

MANAGING WATERSHEDS ON A REGIONAL SCALE, INVOLVING MULTIPLE LANDOWNERS, IS THE KEY TO MEETING TEXAS' WATER NEEDS.

Where the First Raindrop Falls

By Tracy D. Hodge

John Graves said it best in *Texas Rivers*: “The loss of our primeval forests and prairies, the extinction or increasing rarity of many species of living things, the disruption of our waters’ flow and their pollution — all these evils and more ... are the price we have paid for progress and prosperity and our nation’s power, for getting to the point we have reached today.”

What point have we reached? Gunnar Brune’s *Springs of Texas* (1981) gives a clue. “Texas originally had 281 major and historically significant springs, other than saline springs. Of these, four were originally very large springs (over 100 cubic feet per second flow); however, only two, Comal and San Marcos, remain in that class today. Sixty-three springs, many with important historical backgrounds, have completely failed.”

WHY DOES THIS MATTER?

Spring flow is a barometer of underground water supply. "A spring is normally a spillway for an underground reservoir," Brune said. It is those reservoirs, through seeps and springs, that provide what hydrologists call base flows, the water that courses through streams after runoff from rainfall ceases. Underground reservoirs also supply water to lakes, ponds and wells. The fate of springs is ours as well.

Graves was right. We have paid a tremendous price — not out of our own pockets, but borrowed from future generations — for getting to where we are today.

SO WHERE DO WE GO FROM HERE?

In 1947, former President Johnson recognized that private landowners are the key to conservation when he said, "Saving the water and the soil must start where the first raindrop falls." This is especially true in Texas, where more than 90 percent of the land is privately owned.

Finding ways for landowners to work together while maintaining their autonomy and private property rights is perhaps the central challenge of conservation. Fortunately, it is being done in watersheds all over the state. What follows is far from complete, but it broadly sketches how Texans in different parts of the state are working to improve their little piece of what is still, despite several centuries of abuse, one of the best places to live on the "water planet."

The challenge now facing us is how to move to the next level. Increasingly scientists and land managers are coming to the same conclusion: Successfully managing our water resources requires acting on a broader scale than we are accustomed to. We need to manage entire watersheds, not just pieces within them.

WATERSHED OR WATER CATCHMENT?

"Watershed" describes land where most rain quickly runs off, temporarily swelling streams and perhaps eroding adjacent lands. "Water catchment" depicts land where most rain soaks into the soil after moving slowly through grasses and other vegetation, replenishing aquifers before being released slowly through seeps and springs, feeding streams over the long term and nourishing coastal estuaries and bays. It's a vision for the future as well as the landscape functioned in the past.

Wayne Elmore, a riparian specialist from Oregon, preaches converting Texas watersheds to water catchments. "What you do on your land in the upper part of a watershed influences conditions throughout," Elmore says. "After the rain stops and water no longer runs over the surface, all the water in a stream comes from the ground. The condition of riparian

areas and their associated catchments affects how much of that rain goes into the ground and how fast that water comes out of the ground. The opportunity is to increase our water storage area and volume and keep water on the land longer by managing our catchments together."

The Nueces River Authority, with funding from the Dixon Water Foundation, conducted a number of landowner riparian workshops in 2008. It plans additional headwaters stewardship programs through 2010.

"The Dixon Water Foundation funded the Nueces Riparian Network to help people work together to create a riparian whole that is greater than the sum of the individual parcels of land," says Executive Director Robert Potts. "Good land management along our rivers and creeks can create an environment in which water brings neighbors together for their mutual benefit. Better water retention in our state's rivers benefits everyone by providing cleaner, healthier rivers and more usable water for Texas."

BRUSH: VILLAIN OR VICTIM?

The United States Department of Agriculture Natural Resources Conservation Service estimates that brush in Texas uses about 10 million acre-feet (3.5 trillion gallons) of water annually. In comparison, total human use in the state amounts to about 15 million acre-feet.

It seems obvious that if we get rid of the brush, we will have all the water we need.

Not necessarily so, say the experts.

Salt cedar, juniper and mesquite trees have been variously charged with using between 20 and 200 gallons of water daily, and until recently conventional wisdom held that if you clear the brush and let grasses take its place, more water will flow into streams, lakes and aquifers. That thinking led the Texas Legislature to create the Texas Brush Control Program in 1985.

Brush clearing in the North Concho, Upper Colorado and Pedernales River watersheds did lead to increased runoff and rising aquifer levels in some places. Brush control, where it does work, increases water yields only where soils and underlying bedrock are highly permeable. But recent research indicates that the gains may not be permanent and may have resulted more from improved range conditions due to lower

Ranch owners are learning that if you clear brush and water-greedy trees, native grasses will spring up in their place, allowing water to flow freely from natural springs and eventually seep back down into the aquifer





livestock stocking rates than from brush control.

"Our results suggest that for many semiarid rangelands (where baseflow is a small component of streamflow), large-scale shrub clearing in combination with sound range management will not lead to significant — if any — increases in streamflow," says a report coauthored by Bradford Wilcox, Yun Huang and John Walker of Texas A&M University at College Station.

"This is because proper management will enable a vigorous vegetation cover to be maintained, which means that infiltration rates will remain high and water will be retained in the soil and eventually used by plants."

It should be noted that the plants that replace brush may well be forbs and grasses with higher value for wildlife and livestock than the brush they replaced. And more water in the soil is not a bad thing. Think springs and baseflows.

Brush clearing can also have unwanted side effects. The endangered golden-cheeked warbler depends on bark from mature cedars to build its nests, and the southwestern willow flycatcher adapted to salt cedar as it crowded out the native willows. Clearing brush can destroy their habitat. Brush clearing can also lead to increased erosion and lower water quality until grasses grow up to anchor the soil.

**"WATER, WATER, EVERYWHERE,
NOR ANY DROP TO DRINK."**

San Antonio gets most of its water from the Edwards Aquifer, a crescent of intensely fractured and faulted limestone that arcs across the heart of Texas from Hays and Travis counties in the north to Bexar near the center to Kinney in the west. The recharge zone, a relatively narrow band, lies on the northern rim of the aquifer at the edge of the Texas Hill Country — one of the fastest-developing areas in the nation.

In addition to feeding two of the largest springs in the state, Comal and San Marcos, the aquifer also provides habitat for a number of endangered species, some living in underground caverns. Development poses a serious threat to the aquifer both from possible pollution and from diminished recharge due to increasing amounts of impervious cover.

Water flows downhill, so pressure from water entering the aquifer through the recharge zone forces water downward and southward to San Antonio and other users. Ironically, although the level of water in aquifer-monitoring wells reacts quickly to recharge and pumping, most water in the aquifer lies too deep for economic access. Usage is basically restricted to recharge, which varies greatly depending on rainfall.

In 2000 and 2005, San Antonio voters approved a 1/8-cent sales tax to fund the protection of lands over the recharge zone. Through outright purchase and conservation easements, more than 80,000 of the nearly 1 million acres in the recharge zone are protected from development in perpetuity. Those funds have now been exhausted.

In 2007 the Texas Legislature passed Senate Bill 3, which establishes the Edwards Aquifer Recovery Implementation Program. The law gives the Edwards Aquifer Authority the power to implement water management practices to ensure the continuous minimum flows of Comal and San Marcos springs and to develop a recovery plan for threatened and endangered species associated with the aquifer.

The San Antonio Water System has been approached by landowner groups offering to pump groundwater from aquifers to the east and sell it to the city. Naturally, San Antonio is very interested.

But what of the people who live over those aquifers, who fear their wells might go dry because of massive pumping? Texans like to



A mesquite tree (top left) can use 20 to 30 gallons of water per day. (Bottom) Ranchers take notes as they learn more about what they can do to practice good land management along rivers and creeks during a landowner riparian workshop in 2008.

HOW TO GET HELP FOR YOUR PIECE OF WATERSHED

In recognition of the importance of managing watersheds, TPWD has set up the Watershed Policy and Management Program within its Inland Fisheries Division. However, the program is more wide-ranging than its name implies, says Gary Garrett, the senior scientist/program director. "What TPWD is going to do is have a holistic approach to managing the resources of Texas," Garrett explains. "Even though the Inland Fisheries Division will provide staff dedicated to the effort, we want to utilize all the resources we have within and outside the department."

Garrett stresses that TPWD will be providing advice and technical assistance, but it will be up to stakeholders within the watershed to develop and implement a plan. "The way a rancher does business on his ranch, the way industries operate, the way other people affect land use, is all part of

the picture, and you can't separate them. We will identify areas throughout the state that could benefit from management plans, meet with community leaders and stakeholders, put together an advisory team and advise them on what they need to do and what we can do to help them. In addition, we know where the money is to help them make things happen. But it's their program. They have to make it work."

The challenges are huge, but Garrett points out that the rewards amount to nothing less than keeping Texas a place we want to live. "If we don't do this, we are going to lose this resource — if somebody is not taking care of it, it will go away," he says. "Water is important to tourism, to health, to recreation, to farming, to ranching, to hunting, to sustainable cities and industry. If communities will take care of their water, it will be their legacy for the future. Clean, flowing water. Who's not for that?"

think of themselves as always being willing to help a neighbor in need, but when you start talking about taking water from one part of the state and sending it to another, you can expect a catfight.

RANCHING FOURTH-GRADERS

The Trinity River flows through the heart of the most heavily populated part of Texas, linking its two largest metropolitan areas, Dallas-Fort Worth and Houston. Two-thirds of the state's population lives within its watershed. If ever there was a poster child for the need to manage water in an entire watershed rather than on separated bits and pieces of land, the Trinity is it.

Fortunately, the Trinity also serves as an example of how to do it. Combining technical guidance from TPWD biologists, financial support from private landowner organizations and public water suppliers, cooperation from landowners, the expertise of educators and the enthusiasm of kids on field trips, the Texas Wildlife Association and the Trinity Basin Conservation Foundation are leading an effort to link urban and rural Texans by showing how they are all connected by water.

The Tarrant Regional Water District (TRWD) pumps water from Richland-Chambers Reservoir to supply Fort Worth with water. Ranchers with land in the watershed, like Gary and Sue Price of Blooming Grove, can get grants from TRWD for management practices that improve the quality of water coming off their land.

"What happens in the watershed drives not just the quantity of water in our reservoirs, but also water quality," said Darrell Andrews, TRWD assistant environmental director. "That in turn affects the water we sell to our customers. It translates to reduced costs because the water is cheaper to treat, because the water going into the reservoir is cleaner."

TRWD also partners with TPWD on the operation of constructed wetlands that clean Trinity River water, which is then added to Richland-Chambers Reservoir. Private landowners along the Trinity are banding together for projects that will benefit people throughout the watershed.

If it stopped right there it would be a commendable project. But public and private land managers realize they need public support to achieve their goal of making the Trinity River Basin a model for how to manage a watershed.

For that they've enlisted some most unlikely allies: fourth-graders. Through field trips cosponsored by the Texas Wildlife Association (TWA) and the Texas Freshwater Fisheries

Center in Athens, fourth-graders get to see land and water management as it's being practiced, meet with ranchers like the Prices and even roll hay bales after a picnic lunch under huge bur oaks. They leave with a better understanding of where their water comes from and what it takes to get it to them.

"Young people are the most impressionable. By starting with fourth-graders perhaps we can get to their parents as well," Gary Price explains. "We have to show them the things we do, and the things they do, that connect them to the land. Our biggest challenges in the next few decades will be centered around water. Everything is connected to that. If we don't have the quantity or quality of water we need, we will have problems that can radically change lifestyles. We need to get urban dwellers onto the land to see what happens here firsthand and take that knowledge back home with them. And we need to see their side of things, too. We have to take the big picture approach. If we don't do that, we'll never bridge the gap."

TWA engaged Conrod Associates of Washington, D.C., to develop a plan and secure funding for a Web-based educational pilot project to give schools and landowners the tools to connect with each other and create a continuing dialogue about urban-rural issues.

"The vision for the Trinity River Stewardship Project is for a partnership among various agencies, organizations and private landowners," says TWA's Tamara Trail. "We want to expand the project to more schools in the Trinity River Basin. The long-term goal is to change our conservation ethic."

SOME FINAL WORDS

Henry David Thoreau wrote, "There are a thousand hacking at the branches of evil to one who is striking at the root."

Brush control, interbasin transfers, conservation easements and even conservation itself all address branches of the water problem, but we shouldn't forget the root. Ultimately it all comes down to managing Texas watersheds (catchments) in such a way that springs and streams will flow and underground aquifers will be recharged; making water available for use in reservoirs and wells; providing habitat for fish and wildlife both endangered and common; supporting recreational use; and freshening the coastal bays and estuaries that serve as nurseries for marine life.

We know the way. Do we have the will? ★



Gary and Sue Price (top left) of the 77 Ranch, 2007 winners of the statewide Lone Star Land Steward Award, are among the volunteers who help teach fourth-graders about managing watersheds in an innovative Texas Wildlife Association and TPWD program.

DETAILS

Interested in learning more about watersheds and water conservation? Here are some informative Web sites you can visit:

- Texas water matters in general: www.texaswater.org
- Nueces River and its Headwaters Stewardship Project: www.nueces-ra.org
- Brush control: www.tsewcb.state.tx.us/brushcontrol
- Land and water management: www.nrcs.usda.gov; www.lcra.org/community/conservation/creekside.html; www.ucrab.org; www.texaswatermatters.org
- Edwards Aquifer: www.edwardsaquifer.net
- Trinity River Stewardship Project: www.trinityfix.org
- Conservation easements and land trusts: www.texaslandtrustcouncil.org; www.nature.org/wherework/northamerica/states/texas
- EARIP: <http://earip.tamu.edu>

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