

Desert's rivers can be revived

HOLISTIC APPROACH TO ECOSYSTEM IS VITAL FOR RECOVERY

jeffry scott/ Arizona daily star

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When I was a child, I drew rivers with a brown crayon. I grew up on the banks of the Santa Cruz. My grandfather told me stories about fishing from the Ajo Way bridge, but I don't think I ever believed him.

Rivers were places for water to go when it rained. After the rush and thunder of a summer storm, they would disappear into the sand. I did not miss them.

Rivers relinquish themselves to the demands of agriculture, industry and other human enterprises. Scientists are realizing how intimately the future water supply depends on recognizing the needs of nature itself. But rivers cannot speak.

Jackie King has become a voice for rivers. Thirty years ago, concerned about the ecological impact of a planned dam, she wrote the South African government, asking how much water would continue to flow through the river. A government official wrote back, inquiring how much water she thought should flow downstream.

She did not know, and she never replied. Subsequently, she has dedicated her life to finding the answer, becoming an expert in a field that was at the time mostly unknown in her country as well as the world: the science of determining how much water a river needs to remain healthy.

Over the past two weeks, I've traveled with King from Costa Rica to Guatemala to Arizona for a series of multinational conferences. On Wednesday, she will give a lecture on the University of Arizona campus.

The flow is paramount

King learned that a river's health depends primarily on its flow: the pulse of water that regulates the life cycles of insects, cues fish to spawn, and shapes the diversity of life within and around the river ecosystem. Spring flows after snowmelt trigger cottonwoods to disperse their white seeds onto rich, new soil. Monsoon floods scour and reshape riverbeds, calling toads out from hiding. Fish hatch in the shallows, sheltered in gravel deposited by earlier storms.

This ebb and flow of life moves in rhythm with the seasons. It is not enough to merely allow water to remain in a river; dams and other engineering projects destroy the river's natural timing.

Restoring a river's health coaxes life back into an ecosystem that otherwise would fail to supply the most essential human need. We do not have to understand the intricate life cycle of each insect or trace the path of a cottonwood seed's flight. Instead, we can regulate flows to mimic a natural river.

A unique opportunity

The challenge is writing policy that adopts the science. While economists can estimate the value of water left in a reservoir, ecologists cannot do the same for water released. How can you put a price on water given back to nature as insurance for a generation that hasn't been born?

With the transition to a democratic government in the early 1990s, South Africans were given the unique opportunity to completely rewrite their country's water law. King was part of the team that researched the water-management methods used in other countries and found them inadequate.

The United States, for example, often made recommendations for managing rivers based on the needs of a single species — usually a fish, for recreational purposes — rather than the whole ecosystem.

Guided by the knowledge that environmental flows are a critical part of a river's health, King helped develop an entirely new holistic approach to the problem of river degradation. In doing so, South Africa leapfrogged ahead of nations whose laws do not reflect the latest science.

This work became the foundation of the National Water Act, signed by President Nelson Mandela in 1998. Widely considered one of the most advanced water laws in the world, it establishes that nature has as much right to water as people.

The law creates a two-pronged reserve, allocating water for the basic needs of South Africans — drinking, cooking and sanitation — as well as for the ecosystem itself. Industry and agriculture take less priority, unlike in America where economics often determines how rivers will flow.

In Arizona, many dry arroyos are a silent testimony to the adverse effects of replacing a river's natural rhythms with human control.

Growing deficit of water

The Colorado River, named for the muddy red color that once hid native fish from their predators, now runs clear and cold through a gantlet of dams. Bitter with alkali by the time it seeps into Mexico, it no longer flows to the sea. In the San Pedro River basin, migratory songbirds nest in dying trees whose roots cannot reach the aquifer. Groundwater pumping has drawn the life from 90 percent of Arizona's rivers and streams.

This growing deficit of water has gone unnoticed for so long that we no longer remember, as my grandfather does, that the Santa Cruz was once a lush, living channel of green.

In Arizona, developers who wish to build in areas where groundwater overdraft has seriously lowered the water table must prove that they have a 100-year assured water supply. But how can a watershed's condition a century from now be predicted? King's science, centering on the concept of water as a living body with its own needs, gave her country this assurance.

U.S. perspective

Unlike South Africa, the United States has no opportunity to start over with a blank slate. It must work within its system of overlapping and often competing water rights to slow the destruction of the drinking supply.

America's "first in time, first in right" water laws are still in place from the Gold Rush days. New laws asserting that rivers themselves have a right to water must compete with old laws that give the original users a higher priority. Without a universal principal to guide water management, each river becomes a separate battleground.

South Africa's experiment in water law — the fundamental understanding that ecological health serves the common good — is a social contract between the government and the people, and, more than that, between the people and the world in which they live. The scientists and policymakers who crafted its language made a promise to future generations that rivers will not be silent and aquifers will not run dry.

How will the idealistic language of the law translate into real life? The greatest hurdle is that there is simply not enough water. Scientists like King now work to help us understand what threatened rivers need to survive — how much water can be removed, and when, before the level of degradation becomes an unacceptable cost. But the people themselves will have to decide how to use this knowledge in making the trade-off between development and ecological health, and what is stood to gain or lose each time a choice is made.

I dream of taking my children to watch the Santa Cruz River flow on a day when it is not raining. I want them to see cottonwood seeds catch fire in sunlight and sprout anew in the thick, black soil of the riverbanks. I want to give them crayons of green and blue and watch them color their world. I want them to have water to drink.

The United States is late in waking up to this world of silent rivers and dying springs, but there is still time to act. We can bring the rivers back.

What: Jackie King lectures on "*Wounded Rivers, Thirsty Land: Striking the Balance Between Resource Protection and Development (Why Conserving Aquatic Systems Makes Business Sense)*"

When: 4 p.m. Wednesday

Where: Room 208, McClelland Hall, Eller College of Management, University of Arizona, one block north of Speedway and one block east of Park Avenue. Metered visitor parking is available at the Park Avenue garage.

Et cetera: King is a freshwater ecologist and principal research officer in the Freshwater Research Unit, University of Cape Town, South Africa.

With 30 years of research experience on the rivers of southern Africa, King is an internationally recognized expert on environmental flows: the amount of water that rivers — and other bodies of freshwater — need to survive.

King is the author of more than 140 scientific papers and reports, and has served as an international consultant for numerous agencies.

Source: U.S. Rep. Raúl Grijalva's office

Melissa Lamberton is a Flinn Scholar and a University of Arizona sophomore, studying environmental policy. She traveled this summer with Jacqueline King as part of the RioArte Internship Program.