

Rivers drained by greedy state

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Desert rivers aren't like other rivers. For all their canyon-carving power, their ability to endure in the harshest of country, desert rivers are sensitive and fragile.

A desert river can rise six feet or more after a thunderstorm, gushing over its banks, scouring out old trees and willows, then shrink back to a trickle, all in a few hours.

A desert river depends on mountain snow runoff, springs and groundwater. Take one water source away and the river adapts. Its trees and willows reach deeper for water or lie dormant longer. Take away a second source and, instead of adapting, the river weakens and its natural habitat changes.

Arizona's growing population takes two sources. Dams built to capture and save runoff deprive downstream stretches of the water from snowmelt and the nutrients needed to sustain life. Wells draw water from aquifers and cut off the springs and streams that supply and sustain rivers.

Along some stretches of Arizona's rivers, the water that once filled the banks has been sucked dry by wells, most of them unregulated, and no one has moved to stop the pumping.

"We have impacted our rivers pretty strongly," said Tom Moody, an engineer who owns Natural Channel Design, a Flagstaff company that works on stream restoration. "The more you've changed the water by holding it back upstream or pumping it out of the ground adjacent to the stream, the more difficult it is for riparian areas to exist."

Attempts to resuscitate short lengths of damaged waterways have succeeded. But restoration requires money, commitment and a steady flow of water. Preservation will demand more.

The obvious damage caused by dams and diversion ditches along a river's banks is worsened by what happens on the watershed, the hills and mountains and canyons and valleys that surround a river and funnel water toward it.

A watershed must remain healthy - and as undisturbed as possible - to sustain a river. In the aftermath of a devastating drought in the early 1900s, farmers on Tonto Creek in northern Gila County cut down trees around the streambed to provide forage for cattle. Floods washed through, and it was years before the area recovered.

Scientists now are finding more connections between watershed health and rivers. U.S. Geological Survey hydrologists discovered that changes in vegetation, from native to non-native, were a significant factor in a 66 percent drop in water flow on the San Pedro River, according to a study published in May.

The more that is discovered about how desert rivers work and what makes them stop working, the more it seems the relationship between people and rivers must change.

"There's been a fundamental change in how we look at rivers as a society," Moody said. "Once we were trying to tame them so we could live there. Now we're finding there are not an unlimited number. There are ways we look at rivers that we didn't. We need to look at new ways of living with rivers."

State laws pose threats

Arizona's rivers are dying because for more than 100 years, they have been seen as a resource to be tamed and parceled out. The pioneers who settled the arid West harnessed the rivers and treated them as huge conveyor belts delivering a seemingly endless supply of water.

When it became clear that supply was not always available on demand, great dams were built to capture a river's flow, even at the expense of the river itself. On the Colorado, Glen Canyon Dam permanently altered the downstream ecosystem, rendering the river unsuitable for native species. On the Salt and Verde, the dams halted the rivers' flow.

"We obviously depend on those surface waters for the majority of our supply," said Herb Guenther, director of the Arizona Department of Water Resources. "That's what allowed Arizona to develop, the ability to build reservoirs. We have chosen basically to dewater some of the major rivers below those structures."

Arizona's water laws reflect that use-it-up mind-set. They more often favor water use, not conservation.

The laws also reflect the time in which they were written. Lawmakers and regulators didn't recognize or understand the connection between ground and surface water. Thus, while the flow in rivers and streams is allocated based on how much is available, groundwater can be pumped by individual landowners with little regulation.

Scientists now understand that groundwater and surface water are closely linked, that wells drilled miles from a river can rob it of an essential part of its supply. But water use in Arizona is so entrenched in tradition and in property ownership that attempts to change the law have gone nowhere.

"You could fix it legislatively, but the court would have to enforce it," Guenther said. "No matter what you did, you would get into extensive litigation. Wherever you draw the line, there will be people on both sides of it."

The question of where to draw the line is one of dozens before the court in the massive Gila River General Stream Adjudication, which grew out of a lawsuit filed in 1974 to settle once and for all who holds rights to water on the Gila and all its tributaries.

A judge already ruled that groundwater near a river belongs to the river and can't be pumped, but environmental groups and others want a ruling that includes the more recent findings that groundwater may flow toward a river for miles.

Without that ruling, widespread rural pumping will continue to shrink Arizona's rivers.

"The ability to continue to use groundwater without limit will impact riparian areas," Guenther said. "The question is who's doing it, and that's going to be extremely difficult to determine. There's got to be a societal value placed on these systems that allow people to realize that when you pump groundwater, eventually, there will be an impact on surface water."

Values go beyond water

As long as Arizona's rivers are treated as troughs of water to be distributed and used, that's the value we will derive.

But when the water is used up, the entire river system will die.

If Arizona were to place more value on river systems beyond the water, those systems could continue to function as they have for centuries, and the state would reap the benefits. "There are functions that go on in a riparian system that occur for free - functions that humans have now had to take over," said Juliet Stromberg, a riparian ecologist at Arizona State University.

Cities and counties spend millions on flood control projects, in part because they have hemmed rivers in too tightly with development. A river can handle most floods, Stromberg said, "if we'd give it room to roam."

Riparian areas cool the air through transpiration, purify water that otherwise is laden with heavy nutrient loads or bio-organisms and, in a time before fertilizers, rivers spread those nutrients across deltas.

Think of a river as a living system, instead of water that just hasn't been used yet, and its values multiply:

Water. The most obvious and, for many Arizonans, the value of most worth. Arizona has harnessed all its rivers to provide water. Not all of them have survived. The Salt River ends its natural life at Roosevelt Dam. The Gila all but dies at Coolidge Dam.

Industry. Rivers defined most of Arizona's historic industries. Copper miners, cotton farmers, citrus growers and cattle ranchers all built industries along the state's rivers.

Wildlife. Arizona harbors a more diverse array of wildlife than many wetter states. Animals rely on the riparian corridors for food, shelter and travel.

Ecology. Tucson killed the Santa Cruz River, not just by using up all its water but also by carving up its channel, paving over its flood plain, and clearing out its vegetation to make room for roads and parking lots.

Refuge. Rivers give us a cool, green place to play, relax and fish.

Identity. Older Phoenicians tell stories of going down to the Salt River for a picnic or to swim. They delight in talking about what the river meant to them. Now, people avoid long lengths of the Salt River, parents warn their children not to get too close. You can't feel something that's dead.

Aldo Leopold, a naturalist and author, spent a lot of time on rivers, including some in Arizona, and for him there was no question of their worth: ". . . (T)he good life on any river may likewise depend on the perception of its music," he wrote in *A Sand County Almanac*, "and the preservation of some music to perceive."

Rivers in race against time

When a living system as complex and nuanced as a desert river begins to wilt, returning it to natural function is nearly impossible. The systems have begun to shut down.

To see what happens when a river dies, look at the Santa Cruz. It flows naturally at its headwaters, but as it turns the corner in Mexico, it is dry, barren, ugly and littered with bleached husks of cottonwood trees and sickly mesquites. It flows full through Santa Cruz County, but the water is treated effluent, unfit for swimming or fishing. The parched channel vanishes on its final miles through Pinal County.

The clock is ticking for the other rivers. The San Pedro is losing its battle with development in southern Arizona, its decline made more poignant by the lengths that have been preserved or restored. Where there is water, life blooms.

How and if Arizona's rivers can be saved is an open question. While it may seem like there is time to act, signs of a real emergency along Arizona's rivers would be signs of their demise.

"The Legislature will act in a crisis," said Pat Graham, state director for the Nature Conservancy. "And that will be the doom of the rivers. When there's a crisis on the river as a result of growth, it's too late. The key really is to begin to address a balance between water and growth."

One way to truly save a river is to let it be a river. Let water flow naturally in all its seasonal cycles.

Arizona doesn't have that luxury. The state needs the water.

But short of letting Arizona's rivers return to their natural state, experts and conservationists say there are different approaches, and perhaps a change in that use-it-up mind-set, that could save them.

- Strengthen rural water laws, especially those that let landowners drill wells without reporting how much they're withdrawing. Lawmakers have allocated more money to help the state track rural water resources but

offered no help in keeping up with the expansion of wells.

- Protect rivers and their watersheds. Salt River Project and the Nature Conservancy have bought land along the San Pedro that will keep it from development. The Center for Biological Diversity has taken a lead in fighting Prescott's plan to drill wells on the Verde headwaters. Preserving Arizona's Future, the trust land reform initiative that will appear on November's ballot, would help protect critical areas by setting aside 107,710 river-related acres for immediate protection.

- Maintain or increase support for restoration projects.

The challenge for these projects is that they must be maintained. If money runs out or someone else claims the water, the projects will fail.

"Any of these solutions are politically charged," said Holly Richter, upper San Pedro program manager for the conservancy. "We are making progress, but we have a lot left to do. I think we are racing against time. It's just hard to know how much time."