous winners. The name of the actual winner is kept secret until the luncheon.

At April's Texas Section luncheon, previous winners fan out silently across the vast ballroom while the contributions of the still-anonymous winner are read from the podium. Eventually the previous awardees gather behind the current winner. In the traditional and suspenseful luncheon ceremony, Baker was recognized as the 1999 Fuller Award winner.

Baker serves as chair of the Conservation and Reuse Division, Texas Section AWWA. She serves on the TWCA Board of Directors and is a founding member of the Texas WaterWise Council. Gov. Bush chose her in 1997 as a member of the Blue-Ribbon Selection Committee for the Governor's Awards for Environmental Excellence. She is also an alternate to the Region H Water Planning Group.

Irrigation BMPs for the consumer

The Texas WaterWise Council has published the first three in a planned series of brochures on waterwise irrigation and landscaping practices.

Irrigation Best Management Practices; Landscape Improvements: Soil, Mulch, and Maintenance; and Lawn Maintenance Best Management Practices are available in downloadable portable document format on the Council's web site, <http://www.WaterWiseTexas.org>, and in hard copy from the Council, (512) 280-5182.

Written for the consumer, *Irrigation Best Management Practices* includes a checklist of recommended installation practices for irrigation systems. For water-use efficiency, consumers should expect installation of shut-off valves or moisture sensors and installation of low-volume irrigation in narrow or irregular-shaped areas. Consumers should expect an as-built plan and design performance report.

The guide also lists hints for efficient water use, such as hydrozoning and sys-

tem maintenance. Benefits to the homeowner round out the brochure's message: being water-wise is a win-win proposition, as plants and turf are healthier if watered in accordance with their needs, turfgrass and ornamentals develop deeper root systems with proper watering, and proper irrigation discourages run-off.

Soil, mulch and maintenance form the healthy trio of landscape improvements. A minimum 6-inch high-quality soil incorporating organic material has enhanced moisture-holding ability and provides important nutrients. Mulches moderate soil temperature, slow soil evaporation, and hinder weed growth. Over-fertilization causes plants to require increased mowing and irrigation.

When mowing turf, no more than one-third of the leaf-blade length should be removed. Clippings left on the lawn shade the soil and return valuable nutrients. A healthy, dense turf is the best weed control measure.

Forum proposes 6-point strategy; critics push for more conservation

The Second World Water Forum, in The Hague, Netherlands in March, drew nearly 5,000 participants to address worldwide crises: water shortages, floods, and water pollution.

In the International Symposium on Water and Megacities, Klaus Toepfer, Executive Director of the United Nations Environmental Programme, said that the battle for conservation of water will take place in the world's megacities.

Toepfer called upon cities to adopt a six-point integrated strategy for management of urban water resources. The first step is for local authorities to carry out city-wide water audits. The second step is the introduction of policies to stop the pollution of water sources and to protect watersheds. Third is the use of new technologies to control the amount of unaccounted for water. Socially responsible pricing policies which do not penalize the poor, but provide a disincentive for profligate use is the fourth point. Fifth, city authorities must involve industry and community groups to design innovative ways of re-

cycling wastewater. Finally, each city needs to set up an integrated strategy for demand management, including launching city-wide campaigns to change citizen's attitudes about water-use efficiency.

Although the Framework for Action called for integrated water resources management, critics from the World Wide Fund for Nature said the document's guidelines aimed at ensuring safe and adequate water supplies fails to give prominence to conservation as a solution to the world's water problems.

"This is a flawed framework," said Richard Holland of the World Wide Fund's Living Waters Campaign. "It's built on a basic misunderstanding of the role of nature in meeting human needs such as water for drinking and food production."

One billion people are without healthy drinking water today, and according to the United Nations Environmental Programme, two-thirds of the world's population will live without adequate water resources by 2025 if current consumption levels persist.

El Paso aggressively pursues conservation agenda

From their March water bills and an early summer television campaign, El Paso Water Utility (EPWU) customers learned about a massive low-flow showerhead distribution program which could save up to 4 billion gallons of water per year. In April, EPWU initiated its Conservation Phase II program by distributing 200,000 showerheads: two to each residential customer and larger quantities to commercial establishments.

It all started as a recommendation from the utility's Public Working Committee. The Committee is composed of a group of dedicated citizens who underwent an intensive training and overview of regional water issues during 1999. At the end of this exercise, they were asked to outline, among other things, recommendations for future conservation programs. The recommendations became the basis for the El Paso Water Utilities Conservation Phase II. One such program was to offer free low-flow showerheads to customers.

As of July 1, 150,000 showerheads had been distributed to El Paso Water Utilities customers. The program is the first of its kind in the country, according to Anai Padilla, water conservation manager.

The distribution of 23,000 units requested by local hotels, apartment complexes and other commercial customers began in May. To quantify the conservation effects of showerhead retrofits, large commercial accounts, such as apartment and motels, will be monitored, according to Padilla.

With aggressive mandatory water conservation ordinances and a strong educational program, El Paso already boasts water consumption of 163 gallons per capita per day (gpcd) down from 200 gpcd in 1989. What makes this

EPWU reaches 2000 per capita goal

milestone even more laudable is the fact that El Paso typically receives only 8 inches of rain annually, compared with more than 50 inches in East Texas. Recently, the utility even achieved its year 2000 goal of 160 gpcd, perhaps partly attributable to recent rains.

El Paso further reduces potable water consumption by treating and pumping wastewater for golf course irrigation in dual-piped infrastructure. (*Texas Water Savers*, Summer 1999, <http://twri.tamu.edu/twripubs/WtrSavrs/v5n3>).



Anai Padilla

Another component of Phase II is a collection of changes proposed to the water conservation and landscape city ordinances.

The Water Conservation ordinance already includes mandatory watering days and times with Class C misdemeanor status for violations. Proposed changes are designed to clarify language and promote water conservation through efficient landscapes.

Proposed ordinances to be presented in late fall

to the City Council include—

1. Elimination of turf on narrow strips between sidewalks and streets.
2. Restricting fund-raising car washes to commercial car wash facilities where wastewater is either captured and recycled or is sent to the sanitary sewer for treatment and recycling at wastewater reclamation plants.
3. Requiring that the mandatory landscaped area of commercial sites adhere to water-wise landscaping principles. Businesses installing only the minimum required landscaping, therefore, would install water-wise landscaping exclusively.
4. Publication of a comprehensive, tree, shrub, and groundcover list.

Enforcement has been beefed up. Four new inspectors were hired in the summer to warn or even cite residents for watering on other than their designated day and for allowing water to run into streets. El Paso Water Utilities is also proposing restricted turf area in the front yards of new residential construction.

"I expect opposition on this issue; however, we are open to work with the community and reach a compromise, if necessary," said Padilla.

At the same time, however, this is a plan to sweeten conservation incentives. One such incentive could be a landscape rebate program. Padilla is working on a plan to benefit citizens who remove turf from narrow strips, as well as for retrofitting traditional landscaping with a more water-thrifty ensemble.

Another proposed incentive is a joint program with El Paso Electric to offer \$100 rebates for purchase of horizontal-axis washing machines.

Also in the works is a rebate for replacement of evaporative coolers in residences, notorious water users which operate similarly to industrial cooling towers, with refrigerated air units, and the promotion of ozonation systems for commercial laundry facilities. "We are hoping to synergize and boost the market for these proven products and technologies," Padilla said.

El Paso has had in place a toilet retrofit program for more than five years

Since 1991, El Paso Water Utilities has offered a multi-pronged educational program. Recently, a water conservation educational specialist, Diane Perez, has joined the staff to coordinate and organized program such as the *Learning to be WaterWise and Energy-Efficient* and the Binational, Tri-City Water Festival, which included El Paso, Las Cruces, New Mexico, and Ciudad Jurez, Chihuahua, Mexico.

For more information, Padilla can be reached at (915) 594-5508 or ajpadilla@epwu.org

Meetings and Conferences

Texas WaterWise Council, Oct. 12, at Texas Nursery and Landscape Association headquarters. See <http://www.WaterWiseTexas.org> or call (979) 845-1852 for more information. Regular meeting date is the second Thursday of each month.

Groundwater Districts: Roadmap for Local Control, Oct. 5-6, Austin, is organized as a two-way forum for the exchange of information among legislators, state agencies, and groundwater district personnel about the roles of groundwater districts in managing Texas' resources. See <http://www.bseacd.org>, e-mail clover@mail.bseacd.org, or call (512) 282-8441.

WEFTEC: 73rd Annual Conference & Exposition on Water Quality and Wastewater Treatment, Oct. 14-18, Anaheim, Calif. Convention Center. To feature an entire track on natural systems water reuse and small communities. See <http://www.wef.org>.

Risk-Based Decision Making in Water Resources IX, Oct. 15-20. Santa Barbara, Calif., featuring sessions on risk tolerance, infrastructure survivability, flood frequency and climate nonstationarity. For registration, see <http://www.engfnd.org/conf.html> or (800) 541-7016

10th Annual Conference on Texas Water Law, Oct. 23-24, Austin, including a featured presentation, "Water Law and Policy Outlook for the 77th Legislature by Sen. J.E. "Buster" Brown and a session on Retail Water Supply and the Regula-

tion of Water Utilities. See <http://www.cle.com/upcoming/auswat00.shtml> or call (800) 873-7130.

Uniting the Basin 2000, Finding the Balance: Water Supply and Growth in the Rio Grande/Rio Bravo Basin, Nov. 9-12, Ciudad Juarez, Chihuahua, Mexico, a conference and workshop for citizens committed to the long-term sustainability of the basin, and to the forging of partnerships to solve international environmental and water-supply problems. See <http://www.rioweb.org>, (915) 532-0399, or coalition@rioweb.org.

Environmental Excellence applications due Nov. 15

The deadline for the 2001 Texas Environmental Excellence Awards is Nov. 15, 2000.

The Texas Environmental Excellence Awards recognize individuals organizations, schools, and businesses which have created successful programs to preserve and protect the Texas Environment. Winners will be honored in Austin on May 1, 2001.

An application for the 2001 awards and a description of previous winners can be downloaded from <http://www.tnrcc.state.tx.us/exec/oppr/txawd/txawd.html>. To receive an information packet, contact Dana Macomb, dmacomb@tnrcc.state.tx.us or (512) 239-4745.

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