UPSTREAM SOLUTIONS: PROTECTING WATER FOR THE WEST

In the fire-scarred valley at the headwaters of the Colorado River, a dedicated team is reviving lost wetlands and rebuilding resilience.

Half a century ago, the Kawuneeche Valley in Rocky Mountain National Park was a lush, living sponge. Home to an extensive and vibrant beaver meadow complex, it was covered with rushing pond systems and dense willows that slowed snowmelt and sustained the flow of water through dry seasons, feeding the mighty Colorado River – a source of drinking water for nearly 1 in 10 Americans. But decades of human and wildlife impact, as well as changing river dynamics, degraded the landscape. Over time, as willows and beaver populations declined, the valley dried and eroded, leaving behind a landscape vulnerable to both flood and fire.

Then, in 2020, the East Troublesome Fire tore through Grand County, scorching forests and sending sediment cascading into the rivers and reservoirs below. Without soggy meadows and healthy beaver-dammed wetlands to hold water on the land, the fire spread unchecked, turning the dry landscape into a conduit for flames.

It was one of two giant wildfires that season that collectively scorched over 400,000 acres of wilderness, leaving the region's ecosystems – and a water supply that reaches 40 million Americans – in peril.

While wildfires are natural – and sometimes necessary for forest renewal – the desiccated landscape supercharged the damage, leaving behind a charred valley even more vulnerable to flash floods and water quality decline.

"It's not like we didn't know there would eventually be fires in our watersheds, but no one envisioned something on that scale," says Esther Vincent, director of environmental services at Northern Water.

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In the aftermath of the disaster, organizations including Northern Water, The Nature Conservancy, Colorado State University, the National Park Service, Grand County, Rocky Mountain Conservancy and the U.S. Forest Service came together as the Kawuneeche Valley Restoration Collaborative to improve aquatic and terrestrial ecology and protect against future catastrophes.

The goal is to return the area to its lush past, complete with the meadows and willows that used to protect the valley and regulate water flow. Yet the project isn't being driven by heavy excavation and construction. Instead, it's primarily using the same tools as the beavers who once maintained the valley, and enticing them to return.

The team is building Beaver Dam Analogs, Simulated Beaver Structures and Post-Assisted Log Structures – simple, nature-based methods to intertwine wood and soil to slow water flow and replicate the ecological functions of real beaver dams. These low-tech structures catch sediment flowing down the stream, raise the water table and spread water across the floodplain, encouraging the return of the soggy, willow-lined wetlands. Combined with forest management strategies like targeted thinning in the adjacent national forest, these solutions are rebuilding the region's ability to hold water, resist fire and heal itself.

The beauty of this nature-based approach lies in its simplicity – keeping interventions close to natural elements so ecosystems can maintain themselves. The goal is to draw nearby beaver communities back so that they can move in and maintain the structures going forward. It's a way of helping the ecosystem remember what it was – and begin again.

"It's hard to mess things up too badly when you just put wood and soil in the stream channel," says Jeremy Shaw, a wetland ecologist at Colorado State University and a member of the research team managing the restoration project. "We're trying to use the softest approach possible to accomplish the goal – and the goal is to reinstate natural processes in a self-sustaining way."

NINA RIGGIO

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These stream restoration techniques aren't just low-key; they're also incredibly effective at healing the fire-scarred watershed and transforming it into a living buffer against the next blaze. At a time when wildfires are becoming more frequent, that effort is urgent.

"We don't have decades to plan for this and then start implementation 30 years from now," says Vincent. "We need to take action on the ground much faster than that."

Already, the work is paying off, with hundreds of tons of sediment from fire runoff piling up against the new wood structures and raising the stream beds in some places by two or three feet.

"You can see the difference between this year and last year...and it's happening faster than we thought," says Sean Henry, an Environmental Planning Department manager at Northern Water.

Their work to restore the valley has a range of added benefits. By slowing water and reconnecting it with the floodplain, the project also makes the water clean and clear – key issues for millions of downstream users who depend on the Colorado River for drinking water, agriculture and hydropower. Meanwhile, healthy headwaters support everything from municipal drinking water to recreational activities like rafting and fishing. This range of important impacts has made the project popular with an array of local groups and nearby communities, bringing together diverse stakeholders around a shared goal.

"Just knowing that we're going to be able to do something that cumulatively has a good impact on water quality, water quantity, the environment – it's a pretty exciting time out there," says Henry.