



Plant Ecology Staff

David Hirt (Senior Plant Ecologist)

Casey Balthrop

Carrie Cimo

Stephen Hauptli

Brad Winckelmann

Seasonal Staff

Kelsey Backiewicz

Samantha Bietsch

Maria Pezza

Boulder County

Plant Ecology

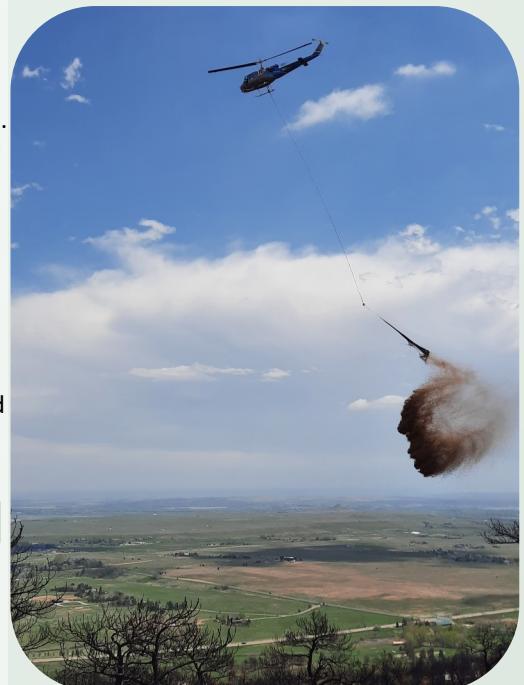
2021 Highlights

- ◆ Completed aerial mulching across 2,115 acres of moderate and high severity burn on County, private, and USFS lands affected by the Cal-Wood fire. Physically monitored 1,720 plots to ensure mulch coverage complied with contract specifications.
- ◆ Worked with a consultant to complete Phase 2 of a two-year project to assess and map emergent wetlands countywide. Mapped 157 wetlands, which totaled 443 acres, and formally assessed 46, across 7,274 acres on 39 properties.
- ◆ Completed the final year of contracted maintenance, monitoring, and reporting on four remaining federally funded flood recovery projects.
- ◆ Collected 393 pounds of native seed of 31 unique species.
- ◆ Completed vegetation mapping on 160 acres of the Billings West property adjacent to Longmont's Button Rock Preserve.
- ◆ Planned and oversaw installation of 8,237 plants and distribution of 12.4 acres of riparian, upland, and dryland pasture seed at the Niwot Ditch Diversion Project.



Cal-Wood Fire Recovery

- The Cal-Wood Fire ignited on Oct. 17, 2020 and quickly grew to become the largest recent wildfire in Boulder County history, burning 10,115 acres. More than 45% of that fire was on BCPOS lands, primarily Heil Valley Ranch. Boulder County acted as the lead sponsor to secure \$5,300,000 in Emergency Water-shed Protection Funding from the Natural Resources Conservation Service.
- Additionally, Plant Ecology staff submitted and received a grant from Colorado Water Conservation Board for \$550,000 to address high priority slopes on United States Forest Service (USFS) land adjacent to county and private holdings that were ineligible for Emergency Watershed Protection Program (EWP) funding and which could compromise mulched slopes on county and private lands.
- The ensuing project became the largest wood shred aerial mulching in state history, though it was soon eclipsed by work on the Cameron Peak Fire.
 - Removed hazard trees across nearly eight miles of trails and access roads.
 - Dropped 10,780 tons of wood mulch from trees harvested and shredded on site.
 - Mulched 2,115 acres of moderate and high severely burned slopes across county, private, and USFS lands.
 - 647 hours of helicopter flight time. Project completed in 14 weeks and four days.
 - Total cost was \$4,072,145, or \$1,925/acre.
 - Seeded 31 acres of high priority slopes for soil stabilization above the main trailhead at Heil Valley Ranch.
 - Plant Ecology staff monitored 1,720 plots across 172 transects to make sure contractor was compliant with specified mulch coverage of 70%.
 - A final report can be requested from Plant Ecology staff.



Aerial mulch drop on the Cal-Wood fire above the Mountain Ridge Subdivision..



Consistent mulch coverage across severely burned slope.



Volunteers help with seeding on severely burned slopes above the main trailhead at Heil Valley Ranch.

Left: Tree grinding operations and aerial mulch drop at landing on Heil Valley Ranch.

Niwot Ditch Diversion Project

The Niwot Ditch Diversion Project is located on the St. Vrain Creek approx. 1/2 mile downstream from 75th St. and extends downstream for another 1,400 feet. Among other goals, the project aims to achieve the following:

- Create a diversion structure to deliver water, provide fish passage, increase resiliency during floods, and decrease sediment deposition upstream of this structure.
- Re-establish the natural riffle-pool sequence to improve instream habitat, allow and provide long-term channel profile stability, thus protecting property adjacent to the stream.
- Reconnect the channel to the adjacent floodplain to restore ecological connectivity.



Above: An excavator carefully places logs at an outer bend of the St Vrain Creek as a part of the Niwot Ditch Diversion Project. The outer section of this row of logs will be covered with slash and fill material before being covered with riparian seed-laden soil lifts that will be supported with hundreds of willow stakes. This toe wood structure provides a strong natural barrier that protects the channel from erosion and provides fish habitat.



Container plantings installed in the Phase II section of the project. The red-painted bamboo poles will assist to locate plants for irrigation and to monitor survival.



Plants are delivered to the project site.



Above: toe wood structure #1, the same feature as pictured in the top photo, after construction is completed. Willow stakes are anchored into the two soil lifts and will soon take root and fortify the feature.



A total of 18 volunteers provided 54 service hours to plant 1,012 wetland plugs in two of the three soil lifts.

Plant Ecology Role and Vegetation Highlights

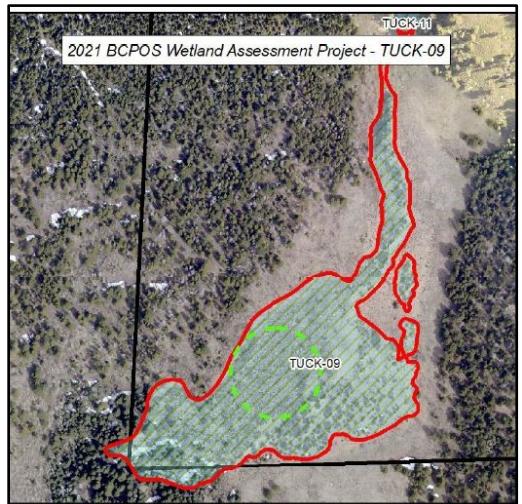
The Plant Ecology workgroup reviewed and commented on plan design and specifications. It also oversaw all plant container stock acquisition, and it secured all seed for restoration. The PE team provided project oversight and will continue to lead plant survival monitoring and vegetation success after construction is complete to ensure compliance with the success criteria set forth by the United States Fish and Wildlife Service (USFWS) to protect the Preble's meadow jumping mouse. Vegetation highlights include:

- 2,065 coyote willow poles were installed in the soil lifts.
- 4.64 acres of upland seed (68.1 lbs.) were applied.
- 2.78 acres of riparian seed (21.9 lbs.) were applied.
- 1,504 wetland plugs, including grasses, rushes, and sedges were planted.
- 4,283 riparian plants, including false indigo-bush, dogwood, cottonwood, and five species of willow were planted.
- 385 upland plants, including American plum, chokecherry, golden currant, snowberry, and Woods' rose, were planted.
- Another 137 lbs. of various dryland seed mixes were used to reclaim 5.0 acres of disturbed areas used for staging and stockpile locations.

Phase 2 Wetland Assessment

Wetland Mapping and Assessments

- Staff assisted a contractor and the Colorado Natural Heritage Program in their efforts to complete the second phase of a countywide wetland mapping and assessment, using the Ecological Integrity Assessment protocol developed by the Colorado National Heritage Program.
- ◆ Phase 2 mapped 157 wetlands that totaled 443 acres and formally assessed 46 wetlands across 7,274 acres on 39 open space properties.
- ◆ All 19 wetlands assessed in the mountains scored a "B" or higher, with 12 of the 19 ranked as "A".
- ◆ Only one of the 27 wetlands in the plains scored a "B" or higher.
- 419 plant species were documented during the assessments. 307 native, 791 non-native, and three cryptogenic species (mixed-origin).
- Species diversity in the mountains ranged from 33 to 69 species per wetland. Species diversity in the plains ranged from 5 to 67 species per wetland.
- This two-year project and associated data are the most accurate and comprehensive information collected on BCPOS wetlands to date and will serve as a valuable management tool for the department, providing recommendations for preservation and restoration, as well as providing a baseline status for monitoring changes to our wetlands moving forward.



Bullock Invasive Tree Removal

- Funded with internal Stewardship funding.
- Contractors removed all non-native trees over 4" diameter, totaling 573 trees of crack willow (*Salix fragilis*), black locust (*Robinia pseudoacacia*), Siberian elm (*Ulmus pumila*), and green ash (*Fraxinus pennsylvanica*) across seven acres.
- Plant Ecology staff, in collaboration with Weeds staff, has started work to remove the remaining trees less than 4" in diameter.

Additional Invasive Tree Removal

- Over 450 Russian olive, crack willow, tamarisk, and black locust trees were removed at Pella Ponds and Lower Boulder Creek.



Monitoring & Mapping

Vegetation Monitoring

- The final 2021 Annual Inspection Reports for the Fourmile Canyon Creek, Gold Run, Lower Fourmile, and James Creek were submitted to the Colorado Water Conservation Board detailing the vegetative status of these four Emergency Watershed Protection (EWP)-funded 2013 post-flood stream restoration projects.
- Plant Ecology staff completed six vegetation monitoring transects in the summer of 2021 at James Creek related to the final EWP reporting.
- Five vegetation monitoring transects were completed at the Reach 3 Phase 2 (Longmont Supply Ditch) project site to ensure vegetation cover and plant survival meets the success criteria for Preble's Meadow Jumping Mouse as set for by US Fish & Wildlife requirements.



PE staff setting up a monitoring transect at James Creek.



40°12'21"N 105°13'27"W
125° SE
Western Mobile_Reach3Phase2_Reach3-15_End
Jul 29, 2021 9:52:38 AM

Transect at Reach 3 Phase 2.



Vegetation mapped at the Billings property.

Vegetation Mapping at Billings West

PE staff mapped 160 acres of vegetation at the Billings West property using the US National Vegetation Classification System (USNVC). PE staff continue to process the data collected in the field to determine the proper Alliances and Associations to which the vegetation communities belong. Multiple Significant Natural Communities and rare plant populations were identified. This information will assist in upcoming forest thinning projects as well as overall management of the property.

Cal-Wood Fire Mulch Monitoring

To support the Cal-Wood Fire aerial mulching efforts, PE staff established and monitored 172 transects to assess whether mulch cover was acceptable. In all, this comprised 1,720 data plots that were analyzed. Plot data was collected utilizing a Wood Straw cover grid, and staff utilized randomly generated points within each mulch treatment unit as a transect start point.



PE staff use a Wood Straw cover grid to assess mulch cover in the Cal-Wood Fire burn area.

Cal-Wood Fire Vegetation Monitoring

PE staff resampled four transects that lie within the Cal-Wood Fire burn scar to carry forward years of previous monitoring efforts, and two additional transects were established and monitored in high severity areas. Analysis is still ongoing to explore the data.



Nov.17 2021 3:21:52 PM
1933 Geer Canyon Drive
Boulder County
Colorado
Heil Tree Survival HVRT_19

Severely burned Ponderosa pine marked for monitoring.

Heil Tree Survival Monitoring

During Cal-Wood Fire recovery efforts, certain trees along picnic sites, parking lots, and trails were marked to be left in case they end up surviving fire-related damage. PE staff identified Ponderosa pines at Heil Valley Ranch that lost a significant amount of leaves and will continue to monitor their recovery. A total of 30 trees were placed into three categories of live needle percentages: 0-10%, 11-20%, and 21-30% needle retention.

Volunteer Program and Seed Collection

"The best way to find yourself is losing yourself in the service of others."

-Mahatma Gandhi

This dedicated community of land stewards gave a mighty amount time and energy to Plant Ecology programs in 2021. Navigating the second year of a global pandemic allowed us to hit our stride and make a lot of great things happen, all while remaining diligent and COVID-safe.

Volunteer Work Projects

- 44 episodic work projects— seed cleanings, seed collections, seed sowing, planting, weed pulls, and other tasks.
 - 33 public projects, 9 requested projects, 2 Partnership projects
- 393 bulk lbs. of native seed collected with volunteers and staff
- 31 different species collected
- 31.35 acres seeded for Cal-Wood Fire recovery
- 1,446 plants planted – Heil Valley Ranch, Niwot Ditch Stream Restoration Project, Walden Ponds
- 1,823 total service hours given by volunteers
- I-Naturalist Fire Followers
- In partnership with the Lefthand Watershed Center, volunteers conducted monthly surveys within the Cal-Wood Fire footprint, documenting plants species. In total, 140 observers made 4,914 observations, documenting 374 species; 286 volunteers aided with on-line identification.

Ongoing Volunteer Programs

- Native Garden Stewards: 10 volunteers, weekly gardening sessions – 27 weeks, 571 service hours.
- Caribou Weed Warriors: two volunteers, 243 lbs. of Oxeye Daisy heads removed, 110 ser-vice hours.
- 2021 Pilot Program Launch: The Property Stewards; four properties monitored, 30 service hours
 - This group was formed to aid Parks staff in visiting remote properties with high resource values and history of trespass to report observations.
 - Properties visited included Barron, Cline, Grassy Top and Tucker.
 - Observations included social trials, fire rings, OHV use, weed infestations, etc.

Peck Native Seed Garden

- 10th year of production (established 2012)
- 10 species in production in 2021
- 215 bulk lbs. of native seed produced/harvested at the garden
- 860 plants planted , 420 plants salvaged to be out-planted elsewhere



Resource Management Plant Ecology

David Hirt
Phone: 303-678-6218
Email: dhirt@bouldercounty.org

Our Mission:

As Plant Ecologists for Boulder County, we strive to preserve the health and diversity of our native flora and plant communities, as well as work to restore the vegetation and ecological functioning of our streams, wetlands, grasslands, and forest ecosystems impacted by human and natural disturbances.



Goals:

PROTECT

Identify, preserve, and maintain high quality native plant communities and landscapes.

RESTORE

Enhance wildlife habitat, ecosystem functions, and visitor experience through the restoration of degraded lands.

ENGAGE

Increase enthusiasm and support for native plants and their importance to ecosystem function and habitat.

