FOREST NEWS

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Restoring Wetlands for Forest Resilience

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BLM RE-RELOCATING / 4FRI BOONDOGGLE

A beaver lodge sits in wetlands maintained by beaver activity in Colorado wilderness. A 2006 study conducted in Rocky Mountain National Park concluded that increases in aquifer recharge and groundwater storage "may be the most important beaver-related factor in mitigating effects from climate change."

Low-Tech Restoration for Forest Health

The devastation caused by catastrophic wildfire has sparked an overdue federal reaction to climate-driven crises. Proposed and approved budget increases will ramp up forest thinning and firefighting efforts, but Jackie Corday would like to see a more balanced approach that looks beyond wildfire mitigation and containment to ecosystem health and resilience. Corday is a Colorado natural resources consultant and former Colorado Parks and Wildlife Water Resources manager. She advocates for stream and wetlands restoration in parallel with wildfire mitigation efforts, starting with headwaters regions where restoration efforts will generate the most benefit.

Corday believes the Forest Service is "the agency that can make the greatest impact for improving headwaters health in Colorado and other Western states." Therefore, the Forest Service "can and should be a leader in scaling up headwater restoration of streams and wetlands — our natural water infrastructure — on our National Forests to improve water security and climate resilience to wildfires and drought."

Water Security:
the adaptive capacity to safeguard the sustainable availability of, access to, and safe use of an adequate, reliable and resilient quantity and quality of water for health, livelihoods, ecosystems and productive economies.
Sustainable Water Partnership

The Forest Service would seem to agree with Corday since its Water Facts webpage identifies water as "one of the most important natural resources flowing from forests. National Forests and Grasslands are the largest source of fresh water in the U.S. under a single manager .... Some 180 million people in over 68,000 communities rely on these forested lands to capture and filter their drinking water." A 2010 report from the Forest Service Pacific Northwest Research

Station documents the particular importance of high-elevation forests, which store vast quantities of water as snow during the winter then release it gradually through spring and summer, sustaining downstream water supplies.

But as Corday points out, due to current budgeting, staffing, and directives, the large majority of the agency's time and resources "are spent on timber harvest plans and fighting wildfire," even though National Forests are "the largest source of municipal water supply in the nation." With so much of the Forest Service budget dedicated to timber harvests and wildfire programs, the agency's restoration capabilities have suffered budget and staffing cuts. Those cuts have come at a time when National Forests and their water supplies face growing threats from climate change, including longer and more frequent droughts, reduced snowpack, increased tree mortality from insects and disease, and catastrophic wildfires.

These climate-related issues are exacerbating the fundamental problem of thousands of miles of degraded, incised waterways.[1] In the National Forests of Colorado and the West, stream degradation began in the 1800s when the fur trade decimated beaver populations. Estimates of the North American beaver population prior to European settlement vary from 60 million to 400 million, but by 1899, beavers were considered rare. The removal of beavers from the landscape altered critical ecosystems that naturally conserved water in wetlands and alluvial aquifers, which in turn sustained streams and rivers during drought years.

North American beaver (Castor canadensis).

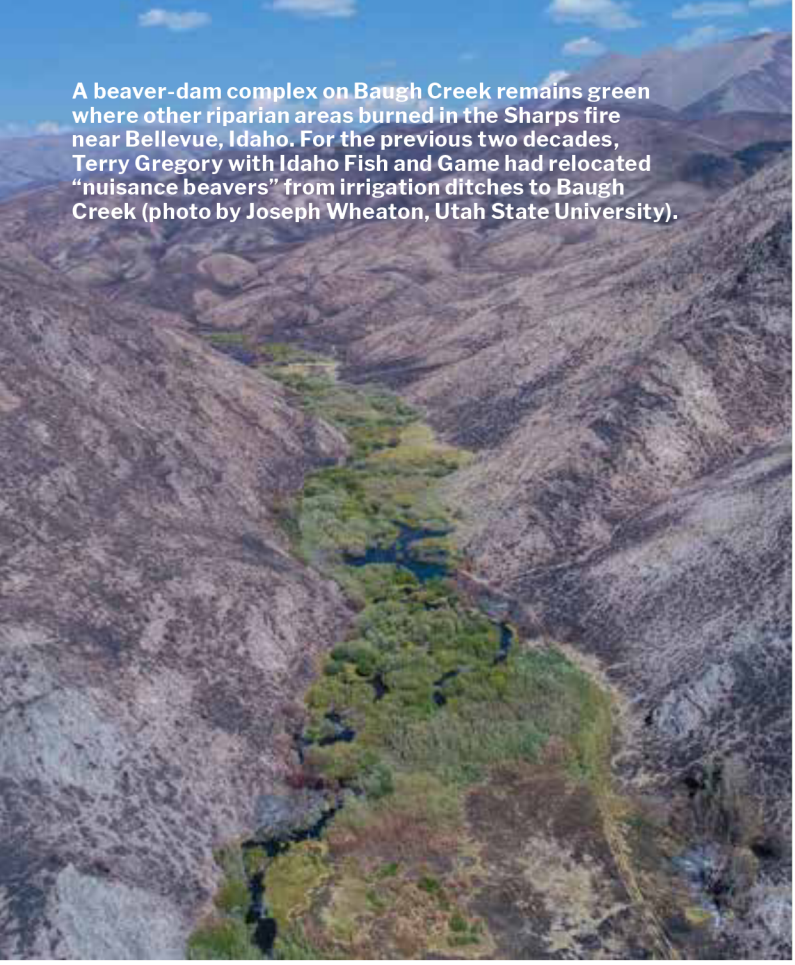
Without beavers maintaining the dams they'd built for millions of years, rivers began to flow faster, carving channels below their floodplains, and water drained out of the landscape, including the alluvial aquifers. The resulting ecosystem is drier, less resilient to drought, and more prone to catastrophic wildfire. Given the time frame, historical records cannot even document the extent of wetlands loss from over-trapping beavers. Historic mining and logging practices added to the stream-health problem, as have unmanaged grazing of livestock, riparian vegetation removal, alteration of stream flows, and channelization.

To begin restoring waterways and increase resilience to the effects of climate change, numerous agency reports and academic studies indicate that taking a low-tech, process-based restoration (LTPBR) approach provides an economical, scalable natural solution. Utah State University Watershed Sciences Professor Joe Wheaton and his colleagues are leading the way. They currently work with the Forest Service, BLM, Natural Resources Conservation Service, U.S. Fish and Wildlife Service, state wildlife agencies, conservation organizations, and private landowners. Their LTPBR work relies on local, natural materials to create temporary structures that mimic the influence of beaver dams.

As these "beaver dam analogs" trap sediment, stream levels gradually rise, floodplains reconnect, and aquifers rehydrate. "When using BDAs to restore incised streams, the goal is that beavers will return and take over the structures because members of this keystone species are the most beneficial long-term agents of maintaining river health," said Mark Beardsley of EcoMetrics, who specializes in stream restoration. Over time, this type of process-based restoration can effectively reconnect incised streams to their floodplains and costs substantially less per mile than traditional engineering approaches with heavy equipment.

With thousands of miles of degraded streams and thousands of acres of degraded wetlands in National Forests, Corday advocates for, "in addition to fuels reduction, an equal and parallel effort to

[1] *Forty-nine percent of all river miles in the West are modified from their natural state.*



A beaver-dam complex on Baugh Creek remains green where other riparian areas burned in the Sharps fire near Bellevue, Idaho. For the previous two decades, Terry Gregory with Idaho Fish and Game had relocated "nuisance beavers" from irrigation ditches to Baugh Creek (photo by Joseph Wheaton, Utah State University).

restore the natural water infrastructure in source watersheds ... with low-tech process-based methods." She cites multiple benefits of restoring headwaters streams and wetlands:

- Improved water quality because floodplains and wetlands filter out sediments and other pollutants.
- Attenuated snowpack runoff and storm flows in floodplains, which improves later season flows.
- Improved riparian habitat and ecologic function.
- Improved resilience to wildfire and drought as documented by research showing vegetation around beaver complexes has a three-times greater survival rate than in other riparian areas.
- Reduced flood risks as healthy floodplains and wetlands absorb storm runoff.

Specifically, Corday recommends that the Forest Service "undertake an effort to substantially scale up protection and restoration of our National Forests' natural water infrastructure — the source watershed streams, wetlands, and meadows that capture annual snow melt and storm events. Restoring, protecting, and managing this natural water infrastructure will improve wildlife habitat and water security for thousands of communities across the west."

On the political front, Corday is educating lawmakers about the need for stream restoration and lobbying them to support a new national directive to protect water security, prioritize funding for natural water infrastructure restoration, and increase Forest Service restoration staffing. "Funding is essential for these strategies to be scaled up effectively," she said. However, without additional Forest Service staff positions to design, plan, oversee, track, and monitor successful projects, increased budget alone will not lead to successfully upscaling this work across National Forests."

In April, Senators Michael Bennet (D-Colo.) and Ronald Wyden (D-Ore.) introduced Senate Bill 1248, the Outdoor Restoration Partnership Act "to establish an Outdoor Restoration Fund for restoration and resilience projects." Corday sees this bill as an opportunity for the Biden administration and Congress to provide the leadership needed "to ensure a more secure water future by protecting healthy watersheds and restoring degraded streams and wetlands in the face of increasing water scarcity and climate change."

If passed, the bill would establish a grant program to fund increased capacity for planning, coordinating, and monitoring restoration and resilience projects. The bill would also establish a Restoration and Resilience Partnership Program through which the Agriculture Department would carry out "restoration and resilience projects that reduce wildfire potential, improve community resilience in the wildland-urban interface, or restore wildlife habitat."

Corday also points out that LTPBR "fits perfectly into helping achieve existing priorities" as stated in the Forest Service Strategic Plan:

- Conserve, maintain, and restore watersheds, ecosystems, and the services they provide to people.
- Use the Watershed Condition Framework to identify restoration priorities.
- Maintain water of sufficient quantity and quality to sustain aquatic life and support terrestrial habitats, domestic uses, recreation opportunities, and scenic character.

LTPBR is also an effective strategy to protect drinking water supplies by mitigating post-wildfire debris flows. More in-depth information about LTPBR's many benefits and applications is provided in Professor Wheaton's April 2021 presentation for the Natural Areas Association.