



***Fort Collins Natural Area Field Trip: Bobcat Gulch Natural Area  
January 12, 2021***

***Purpose:*** Local managers, researchers, and stakeholders visited the City of Fort Collins Bobcat Gulch Natural Area (~17 miles southwest of Fort Collins, CO) where the 2000 Bobcat Gulch Fire was reburned by the 2020 Cameron Peak Fire for collaborative learning.

***Attendees:*** 24 professionals attended the field trip, including staff from the City of Fort Collins Natural Areas (CFCNA), Colorado Forest Restoration Institute (CFRI), USDA-Rocky Mountain Research Station (RMRS), and Denver Water. Attendees' professional roles were generally oriented towards management, research, science, and utility provision.

***Agenda:***

- Stop 1: an herbicide test plot
- Stop 2: areas burned by both the 2000 Bobcat Gulch Fire and the 2020 Cameron Peak Fire
- Stop 3: area that was burned only by 2000 Bobcat Gulch Fire

***Field trip summary:***

The Bobcat Gulch Natural Area—a highly utilized natural area for residents of Fort Collins, Loveland and other surrounding communities on the Front Range of Colorado—has experienced two fires in the last 20 years. In 2000, the Bobcat Gulch Fire left large high severity burn patches in the ponderosa pine stands, and resulted in large areas of complete forest mortality. Recently, the 2020 Cameron Peak Fire reburned forested and unforested areas of the Natural Area. Our field trip discussions focused on issues related to soil erosion, post-fire tree mortality, protecting surviving trees in preparation for potential future fires, reforestation following the 2020 Cameron Peak reburn, and the reduction of cheatgrass and other invasive understory species. The group had several lingering knowledge gaps at the end of the discussion, including questions relating to tree and shrub regeneration in drainages in the Natural Area, and the differences in Cameron Peak Fire effects between areas where trees killed in the 2000 Bobcat Gulch Fire were piled and/or removed versus areas where they were not.

## Summary of field trip group conversations:

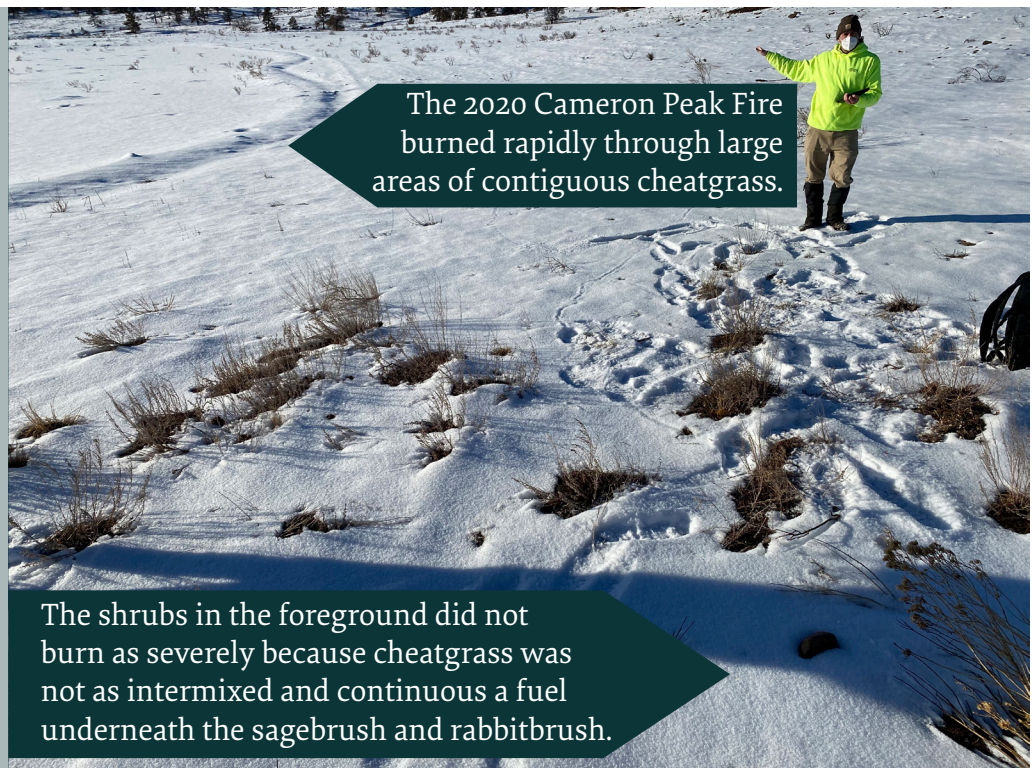
### How the Natural Area Burned in the 2000 Bobcat Gulch and 2020 Cameron Peak Fires

The Bobcat Gulch Natural Area is a highly utilized natural area for residents of Fort Collins, Loveland and other surrounding communities. In 2000, the Bobcat Gulch Fire left large high severity burn patches in ponderosa pine stands, and resulted in large areas of complete forest mortality on the property. There was also some low-moderate severity burning through the ponderosa pine stands on the north side of the Natural Area. Additionally, some individual and small stands of ponderosa survived the 2000 fire.

The 2000 Bobcat Gulch Fire burn scar did not stop the 2020 Cameron Peak Fire; rather the 2020 fire burned across nearly the entire 2000 burn scar on the property, and was strongly wind driven. The fire burned in a patchy manner across property due to non-contiguous understory vegetation (primarily grasses and forbs, with patchy low-statured shrubs) and rocky outcrops. However the presence of cheatgrass did create contiguous fuels in some areas, which easily carried the 2020 fire under high-wind conditions. The 2020 Cameron Peak Fire was stopped at the Natural Area by a change in weather conditions.

#### Stop 1: Herbicide test plot

Mike Aucellio (City of Fort Collins Natural Areas (CFCNA)) discussed an experiment that the CFCNA program undertook along with USFS BAER professionals and CSU PhD student Shannon Clarke to understand the efficacy of the herbicide Rejuvra immediately after fire to control cheatgrass (*Bromus tectorum*).



#### Stop 2: Within reburn area (where 2020 Cameron Peak Fire reburned the 2000 Bobcat Gulch Fire)

##### Drainages and post-fire erosion:

Drainages, particularly the V-shaped drainages, are natural conduits for post-fire erosion issues. However, these drainages are also very difficult to restore or recover to a vegetated condition. This is a big challenge and concern for water utilities. One comment was that the slopes along the drainages in the Natural Area look steep and dry, and it may be hard to get any vegetation to establish, particularly depending on initial moisture conditions in the spring/summer 2021.



If a vegetated condition is desired in steep drainages (similar to the one pictured on the opposite page):

- A good place to start with limited resources might be to focus on revegetating the flatter areas around the streams, where revegetation for erosion control is more likely to succeed.
- The CFCNA could consider what the 2000 Bobcat Gulch Fire's erosion impacts were (e.g., did these drainages produce a high amount of erosion? if so, perhaps prioritize erosion control in drainages before restoring the grassland area below).

### ***Restoration activities following 2000 Bobcat Gulch Fire***

Many of the dead and down trees were piled and burned following the 2000 fire. For immediate erosion control, the area was aerial seeded with grasses in 2001. Additionally, the CFCNA planted ~200 ponderosa pines on north facing slopes on the property. These plantings had good survivorship during monitoring at 6 months, but during the 12 month monitoring nearly all planted seedlings had elk herbivory impacts.

### ***Conifer replanting and recovery***

The group discussed the potential for conifer recovery following the two fires, and several questions, solutions, and knowledge gaps were identified.

*Potential for survival of conifer seeds and seedlings:*

- The City could use seed tubes to reduce herbivory impacts on planted seedlings if they do decide to replant following the 2020 Cameron Peak Fire reburn.
- Due to the Natural Area being at the lower ecotone of ponderosa pine and with climate change considerations, CSU/CFRI researchers suggested that it will be unlikely that ponderosa pine will have a high survival rate and that planting other conifers or accepting a non-forested condition may be considered.
- The CFCNA staff discussed their mission to use vegetation that is native to the Fort Collins area and would need to carefully consider planting conifer species that did not originate on the property.
- Some CFCNA staff articulated that they have already accepted that the area is non-forested, while others held hope that the area could recover to a ponderosa pine woodland or savannah.

*Aerially Seeding and Planting Conifers*

- Marin Chambers (CFRI) is currently working on a project with USDA Rocky Mountain Research Station, The Nature Conservancy, and the U.S. Geological Survey to explore various seed technologies for aerial seeding. Marin will update CFCNA staff on any relevant solutions once more results are available.

*Refugia*

- The protection of surviving ponderosa pine ("refugia") in the Natural Area may be extremely important for conifer recovery.
- CSU/CFRI researchers suggested that large areas of refugia be protected by performing forest restoration and fuels mitigation efforts with the aim to create a resilient forest to future fire (practices to support these efforts are detailed in [GTR-373](#)). Small areas of refugia (such as individual or small groups of surviving trees) may be existing seed sources which could be protected by ground fuels mitigation around surviving trees and pruning lower limbs.

### ***Restoration of understory vegetation:***

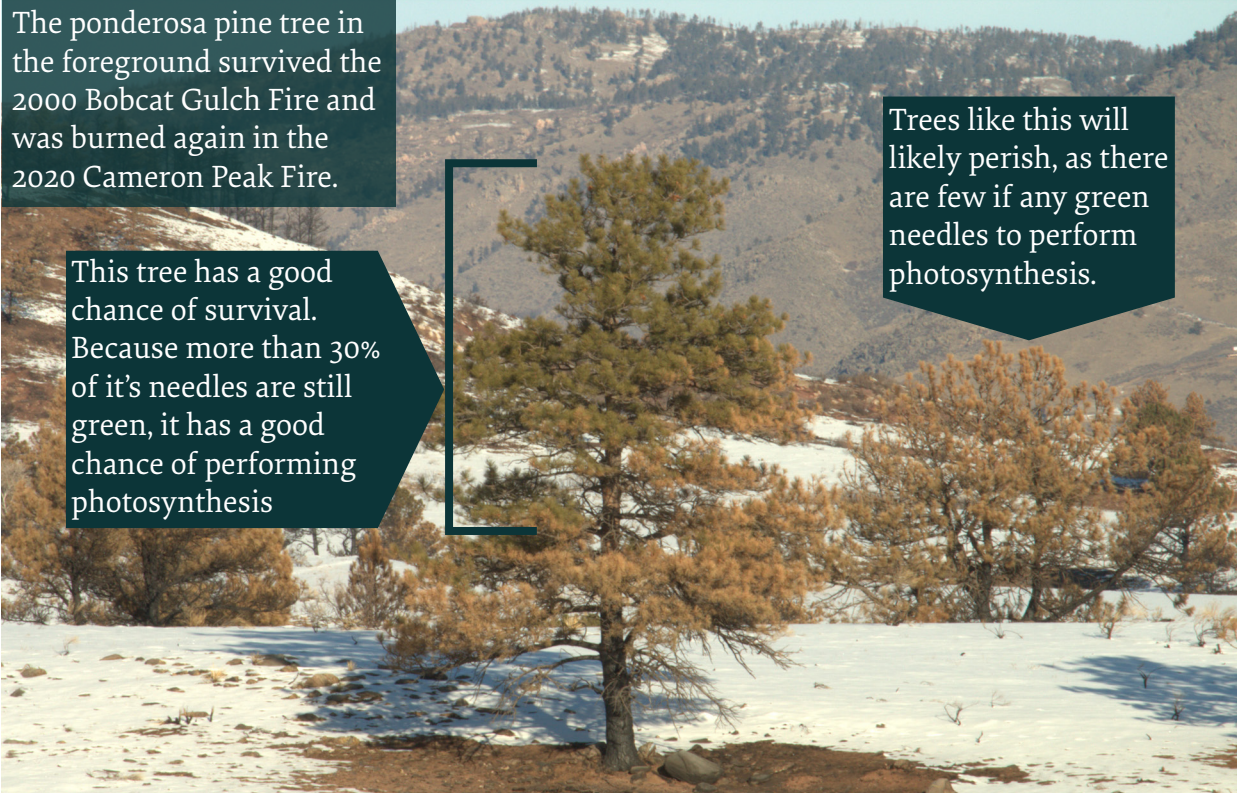
As part of the CFCNA mission, CFCNA is limited to restoring vegetation that originates in the Fort Collins area. Due to limitations of local seed sources, CFCNA gets some seeds from a seed company in Boulder, CO, and sources local seed from volunteer collections on the property. However, space and capacity at the CSU nursery is limited. Additionally, seeds sourced from seed companies are typically cultivars, which is not desirable.

## CFCNA values and concerns:

The CFCNA staff articulated some of their primary concerns for the Natural Area, which need to be considered while completing any restoration:

- **Understanding or predicting the tree mortality that will occur as a result of the 2020 Cameron Peak Fire**

CFRI staff suggested that the City or CFRI can do aerial imagery analysis to help CFCNA determine forest losses following the 2020 fire, but the timing may depend on when the next imagery will be released.



The ponderosa pine tree in the foreground survived the 2000 Bobcat Gulch Fire and was burned again in the 2020 Cameron Peak Fire.

This tree has a good chance of survival. Because more than 30% of its needles are still green, it has a good chance of performing photosynthesis

Trees like this will likely perish, as there are few if any green needles to perform photosynthesis.

CSU/CFRI researchers have the understanding that up to ~70-80% needle scorch on an individual tree may result in survivorship of the tree (Fowler et al. 2020 has some more detailed information on this). However, there are other factors that may impact tree survivorship in the 1-2 years following fire such as: tree cambium destruction and/or resident time of root or trunk scorch may result in mortality; drought conditions following fire may kill already stressed trees; and blow down may occur following fire.

- **Elk herd protection:** CFCNA staff seeks to maintain mountain mahogany (*Cercocarpus montanus*), a preferred food for the elk herd, particularly in the winter. However, they also seek to do what they can to move the elk herd from the property during other times of the year.
- **Restore grasslands in the valley on the property.** Grassland birds are declining on the property, and CFCNA would like to increase their populations
- **Native and rare plant protection across the property,** including:
  - Flouristic resources for invertebrates
  - Mountain shrubs, particularly those in drainages to support pollinator populations
  - Riparian areas for wildlife

## Discussion Highlights:

- **Soil erosion:** If soil erosion was an issue following the 2000 Bobcat Gulch Fire or becomes an issue following the 2020 Cameron Peak Fire, controlling erosion in drainages may take precedent to restoring grassland in the valley on the property. *The concern here is damage to the grassland if drainages produce serious erosion issues. If revegetating drainages becomes a priority, focusing on using native shrubs, particularly along the flatter areas along drainages is a start to controlling erosion.*
- **Reduction of cheatgrass for future fires:** CFCNA is doing amazing work experimenting with options to control cheatgrass in the Natural Area. *The SRFSN could be a great organization to share lessons learned from these experiments with other managers as this concern is prevalent across the Western US.*
- **Post-fire ponderosa pine mortality:** it is difficult to determine exact survivorship and mortality rates of ponderosa pine trees post-fire, but if ~30% of the tree retains green needles, the tree has a strong chance of survival.
- **Protection of surviving ponderosa pine:** forest restoration and fuels treatment mitigation will help to ensure the resilience of the surviving ponderosa pine stands within low-moderate severity burn areas. For individual or small patches of trees that survive within high severity burn areas, removing fuels from around these trees and pruning lower branches will protect these important seed sources from future fires.
- **Planting ponderosa pine seedlings:** due to the general lack of natural regeneration in the Natural Area, and the fact that the Natural Area is at the lower ecotone of ponderosa pine, it may not be a good use of resources to plant ponderosa pine in this area. However, if planting is a priority to achieve Natural Area management goals, the use of tree tubes will help protect planted seedlings from elk herbivory.

## Future opportunities

- Revisit to Bobcat Gulch Natural Area Spring/Summer 2021 for better look at on the ground fire effects (i.e., understory recovery, soil/erosion impacts) and to view areas where post-fire wood from 2000 burn was piled versus left in place to assess differences in fire effects.
- Visit City of Fort Collins Crossline Canyon Natural Area Spring/Summer 2021 as a potential CFRI training or study site.



Field trip attendees walk along the trail in the Bobcat Ridge Natural Area. Evidence of the 2000 Bobcat Gulch Fire is illustrated by the standing dead trees and logs on the ground.