Nature-Based Solutions for Wildfire Mitigation

Overview

This proposal describes collaborative, nature-based approach that will increase the effectiveness of Envision Chaffee County's 'Methodist Front fuel breaks' near Poncha Springs in the area of County Road 115, Hot Springs Road, Pinyon Lane and U.S. Highway 285. The entire project area is on land under the jurisdiction of the City of Salida.

The Objective

- To satisfy concerned community members who want additional work done to supplement existing fire mitigation work, which is mostly focused on managing heavy fuels. As evidenced by the Boulder County fire that burned over 1,000 homes in December 2021, grasslands and brushes are highly combustible and capable of carrying fire rapidly across the landscape; therefore, it is critical to incorporate their management into a comprehensive fire-mitigation plan.

The Problem Encountered

- The current fire-mitigation plan is limited to managing heavy fuels. Unfortunately, without incorporating fine-fuel mitigation, this approach adds to fire danger and increases the likelihood of fire ignition. This is because fine/flashy fuels are more likely to facilitate fire ignition and threaten lives and property by providing a rapid pathway into residential areas before control efforts can be employed.
- Recent work to create a fire break along the "frontside" of Methodist Mountain has, ironically, created a more frequent fire regime because the resulting landscape favors accumulation of fine fuels that burn more rapidly, burn more frequently and are more likely to facilitate ignition than the pre-existing piñon-juniper forest landscape.
- When trees are removed, the ecosystem quickly compensates for the loss of trees by growing grassy vegetation, often in the form of noxious weeds.
- Piñon trees identified as heavy fuels have been removed from the forest and sold as firewood. This is suboptimal, as the costs of removing nonmerchantable boles from the forest likely will not be recovered from their sale.
- Burning of heavy fuels – even in a controlled manner – brings inherent risk and releases sequestered carbon into the environment where it contributes to climate change.

The Solution

- Adding wood-chipped mulch to depleted soils, especially where trees that were removed were not chipped in-place. Fuels chipped into mulch provide a protective overlayer, preventing sunbaked soils, retaining moisture and breaking down over time to build soil for a regenerative forest.
- Adding fungi to woodchips to accelerate woodchip decomposition build soil in 3-5 years.
- Facilitating the prevention of invasive weeds acting as fine fuels capable of carrying wildfire to heavier fuels and nearby homes
- Removing woody-brush overgrowth in a mosaic pattern and systematically burning the decades-old underlayer of accumulated dead fuels in the off-season to stimulate native vegetation growth.
- Adding compost additives and planting naturally wildfire-deterrent native species in areas of devoid soils.
- Adding wood-chipped biomass for coverage and protection then adding wood-rotting inoculants to decompose wood and build soil in areas of sunbaked soils.
- Creating a “greenbelt” or shaded fuel break in Poncha Springs and supporting nature-based, regenerative forestry solutions vs. extractive forestry, a practice in which healthy trees are cut and removed.

The Reasoning

- Fine/flashy fuel initiates a wildfire start more readily and moves through a landscape to urban areas more quickly (i.e., via illegal campfires, cigarette butts, muffler ignition, etc.).
- Disturbed soil and open areas from the thinning of piñon and juniper are ideal for highly flammable cheatgrass and brush to invade, thereby ***increasing*** fire danger.
- Large amounts of brush make it difficult for emergency personnel and their equipment to access the site.
- The Marshall Fire in Boulder County, the most destructive fire in Colorado history, was started and fueled by grass and brush, resulting in the loss of over 1,000 homes in December 2021.

Our Proposal for a Better Solution

Seven Chaffee County/Colorado companies and private entities are partnering to share resources to complete the proposed wildfire fuel-break enhancement.

- **Elements Mountain Compost** will create four (4) test sites within the fire break to evaluate the wildfire resiliency effectiveness of compost and fungi, sourced from the San Luis Valley and from product produced in their Salida facility utilizing Chaffee County food scraps.
- **Science by Design, DBA Fungal Solutions,** will isolate native fungi from the ecosystem, test them for effectiveness, and provide them to Beyond Organics for inoculation. This ensures that appropriate fungal species are chosen that are both well-adapted to challenging local conditions and will avoid the risk of introducing an invasive species.
- **Beyond Organics** will inoculate dispersed wood chips along the soil-depleted areas where tree thinning occurred to test the effectiveness of accelerated decomposition along with the application of algae and other natural resources to enhance the soil. This will assist in ensuring nutrients are absorbed by the soil and plant life more quickly.
- **Clovers Habitat Landscape Design** “encourages living ground covers of native grasses and wildflowers and/or compostable native mulch that will feed the soil for plant communities consisting of trees, shrubs and flowers.” This local company will be vital in building soil and seeding wildfire deterrent grasses and forbs.
- **Terra Firma Forestry** is staffed with Certified Arborists specializing in wildfire mitigation and over 55 years of combined experience in arborcare, forest care and wildfire fighting to prune and maintain fire resilient plant life at the fire break as well as remove fire-hazard plant life.
- **Colorado Headwaters** is a nonprofit dedicated to protecting natural resources in headwaters regions.
- **Matthew Coen** employs his goats and rotational grazing solar fencing to keep fine fuels from reaching a height that will carry wildfire, an optimum approach for maintaining fuel breaks near the wildland-urban interface (WUI). Rotating the goats and allowing them to naturally fertilize the soils is a nature-based solution that has been employed for hundreds of years; plus, this adds to the desired agricultural viability of Chaffee County lands.

Rationale

- Complements and enhances existing fire mitigation efforts.
- Improves access to fuel breaks for emergency personnel.
- Mitigates the unintended consequences of increased fire risk created by soil disturbed by the tree thinning process and the loss of allelopathic nature of the trees that naturally suppressed the fine/flashy fuels of cheatgrass and other highly flammable brush.
- Restores native ecologies.
- Creates a more fire-resilient ingress and egress for evacuation and emergency response route.
- Would serve as a model for increasing the effectiveness of fuel-break work in other areas in Chaffee County as fire breaks continue to be employed along the foothills of populated areas
- Sequesters carbon into soils instead of releasing carbon into the atmosphere, which accelerates the rate of climate change.
- Biomass accumulation of mycorrhizae and mycelia in soils vs above ground biomass of vegetative growth that carries wildfire into the neighborhoods.

Participants

- Elements Mountain Compost, established 2014, Salida, Colorado
- Beyond Organic, established 2012, Farm 146, Salida, Colorado
- Science by Design, established 2018, Durango, Colorado
- Clovers Habitat Landscape Design, established in 2006; Poncha Springs, Colorado
- Terra Firma Forestry, established 2003; Poncha Springs, Colorado
- Matthew Coen, goat farming; Salida, Colorado
- GARNA, volunteer efforts and education, Salida, Colorado
- Colorado Headwaters, 501(c)(3) nonprofit; Salida, Colorado

Project Deliverables

Deliverable	Description
Area Clean-Up	Remove above portion of woody material by brush-hog mowing.
Wildfire Mitigation	Remove flammable conifer growth and ladder fuels in cottonwood groves.
Targeted Prescribed Burn	Eliminate accumulated dead fuels and stimulate new growth in select areas.
On-site accelerated soil conversion of remainder of fuels	Isolate effective fungi from local wood-decaying specimens. Propagate massive amounts of supply and inoculate fungi into mulched beds of wood chips for decomposition, soil building and underground carbon sequestration.
Soil Nutrition	Apply combinations of compost and microbes.
Create Regenerative Forestry	Plant clover and other fire-resistant vegetation.
Maintenance	Utilize rotational goat grazing to keep vegetation height low, thereby eliminating wildfire spread in te fuel breaks

Timeline for Execution

Description	Start Date
Project Start	November 2022
Area clean-up and wildfire mitigation of heavy fuels in the cottonwoods and brush hog mowing of fine fuels	November 2022
Small agricultural burn of ground material	February 2023
On-site accelerated soil conversion prep	March 2023
Mulch inoculation	April 2023
Completion with seeding	May 2023
On-going goat grazing	May 2024

Estimated Cost

Services	Cost
Cleanup of leftover ground fuels from 2021 Envision fuel treatment project	$8,800
Manage fine fuel (brush cutting)	$19,200
Removal of brush, ladder fuels, and conifers from the greenbelt of cottonwoods (City of Salida property)	$45,000
Employ volunteer labor to create a recreational trail in cleanup area, connecting to disc golf course and Poncha Park on U.S. Highway 285.	$0
Burn ground and leaf litter in off-season	$8,500
Place mulch in depleted-soil areas for inoculation.	$18,000
Identify effective native wood-rotting mycelia species and on-site propagation supply for inoculation.	$50,000
Employ volunteer labor to apply inoculant onto wood-chip layer as an educational component.	$0
Add compost .	$8,000
Seed with wildfire-deterrent grasses and forbs	$9,500
Administration	$16,700
Total	**$183,700**