



Plant Ecology

Boulder County

2019 Annual Report

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2019 Highlights

- ◇ Contracted maintenance on four Emergency Watershed Protection (EWP) flood recovery projects across St. Vrain, Left Hand, and James creeks.
- ◇ Restored 2,100 feet of flood-damaged Left Hand Creek on the Brewbaker-Sorenson property.
- ◇ Collected 245 pounds of native seed of 26 species.
- ◇ Reintroduced 50 Colorado butterfly plants, a formerly federally threatened species, to four locations on two properties.
- ◇ Conducted vegetation monitoring on 14 properties to collect data on grassland health, herbicide treatment, and restoration success.
- ◇ Completed vegetation mapping on 1,075 acres of newly acquired properties.
- ◇ As part of our goal to increase enthusiasm and support for native plants, we created a Plant Ecology Twitter account, "BoCoPlants," to showcase our native wildflowers and vegetation, and to highlight Plant Ecology projects throughout the year. Currently at 56 followers.



Restoration and Flood Recovery

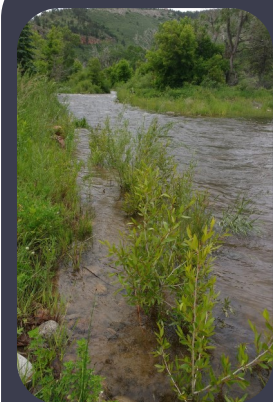
The Plant Ecology group was tasked with contracting and oversight of four EWP flood recovery projects during 2019. Three of those projects were on Boulder County Parks & Open Space (BCPOS) lands: South St. Vrain Creek on Hall Ranch, St. Vrain Creek Reach 3, and Left Hand Creek on the Bielens-Hock property. The fourth was a Transportation project on James Creek.

EWP Warranty Work & Seasonal Maintenance

- ◇ 3,250 willow stakes planted.
- ◇ Planting 5,400 native trees and shrubs.
- ◇ Planting 3,400 wetland plugs by contractor and Left Hand Outdoor Challenge participants.
- ◇ 32 acres of manual and chemical weed control.
- ◇ 8–10 waterings on all BCPOS projects between June and October.
- ◇ Removal of 995 deer and beaver cages, and 739 vole cages on established and dead plantings.
- ◇ 25 flood-monitoring transects completed.
- ◇ Six state-mandated reports written and submitted.

Design Review and Construction Oversight

- ◇ Completion of construction and revegetation at the Anne U. White Trailhead, Reach 3.
- ◇ Design review, planting, and restoration input for the Reach 3, Phase 2 project.
- ◇ Design review, planting, and restoration input for the Niwot Ditch reconstruction.
- ◇ Design alternatives for reconstruction of the Howell Ditch diversion with Mile High Flood District and the City of Boulder.
- ◇ Worked with students at the St. Vrain Valley School District's Innovation Center to provide drone imagery of the South St. Vrain Creek restoration project.
- ◇ Design review and oversight at Lake 4, West Lake and A-Frame dam rehabilitation project.



Left Hand Creek Restoration at the Brewbaker-Sorensson Property

Stream restoration at the Brewbaker-Sorensson property accomplished five goals:

- ◇ Protect and improve the quality and extent of riparian and wetland habitat.
- ◇ Restore stream channel and floodplain geomorphic processes.
- ◇ Restore riparian ecological processes.
- ◇ Provide for agricultural use.
- ◇ Protect life and property.

The stretch of the project was approximately 2,100 linear feet. Construction began on August 1 and ended about eight weeks later on September 24. Notable achievements include:

- ◇ Protected existing or incorporated desirable flood features such as fallen trees, embedded wood, large woody debris, and root wads.
- ◇ Used existing onsite vegetation including native grasses and willows as sod to stabilize banks.
- ◇ Created or maintained microtopography throughout the project site to encourage seed germination and to provide microhabitats.
- ◇ Increased channel sinuosity and floodplain connectivity.
- ◇ Removed artificial berms that interfered with ecological processes.
- ◇ Installed cattle crossing on east side of property to allow passage between pastures, addressing land user and livestock safety concerns.
- ◇ Removed crack willows, Russian olive trees, and spotted knapweed.
- ◇ Preserved native willows, cottonwoods, alders, and select patches of healthy vegetation when possible.
- ◇ Preserved select vertical banks to protect miner bee colonies.

Plant maintenance will continue through October 2020 to ensure a high plant survival rate and successful seed germination throughout the project site and access roads.

Top: Constructed soil lifts lie on top of toe-wood structures, providing habitat and bank stabilization.

Bottom: Excavators equipped with GPS receivers move soil to reconstruct the stream in accordance with the planned channel design.



Photo: David Hirt

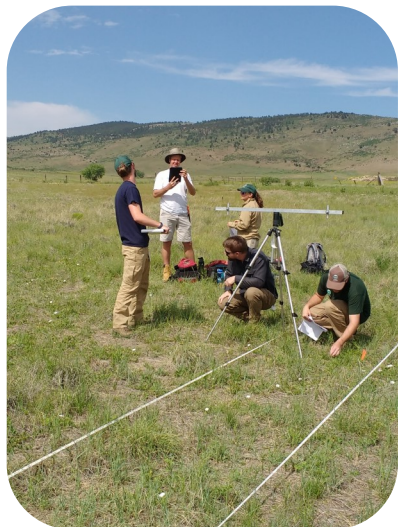


Photo: David Hirt

Vegetation Highlights

- ◇ **4,200** plants installed
- ◇ **Eight** acres of riparian, upland, and pasture seed broadcasted
- ◇ **100** cottonwood poles installed throughout the project site
- ◇ **1,000** willow stakes installed on banks
- ◇ **26** species of trees, shrubs, and herbaceous wetland plants installed

Monitoring and Mapping

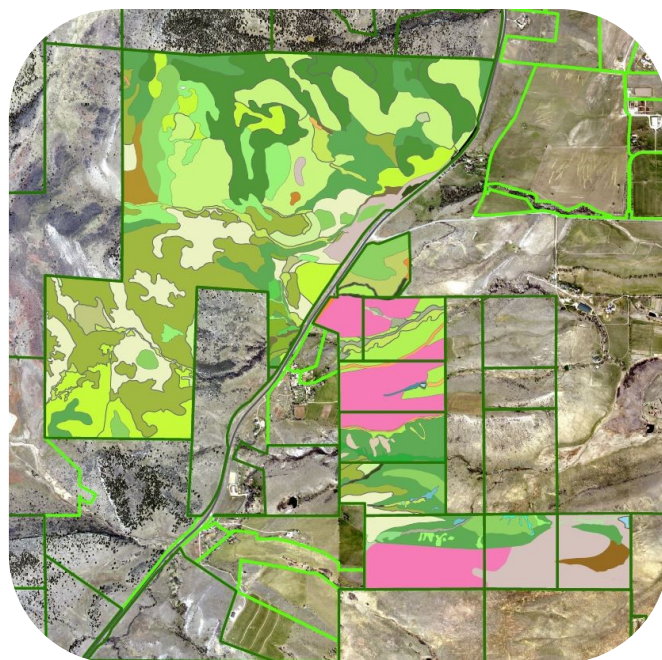


Vegetation Monitoring

- ◇ Completed 25 vegetation transects on three EWP flood recovery projects to document revegetation success and trends.
- ◇ Continued monitoring on nine transects to investigate the effects of Esplanade treatments on native plants at the Ron Stewart Preserve at Rabbit Mountain.
- ◇ Updated data for our Restored Grassland Model with 15 transects on three properties.
- ◇ Revisited restoration transects at Mud Lake to document success of forestry treatments from 2014.
- ◇ Assisted with monitoring of revegetation with Army Corps of Engineers for the Lower Boulder Creek restoration project.

Vegetation Mapping

- ◇ Completed vegetation mapping on 1,075 acres of newly acquired properties, including:
 - 725 acres at the Dorothy Ellen Trevarton property
 - 350 acres on the Loukonen Dairy Farm property



Research Projects

- ◇ Funded an intensive plant survey of the Red Hill area of Heil Valley Ranch and the Trevarton property. This area was designated by the Colorado Natural Heritage Program as one of three areas of Outstanding Biodiversity Significance in Boulder County. This effort documented 350 species of plants within an approximately 300-acre area, which is over 20% of all plant species found in the county.
- ◇ Outplanted 50 individuals of Colorado butterfly plant (*Oenothera coloradensis*), a recently delisted federally threatened species, in four locations on two properties.

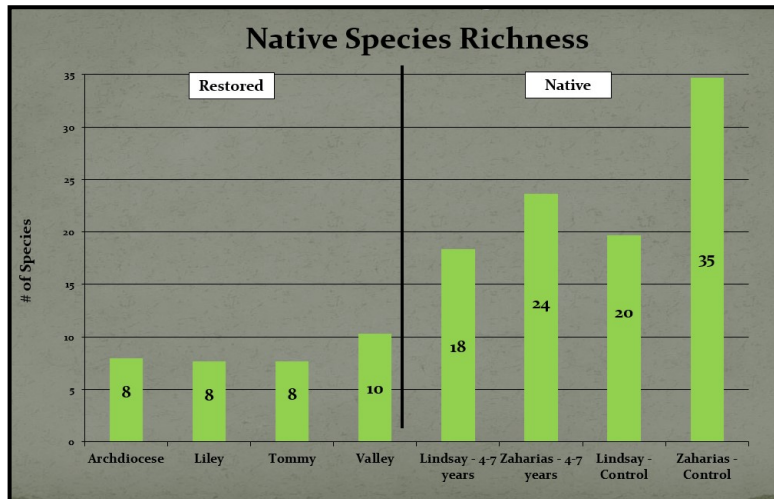


Monitoring and Mapping

Restored Grassland Monitoring

Plant Ecology continued the restored grassland monitoring program by revisiting three properties in 2019:

- ◇ Three prairie dog occupied and three control transects at the Lindsay property
- ◇ Three occupied and three control transects at the Dowe Flats property
- ◇ Three control transects at the Liley property



Key Takeaways:

- ◇ Our restored grasslands, even after 13+ years, do not have the resistance and resilience to prairie dog occupation as our native grasslands do.
- ◇ Restored grassland are lower in species richness, particularly native forbs.
- ◇ Restored grasslands have higher cover of bare ground and basal gaps, and less litter.

Highlights:

- ◇ Average vegetative cover in upper riparian areas of Reach 3 increased from 41% to 67%.
- ◇ Average vegetative cover at South St. Vrain increased from 40% to 63%.
- ◇ Native vegetation ranged from 38% to 62% of total cover.

Flood Recovery Monitoring

Stream restoration recovery monitoring also continued in 2019:

- ◇ 11 transects at the St. Vrain, Reach 3 restoration site
- ◇ Nine transects at the South St. Vrain restoration site
- ◇ Five transects at the Bielins-Hock restoration site (Left Hand Creek)



Volunteer Program and Seed Collection

Volunteer Work Projects

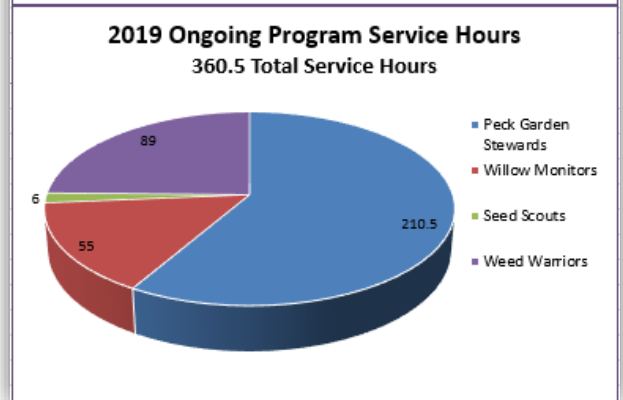
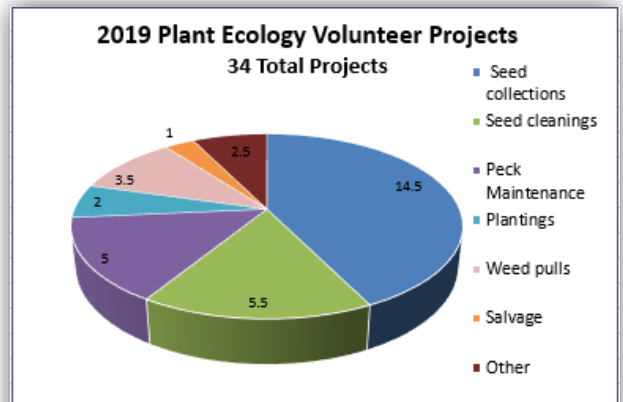
- ◇ 34 episodic (one-time) volunteer work projects in 2019
- ◇ 245 bulk pounds of native seed collected (wildland harvest and Peck Garden grown)
- ◇ 62.3 bulk pounds of seed cleaned
- ◇ 286 plants planted, 160 plants salvaged
- ◇ 1,522 total service hours

Ongoing Volunteer Programs

- ◇ Native Garden Stewards: 11 volunteers, weekly gardening sessions, 28 weeks, 210 service hours
- ◇ Weed Warriors: Two volunteers, 84 pounds of Oxeye daisy heads removed, 89 service hours
- ◇ Willow Monitors: Six volunteers, nine properties, estimated 130,000 harvestable willows, 55 service hours
- ◇ Seed Collection Scouts: Three volunteers, two properties, six service hours
- ◇ 361 total service hours

Peck Native Seed Garden:

- ◇ Eighth year of production (est. 2012)
- ◇ 10 volunteer work projects hosted, five monthly public projects, three partner/requested projects, two WRV projects:
 - ◇ planting (30 hours), weeding (71 hours), seed collection (361 hours)
- ◇ Nine species in production in 2019
- ◇ 158 bulk pounds of native seed produced/harvested
- ◇ 672 total service hours





Resource Management Plant Ecology

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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:

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

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

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

