

Flessa and his colleagues were not the only ones captivated by the flow. Days before the water was released, residents of the town of San Luis Rio Colorado, located 25 miles south the Morelos Dam, cleaned litter from the dry riverbed and held picnics by its banks. When the water arrived, the excitement was palpable. Film footage of the flow depicts families delighting at the water's return.

"The social or human response to the flow was a surprise," says Francisco Zamora Arroyo, director of the Colorado River Delta Legacy Program at the Sonoran Institute and a member of Minute 319's environmental working group. "Not only did people at the part of the river near San Luis Rio Colorado come, but also people around other parts came to see and greet the river."

Now the question is whether those working on this project will be able to build on their efforts. Minute 319 is a detailed pact. Beyond allowing for the one-time Pulse Flow and the additional base flow to infuse water into the river's lower reaches, it also provides for Mexico to store some of the water it's entitled to under previous agreements in upstream U.S. facilities. The agreement will expire at the end of 2017.

Nevertheless, scientists involved with the project are optimistic that a new accord can be struck and that more environmentally targeted flows will occur. In fact, reports Edward Drusina of the International Boundary and Water Commission, planning for Minute "32X" is well underway: "We are looking at providing water where we need it, when we need it, and in the amount needed."

Based on what's been learned, Flessa and Zamora Arroyo and their colleagues are confident that with additional scouring and tweaks in the water-release design an even longer-lasting legacy can be realized.

"I understand the limitations. I understand that we are in a drought. I understand it isn't easy. I understand there are other uses that have higher priority," Zamora Arroyo says. "But I'm optimistic that in the next few years we'll be able to reach out and show the environmental benefits and the social benefits of this work." ■

TAKE THE NEXT STEP

For updates and to learn more about restoration work at the delta, visit raisetheriver.org.



ALFALFA HAY, grown on 26 percent of all irrigated lands in the Colorado River Basin, is a thirsty crop, and many are asking whether we should water less grass.

The Future of Grass

What role should alfalfa, hay and bluegrass have in the Colorado River Basin?

BY SAMANTHA TISDEL WRIGHT

Americans have always seemed to have a love affair with lawns.

The problem is, as we moved west, we also fell in love with the landscapes of Arizona, California and Colorado—and then set about trying to change them. In an effort to make our homes and yards look like Illinois and Indiana, we planted grass and shrubs appropriate for wetter climates.

Western farmers and ranchers, too, have always valued grass—from alfalfa to native hay—that can feed hungry livestock through the winter season.

This mindset of grassy green abundance, however, has been periodically interrupted by western drought, affecting everyone from 1930s homesteaders to early 21st-century municipalities forced to implement strict water reductions. Rapid urbanization

has now run up against a record-breaking dry 16-year period, requiring a paradigm shift. Several of the fastest-growing cities in the nation are in the deserts of the West, and water from the lower Colorado River Basin irrigates some of the most intensively farmed areas of the planet. With seven U.S. states and Mexico dividing up 16.5 million acre-feet of water (the equivalent of 5.4 trillion gallons) and only 75 percent of that in average annual river flows to go around, we have a problem.

As water demand outpaces supply in the American Southwest, the water used to irrigate alfalfa, hay and bluegrass turf is receiving public scrutiny, with rural values often pitted against ever-increasing urban thirst. Parched cities are finding ways to compel residents to lose their lawns, while farmers may soon be offered payments to transition away from thirsty crops or

otherwise reduce use in order to free up some of their water supplies.

A number of cities dependent on water from the basin—from Denver to Los Angeles—have some sort of turf removal plan in place, but Las Vegas has led the pack in this regard. Under the leadership of Patricia Mulroy, former general manager for the Southern Nevada Water Authority, the Las Vegas region began an aggressive turf removal campaign in 2003, putting more than \$200 million on the table to pay residents and businesses to tear out their turf and replace it with less water-thirsty landscapes.

The voluntary program is part of a four-pronged approach to water conservation in the Las Vegas region that also incorporates pricing, education and enforcement. It has been stunningly successful, resulting in the removal of more than 170 million square feet of “non-functioning” turf from front yards, golf courses, highway medians and resorts. As a result, Colorado River water consumption in the region has dropped by 30 percent—and per capita water consumption by 40 percent—even while the population has increased by nearly a half-million people.

“By our estimation, about half of the grass in Las Vegas has been removed,” says Bronson Mack, SNWA public outreach and media manager. That’s enough for a strip of sod 18 inches wide to wrap more than three-quarters of the way around Earth. Looking around Las Vegas today, it’s obvious that you can still have beautiful, easy-to-maintain and shady landscapes without all that grass. As Mack puts it, “A community may not need wall-to-wall carpeting if an area rug will do.”

Turf reductions in the basin’s cities, however, won’t balance the system on their own, not when agriculture and food production uses 70 percent of the Colorado River’s water.

According to the Pacific Institute’s 2013 report “Water to Supply the Land,” irrigated pasture and forage crops used primarily to feed livestock cover about two million acres, or 60 percent, of the basin’s irrigated area. Alfalfa alone, a protein-rich and water-intensive grass crop planted extensively from Wyoming to the delta in Mexico, covers more than a quarter of the total irrigated acreage. These flood-irrigated hay

meadows and alfalfa fields consume more than five million acre-feet of Colorado River water each year—more than a third of the volume currently stored in Lake Powell.

“If we are trying to map out our water future, we really have to get our arms around alfalfa and hay crops, because that is where so much of the water goes,” says John Fleck, an adjunct professor and writer in residence at the University of New Mexico’s Water Resources Program. Fleck is at work on an “optimistic book” about the future of the Colorado River, tentatively titled *Beyond the Water Wars*.

Fleck and University of Arizona researcher Robert Glennon have proposed tweaking the system by developing flexible, resilient, market-based policy mechanisms

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BRONSON MACK
SNWA public outreach and media manager

that would allow ranchers and farmers to continue to thrive with less water while being compensated for the water they give up.

For example, Glennon suggests in his book *Unquenchable: America’s Water Crisis and What to Do About It* that alfalfa farmers in the lower basin should be able to idle their land during the hottest summer months—when their crops use four times as much water but get a dramatically lower yield—and then turn around and sell or lease the water savings to other thirsty farmers or desperate cities, without jeopardizing their own water rights when they return to farming in the fall.

“These are issues of equity and justice in our communities,” Fleck says. “It seems like there are opportunities here, but building the right institutions and getting the markets right is really hard.”

The future of grass, whether turf or forage, will likely also be shaped by technology and best management practices. Converting to ditch piping and subsurface irrigation to reduce evaporative losses, or implementing

regulated deficit irrigation, where crops are intentionally grown using less water than they would normally consume, are both practices that may ultimately be subsidized by municipalities that would benefit from the water savings.

But flood irrigation in the upper basin still makes sense under certain circumstances, says John McClow, a member of the Colorado Water Conservation Board and general counsel for the Upper Gunnison River Water Conservancy District. For instance, in some areas along the Gunnison River, a tributary to the Colorado, flood irrigation contributes to a stable groundwater table that ultimately reduces infiltration of irrigation water.

One long-term study conducted by the Western Landowners Alliance showed that flooding high mountain hay meadows actually creates a big sponge in river valleys, holding the water on the land, improving soil health, recharging aquifers, and contributing to a healthy riparian environment.

And while revenues from hay production may be small in the context of state GDP, McClow points out that, at least in rural Colorado, ranching is a relatively large contributor to the local economy, both directly and indirectly through the view corridors and social fabric it provides.

Although flood irrigation in the Gunnison Valley drains into the river, providing flows to downstream users in the Colorado River system, it’s a very different story in central Arizona, where farmers use Colorado River water to flood irrigate crops in Maricopa County, where return flows do not reach the river.

In the end, forces of both politics and nature will likely combine to determine the future of grass in the Colorado River Basin. “But it’s not a catastrophe,” Glennon says. “That’s the beauty of the crisis we are in. We still have choices to make between one path and another path. We are not bound inexorably, like lemmings, to jump off the cliff.” ■



Growing alfalfa in Colorado requires 10 to 25 percent more water than grass hay and 36 to 106 percent more than sorghum and other feed crops grown for livestock. Source: Colorado State University Extension