Tucker and Elk Draw
Project Area 1 Unit 1
Scope of Work DRAFT

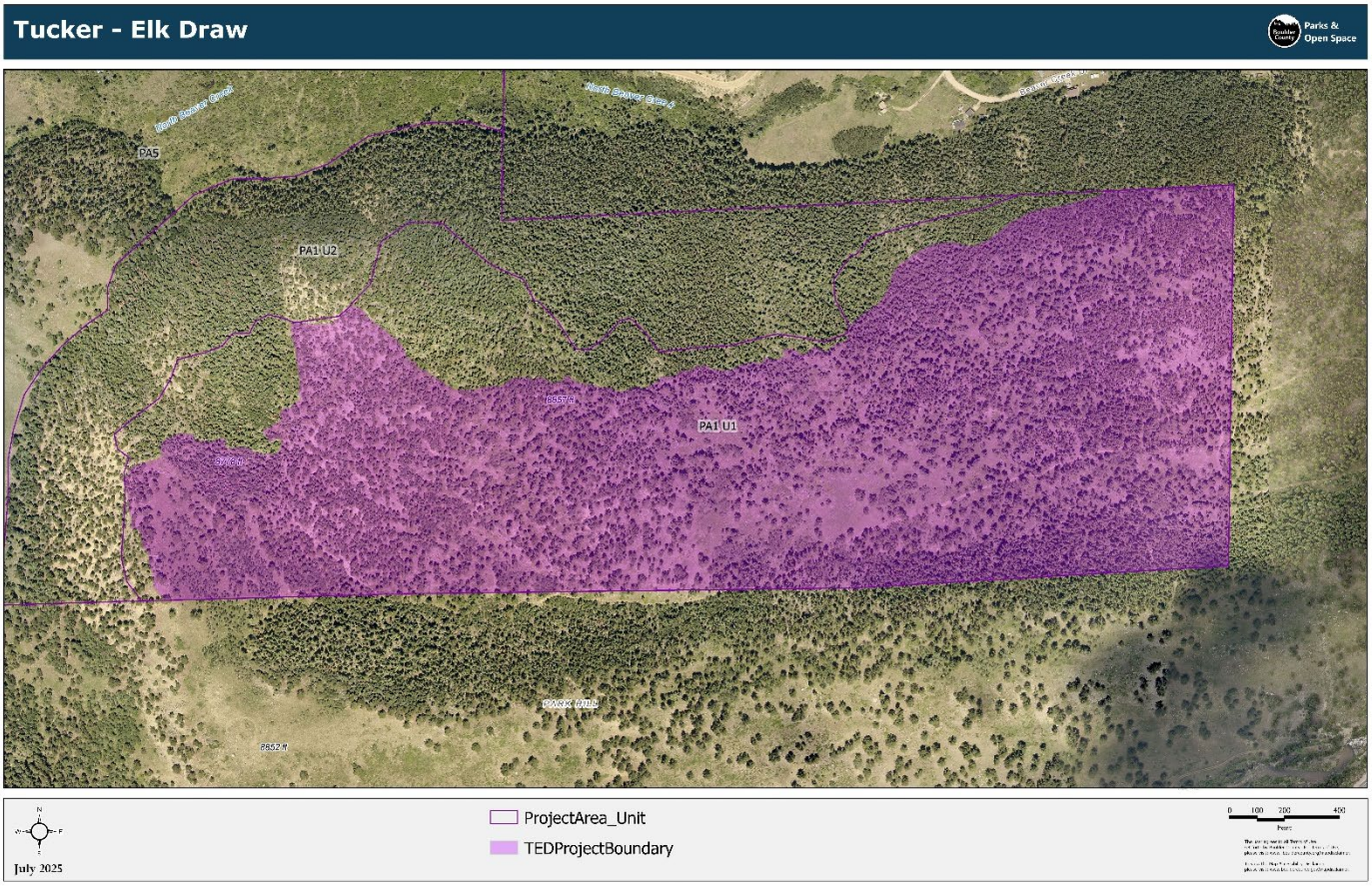


Figure 1: Tucker – Elk Draw map showing Project area. Units, and the Forestry treatment boundary.

Project Area Background

The 323-acre Tucker property was purchased by Boulder County in 2020. The 40-acre Elk Draw property was donated to Boulder County early in 2024 by Colorado Open Lands (COL) a non-profit land trust. Elk Draw lies directly east of Tucker and together these two properties create a continuous county managed area of 363 acres. These two properties will be referred to collectively as TED (Tucker-Elk Draw) in this and associated documents.

The US Forest Service owns a 40-acre parcel to the east of Elk Draw. East of this Forest Service parcel is the County-owned Mariposa Passage property, a small 2.4-acre parcel which the County purchased in 2024 to provide administrative access for BCPOS from 1st Street in Nederland to the Elk Draw and Tucker properties via an access road that crosses the Forest

Service parcel and enters TED. The TED property has limited legal public access and no authorized trails but does see recreational use presumably by neighbors and local residents. The property is open to passive recreation, but unauthorized trail building is prohibited. Some newly emerging unauthorized trails have been rehabbed and obscured to deter usage. No new trails may be constructed on the property without first going through an established management planning process.

Project Area 1 encompasses Park Hill, ending where it meets the wet meadow to the west. Unit 1 was defined as the relatively moderate terrain on top of Park Hill. Unit 2 encompasses the steeper side slopes of Park Hill and ends where the forest abuts the wetland area. See Figure 1. A total of 30 plots were randomly distributed in Unit 1 and 12 plots were distributed in Unit 2. The prescriptions described here are only within Unit 1. Fuels data was not collected as of 2024.

Unit 1 (top of Park Hill) is very diverse. Most of the area is covered by mixed conifer consisting primarily of ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), subalpine fir (*Abies lasiocarpa*), lodgepole pine (*Pinus contorta*), limber pine (*Pinus flexilis*), and aspen (*Populus tremuloides*), with some Engelmann spruce (*Picea engelmannii*) and blue spruce (*Picea pungens*). The dominant overstory species across most of the plots are ponderosa pine (27.69%) and Douglas-fir (25.70%). The remaining half of the overstory consists of subalpine fir (20.07%), lodgepole pine (14.59%), quaking aspen (10.28%), limber pine (1.00%), Engelmann spruce (0.50%), and blue spruce (0.17%). See Figure 2.

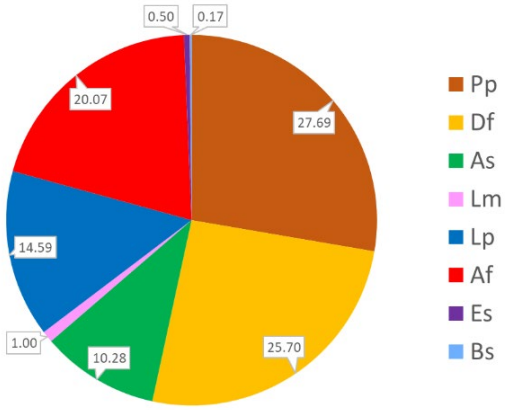


Figure 2: Tucker – Elk Draw Project Area 1 Unit 1 Species Distribution

Species	Species Code
Ponderosa pine	PP
Douglas-fir	DF
Quaking aspen	AS
Lodgepole pine	LP
Limber pine	LM
Subalpine fir	AF
Engelmann spruce	ES
Blue spruce	BS

The basal area ranges from 30 to 260 ft2/acre, with an average of 153.32 ft2/acre. Of the trees sampled, the diameter at breast height (DBH) ranges from 0.2 to 28.2 inches, with an average diameter of 8.56 inches and a quadratic mean diameter of 5.56. The average height of sampled trees is 32.17 feet, ranging from 4.5 to 69 feet. The crown ratio (percent of the tree's total height that has live crown, value 1-9) is an average of 5.60. The percent of closed canopy cover is 70.36%, ranging from 15.5 to 95.75%. Most of the trees sampled were living; the tree kind (scale from 1-3, 1- live, 2 - dying, and 3- standing dead) average is 1.3. Ninety-one (15.09%) out of the 603 trees sampled were dead. Most of the dead trees sampled were Douglas-fir (5.31%) and aspen (4.64%); the remainders were lodgepole pine (1.99%), subalpine fir (1.99%), and ponderosa pine (1.16%). Of the 62 aspen trees sampled, 45.16% were dead. DBH for the dead trees ranged from 0.2 inches to 21.5 inches, with an average DBH of 6.88 inches. There were also 6 trees (1.00% of the total

trees) with a rating of 2; 2 lodgepole pine, 2 Douglas-fir, an aspen, and a subalpine fir. The average vigor (scale from 1-4, 1 being healthy dominant form and 4 being suppressed form) is 2.50.

Treatment Rationale

The primary goal of forest management at Tucker Ranch and Elk Draw is fire mitigation with the additional goal of forest resilience. The area has experienced fire in the past as evidenced by numerous fire scars and will experience fire again in the future. Treatments on the property will aim to foster an ecosystem that is able to accept fire in a less catastrophic way.

The East portion of Tucker and Elk Draw will have an increased emphasis on fire mitigation and fuels reduction due to the proximity to the Town of Nederland. The Boulder County property boundary is within 0.25 miles of the Nederland town limits, but there are additional homes and structures closer than this. Based on satellite imagery, approximately 24 buildings are within 0.25 miles of Elk Draw and the east portion of Tucker occupying Park Hill. Fire in this area would also likely produce firebrands that could be carried into Nederland on the prevailing westerly winds. Decreasing fire behavior would help to mitigate the production of these firebrands.

The treatment is not expected to stop a fire, nor does it guarantee any specific outcomes under all fire weather conditions. It is anticipated that up to the level of moderate fire conditions, fire personnel may be able to engage directly with a fire within the treatment area. If extreme fire conditions are present and fire personnel cannot directly engage the fire, treating this area increases the opportunity for, and effectiveness of, aerial suppression efforts such as water and retardant drops. These mitigation efforts and suppression actions when combined with home hardening and defensible space work on private property can mitigate fire behavior, potentially allowing more time for evacuations. This treatment extends beyond individual property interests, aiming to promote conditions which would increase the ability of the ecosystem to rebound after fire.

Park Hill is a forested ridgetop that leads directly into town and is designated as Wildland Urban Interface (WUI) in the Nederland and Timberline Fire Protection District Community Wildfire Protection Plan 2024 Update. The CWPP also identifies the Tucker Ranch area as a first priority project, specifying a desire to “reduce the risk of intense, rapidly spreading wildfire directly west of the most densely populated area in these districts” as well as “protecting key drinking water infrastructure, watershed health, and a known elk migration corridor” (CWPP, 2024, p152). The area of interest delineated in the CWPP encompasses the entirety of the Boulder County (BC) Tucker Ranch property as well as some US Forest Service and Private lands. The US Forest Service 40-acre parcel to the east of Elk Draw is critical to the Town of Nederland’s fire mitigation goals, but the USFS has not yet treated this parcel. Treatment of Park Hill to the west of the FS property will partially fulfil this fire mitigation goal until the Forest Service is able to treat their parcel. Boulder County, through the Colorado State Forest Service (CSFS), is pursuing a Good Neighbor Agreement (GNA) to treat the US Forest Service land using the same funding

source as the work on Tucker – Elk Draw. This combined work would maximize the aims of the CWPP.

In addition to fuel reduction, treatment of Elk Draw, and this area of Tucker Ranch has the objective of improving forest resilience to climate change and disturbances, such as fire and insect and disease. TED falls within the upper montane life zone, with some north facing slopes and mesic areas containing characteristics of the subalpine life zone. There is evidence of past fire across the whole area with fire scars on many live trees as well as charred snags and logs, indicating that low-moderate or mixed-severity fire impacted the area. Although it was not uncommon for ponderosa pine/mixed conifer forests in the upper montane to experience high or moderate severity stand-replacing fires. These events could reduce basal area of the effected stand by 20-70% and typically occurred in 50+ year intervals (Battaglia, 2018; Brown et al., 1999; Schoennagel et al., 2011; Sherriff et al., 2014). The historic fire return interval for the upper montane ecotone in the Colorado front range is between 20-60 years (Battaglia et al., 2018) or 40-100 years (Veblen and Donnegan, 2006). A Historical Range of Variability Assessment for Caribou Ranch Open Space (Brown and Carpenter, 2001), less than 1.5 miles to the north, found three widespread inter-stand fires in the past 340 years, with fire intervals of 52 yrs and 153 years. It has now been 166 years since that last widespread fire in 1859. This indicates that the Caribou Ranch area has likely missed at least one fire cycle for this ecotone and has seen an increase of stand density as a result.

While historic fire regimes and historic ranges of variability in stand volume are useful references, they may not always be applicable when considering the impacts of climate change and the goals of long-term resilience (Millar et al. 2007). With climate change impacts we can expect more extreme fire weather conditions leading to elevated fire frequency, scale, and severity. Decreasing stand volume, creating more heterogeneity in stand structure, and favoring more fire-resistant trees can help promote the area's resilience to fire. Within the lodgepole pine stands, small patch cuts would introduce more age class diversity to promote resilience to insect and disease issues. Enhancing existing aspen stands and protecting specific features such as limber pine and legacy trees, also increases overall diversity in forest composition which is key to resilience.

TED also has high ecological value within the larger landscape. The North Beaver Creek Colorado Natural Heritage Program Potential Conservation Area (L4_PCA-North Beaver Creek_7-11-2024.pdf) overlaps some of Park Hill and is listed as having high biodiversity significance due to the presence of mature forests, wetlands, vulnerable willow carrs, and a valuable wildlife corridor for large mammals like elk. This planned treatment will have no impact on the wetland itself, but in the event of fire, decreased fire severity on Park Hill could result in less erosion and sedimentation into waterways.

The Indian Peak Environmental Conservation Area also spans some of the TED area. The area description states “Conservation efforts in this area have focused on protecting key ecological components at the lower edge of the ECA : montane parklands and habitat connectors to lower elevations. In the mid-1980s, Lee and Virginia Evans donated a conservation easement on the 650-acre Arapaho Ranch, a montane parkland with important wetlands, grasslands, and transitional elk range, to Colorado Open Lands.” (bccp-eca-descriptions-2013.pdf (bouldercounty.gov)) The TED project lies directly north of the Arapaho Ranch conservation easement with plans to implement cross-boundary forestry work. Improved resilience of the Tucker-Elk Draw forests would increase the impact and value of the Indian Peaks ECA.

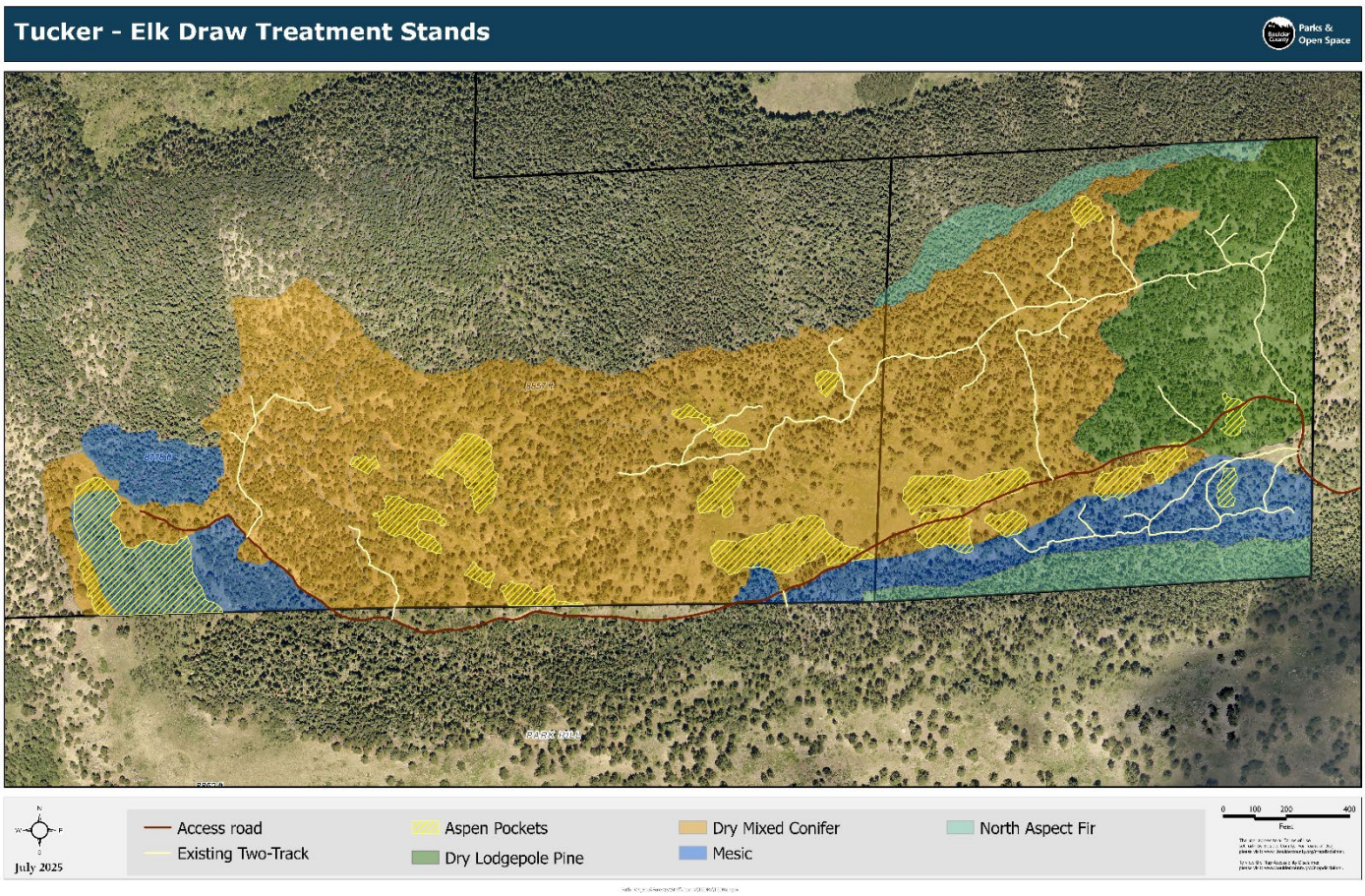


Figure 3: Tucker – Elk Draw map showing various stands within the treatment area.

Recommended Treatment

Desired forest conditions consist broadly of a forest that allows for low-moderate severity fire to occur under normal fire weather conditions and is resilient to disturbance and a changing climate. The desired forest will have diversity in age, size class, spatial arrangement, and species composition of trees. See Figure 3.

The primary objective of treatment at TED is fuels reduction and fire mitigation for the town of Nederland and the homes in the surrounding WUI. This will be achieved by reducing overstory density, decreasing BA and TPA, and increasing spatial heterogeneity. Removing ladder fuels and creating space between groups of trees will help decrease fire behavior under normal fire weather conditions. Additionally, opening up the canopy will enhance understory vegetation, both in species richness and cover, leading to more grasses, forbs, and shrubs that quickly regrow after a fire, which helps to stabilize the soil post fire.

Within the dry lodgepole pine dominated stands on the east side of Elk Draw there are areas that were thinned by a previous owner and have since experienced windthrow. This would be a good site for small patch cuts to remove some of the blowdown, introduce more age class diversity, and create a break in the canopy. As lodgepole regeneration returns in these patch cuts it will be thinned when saplings are young in order to decrease density and improve wind firmness. Both the project-wide thinning and the lodgepole patch cuts fulfill the joint objectives of fuels reduction and forest resilience by enhancing a mosaic structure in the forest. Following operations, some newly opened areas may be used as a site for planting rust-resistant limber pine seedlings as part of the County's limber pine conservation efforts

As part of the forest resilience goal, promoting species diversity is an additional objective of this treatment. There are many aspen stands dispersed throughout the property. Some are well established, but many are suppressed due to competition with conifers and browsing from wildlife. Removing conifers that are overtopping or becoming established in aspen stands will encourage their success. Cutting a small proportion of aspen can induce increased suckering. With enough new growth some saplings will stand a better chance of growing above browse height.

Limber pine (*Pinus flexilis)* is a species of special concern within Boulder County. It is important to maintain and promote this species due to its ecological significance and the numerous threats it faces, which contribute to the Boulder County Species Conservation Plan. Limber pine is a poor competitor in the forest and can easily be suppressed by nearby trees that grow more quickly and vigorously. There are many mature limber pine on the property that can be improved by removing competing conifers that are becoming established underneath as ladder fuels or are overtopping smaller the limber pine. Vigorous limber pine saplings would also benefit from competition removal whenever possible. In addition, areas of this property could be suitable for planting limber pine seedlings after treatment.

Forestry Prescriptions

Dry Mixed- Conifer Prescription:

Across the dry mixed-conifer stands that occupy the majority of the unit the thinning prescription will focus on removal of smaller diameter trees and increased spacing between the crowns of groups and/or individual trees. Since fire mitigation is a primary goal of this

treatment, especially on Elk Draw, retained trees should be grouped with space between crown groups to deter the potential of a running crown fire. Ladder fuels should also be removed beneath retained trees on the eastern portion of the property closest to town. On the western portion of Park Hill less emphasis can be placed on fire mitigation and more vertical complexity may be retained. Most standing dead trees should be retained for wildlife value unless they pose a hazard to operations.

Within the larger dry mixed confer stand there is an area on the western side that contains a significant proportion of ponderosa pine trees that exhibit characteristics of legacy trees, which indicates that many of these trees are over 200 years old. Within this area primary emphasis will be placed on preserving individual older trees by removing ladder fuels and increasing canopy spacing. With so few areas like this left in the County, it is important to help these trees be as resilient to fire as possible. See Figure 4.

There is also a distinct area of uniform, secondary growth, homogenous ponderosa pine, likely regenerated in the wake of past cutting and/or fire. This area will fall under the same prescription as the rest of the dry mixed conifer stand but is identified on the map because it will require a different marking strategy to break up the homogeneity.

At the northwest edge of the treatment area is an area of open grown mature and legacy ponderosa that have some regen becoming established below them. If funding remains at the end of the project this area may be target for hand cutting only to remove the ladder fuels within this area.

Basal area across the dry mixed conifer stand (which excludes data plots in the dense fir and mesic areas) will decrease from approximately 142.3 ft2/ac to approximately 98.5 ft2/ac for this treatment. See Figure 5. TPA will decrease from approximately 683.79 to approximately 356.28, with a 49.9% reduction in trees per acre for DBH classes 0-8 and 26.2% reduction in trees per acre for DBH classes 8-16.

- Remove 75% LP 0-8” DBH
- Remove 75% DF 0-8" DBH
- Remove 75% AF 0-3" DBH
- Remove 50% PP 0-8” DBH
- Remove 50% LP 8-16” DBH
- Remove 25% PP and DF 8-16” DBH

- Remove 5-10% AF 3-16” DBH (removal of subalpine fir is not a primary goal, but there is the option of removal in some limited situation, for example growing beneath a legacy tree)

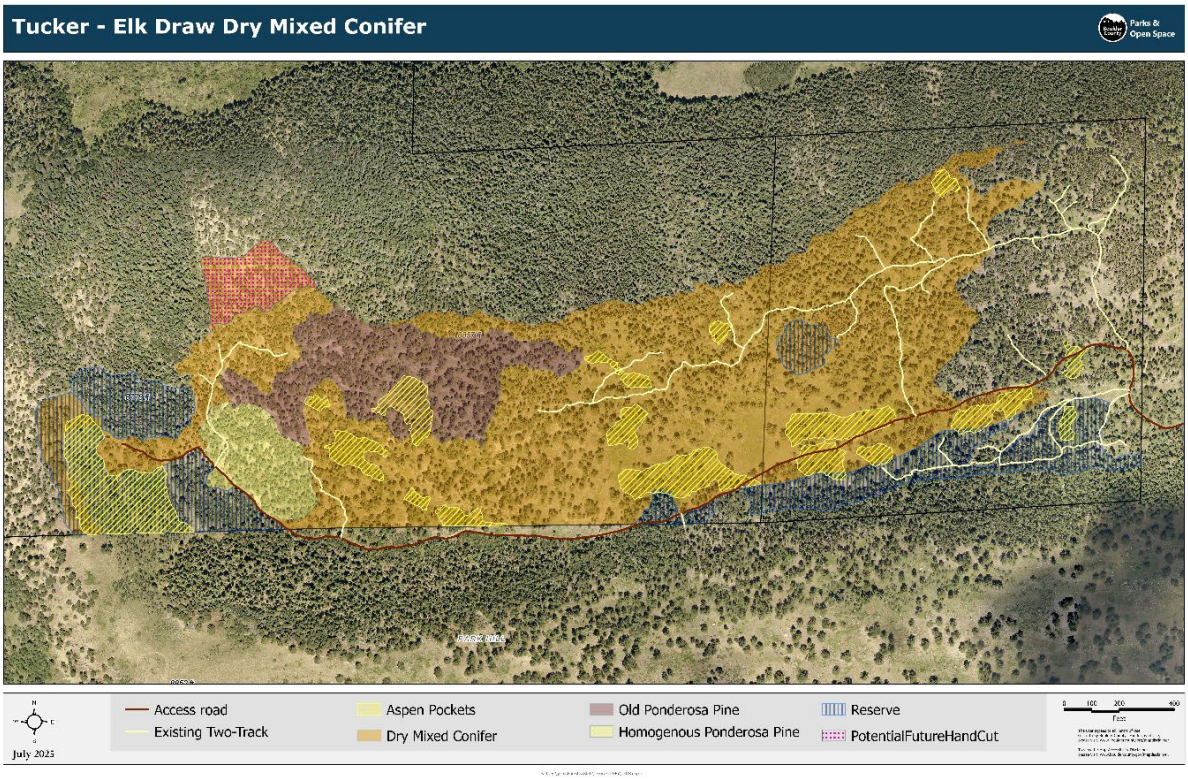


Figure 4: Tucker – Elk Draw map showing the dry mixed conifer stand with overlapping polygons for other features.

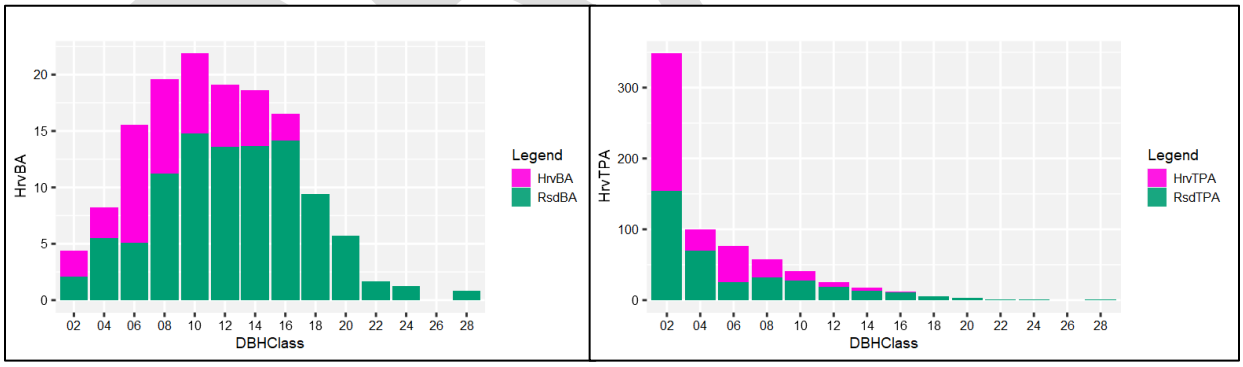


Figure 5: Graph on the left shows the removed basal area in red and the residual basal area in green broken out by DBH class. The graph on the right shows removed trees per acre in red and residual trees per acre in green, broken out by DBH class.

Lodgepole Patch Cut Prescription:

A small series of patch cuts totaling approximately 3 acres will be implemented in the eastern portion of Elk Draw where previous lodgepole thinning has resulted in residual wind throw. See Figure 6. Some of the downed woody debris may be removed from this defined area after consultation with wildlife staff to determine an appropriate balance between wildlife needs and surface fuels reduction. It is estimated that approximately two thirds of the existing blowdown will be removed along the eastern portion of the dry lodge pole area. Coarse woody debris is important for wildlife so efforts will be made to retain sufficient material in defined areas that will be located to pose a minimal risk of contributing to fire severity. This patch cut will introduce a new age class, reduce dead and down fuel, and create a break in the canopy. Patch cuts will be maintained in subsequent years by thinning new regeneration.

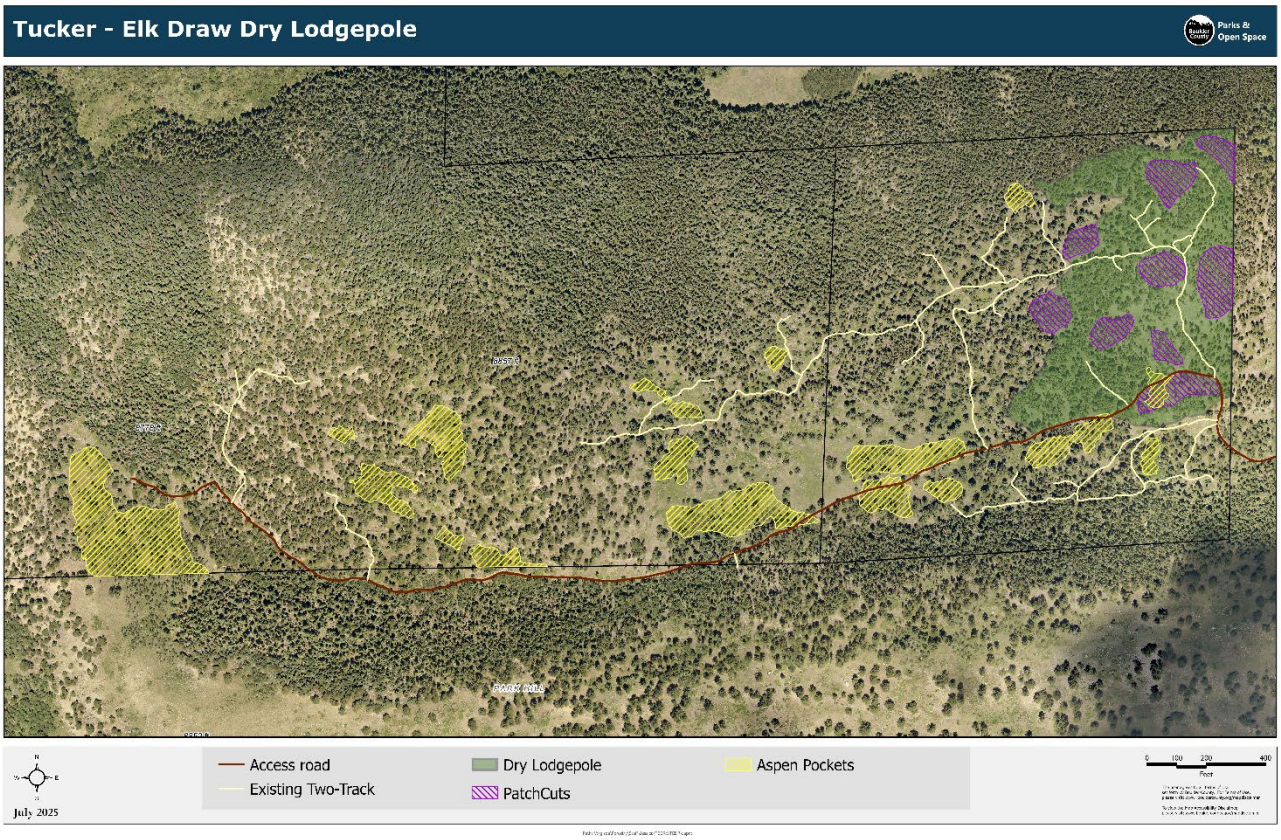


Figure 6: Tucker – Elk Draw map showing the dry lodgepole pine stand with overlapping patch cut and aspen polygons.

Mesic Stand Prescription:

Dense Douglas-fir and subalpine fir dominated stands exist in some defined areas of the project area, such as north aspects and low sheltered areas that hold more moisture. These mesic areas will be retained with the exception of a few openings that will be created to provide a break in canopy for fire mitigation purposes and aspen stand enhancement. See Figure 7. These openings, totaling approximately 1.62 acres, will be located along existing old roadbeds in areas

that are already fairly open. No equipment will be permitted in this area, and all work will be hand cut and pile.

North Aspect Fir Stand Prescription:

Dense Douglas-fir and subalpine fir dominated stands exist in some defined areas of the project area, such as north aspects. The small north slope located south of the mesic area and adjacent to the Arapaho Ranch boundary contains a mixed overstory with dense regeneration of mostly Douglas-fir and subalpine fir. This dense regeneration likely resulted from prior overstory removal. While this area has value as wildlife cover, it is also a very dense band of regeneration leading to the east. Removal of some small diameter trees within a few defined areas of this stand will break up fuel continuity and remove ladder fuels. The cumulative are of these hand cut and pile areas is approximately 1.16 acres.

Basal area within the treated portions of this dense fir stand will decrease from approximately 173.3 ft^2/ac to approximately 134.9 ft^2/ac. TPA will decrease from approximately 2642.7 to approximately 851.9, See Figure 8.

- Remove 75% AF, DF, and LP 0-5” DBH
- Remove 25% AF, DF, and LP 5-8" DBH

While not currently a top priority, if excess funding remains additional acreage long the north aspect of Park Hill is identified as a potential area for hand cut and pile to expand fuel reduction efforts closer to town. Work would be with manual saw crews hand cutting on gentle to moderate slopes. The specific hand cut areas would focus on releasing suppressed aspen and enhancing limber pine and legacy trees. See Figure 7.

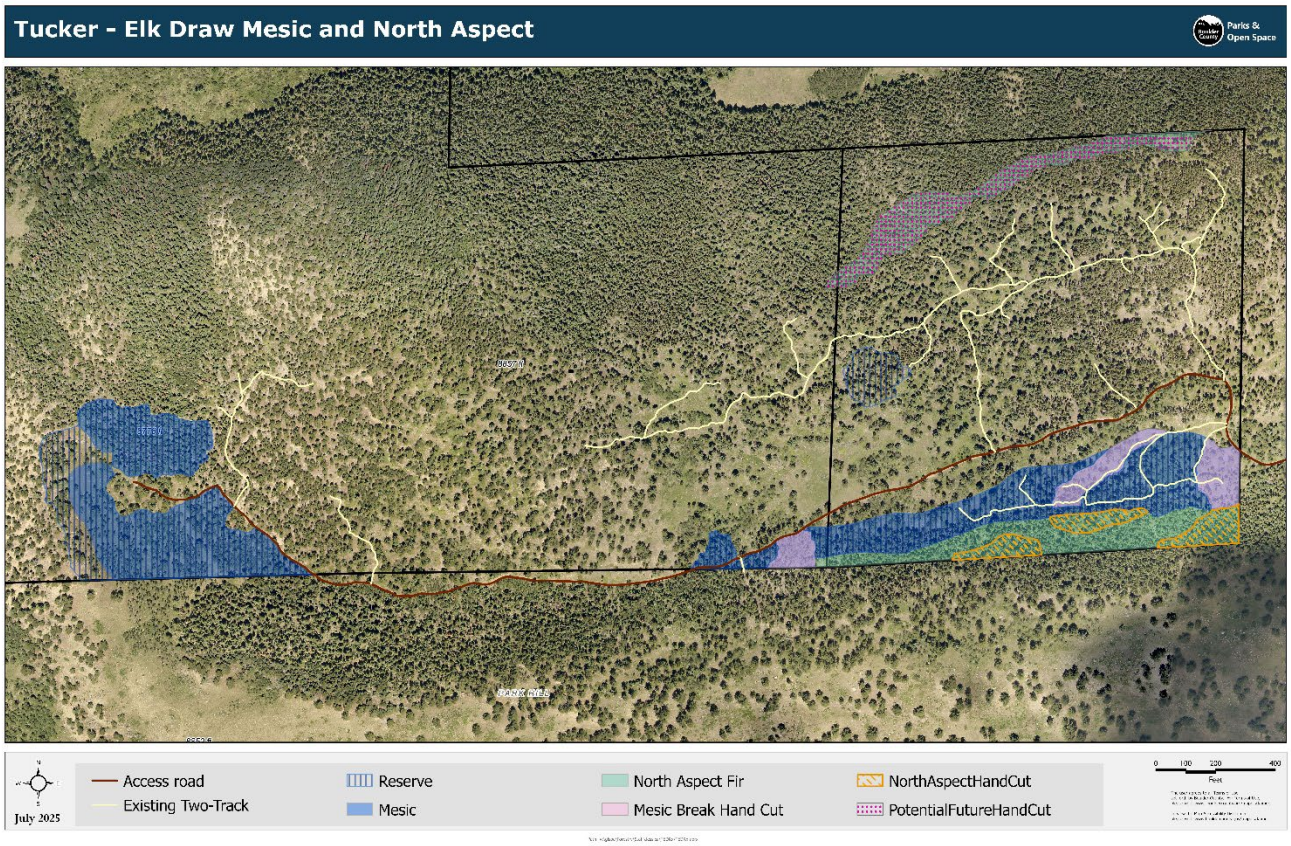


Figure 7: Tucker – Elk Draw map showing mesic areas and hand cut and pile areas on north slopes with overlapping polygons for other features.

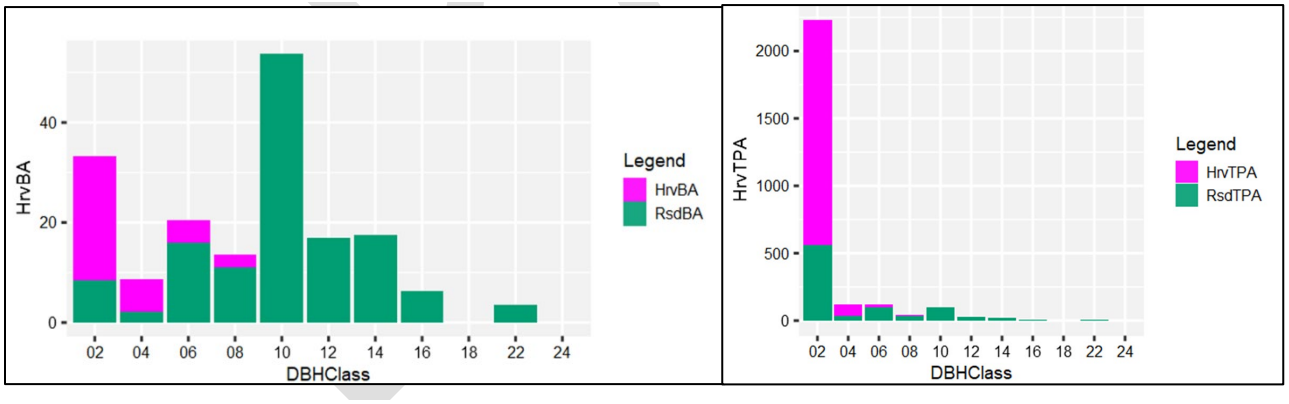


Figure 8: Graph on the left shows the removed basal area in pink and the residual basal area in green broken out by DBH class. The graph on the right shows removed trees per acre in pink and residual trees per acre in green, broken out by DBH class.

Aspen Enhancement Prescription:

Numerous aspen stands exist across the property but are seeing minimal regeneration or expansion due to browsing pressure and competition. Most conifers <16” DBH (except limber

pine and legacy trees) will be removed from within aspen stands and from within 50ft of the aspen stand edge, except in areas were aspen stands abut exclusion areas. In addition, up to 10% of aspen DBH <10" will be removed to induce suckering. Existing aspen stems may be removed both to enhance suckering and facilitate operations.

Limber Pine Enhancement Prescription:

Limber pine is a Boulder County species of concern due to its ecological value and the multiple threats impacting the species. Limber pine is also less vigorous than many other tree species and can easily be overtopped and outcompeted by neighboring trees. TED has a significant proportion of limber pine and care should be taken to promote the tree's success. Ladder fuels should be removed from beneath established limber pines, and trees overtopping or crowding limber pine should be removed when reasonable. No legacy trees will be removed for this purpose.

Treatment Narrative

A combination of mechanical and handcut /pile operations will be used on this project. Manual chainsaw work will occur in areas that are sensitive, difficult to access for equipment, or do not have larger tree removal. The manual hand cutting will occur in late summer (August) to avoid critical wildlife timing. Approval will be obtained from wildlife staff before operations begin. Due to the hand cutting occurring after the mechanical operations, the operator will also clean up any remaining slash generated from the winter operations.

Due to the use of mechanical equipment for this project, special care will be taken to minimize surface disturbance. Mechanical treatment will only occur when the ground is frozen, dry, or when adequate snowpack is present. Exceptions to this will only be made in consultation with Boulder County Forestry Staff. The mechanical work is expected to be completed in the winter of 2025/26, but if there is a warm winter or snowpack is insufficient the operations will be halted and resumed the following winter when conditions are preferable. Forwarding of material will only be permitted on the existing road, remnant two tracks, and new skid trails preapproved by Forestry Staff. See Figure 9 for the existing roads on Park Hill.

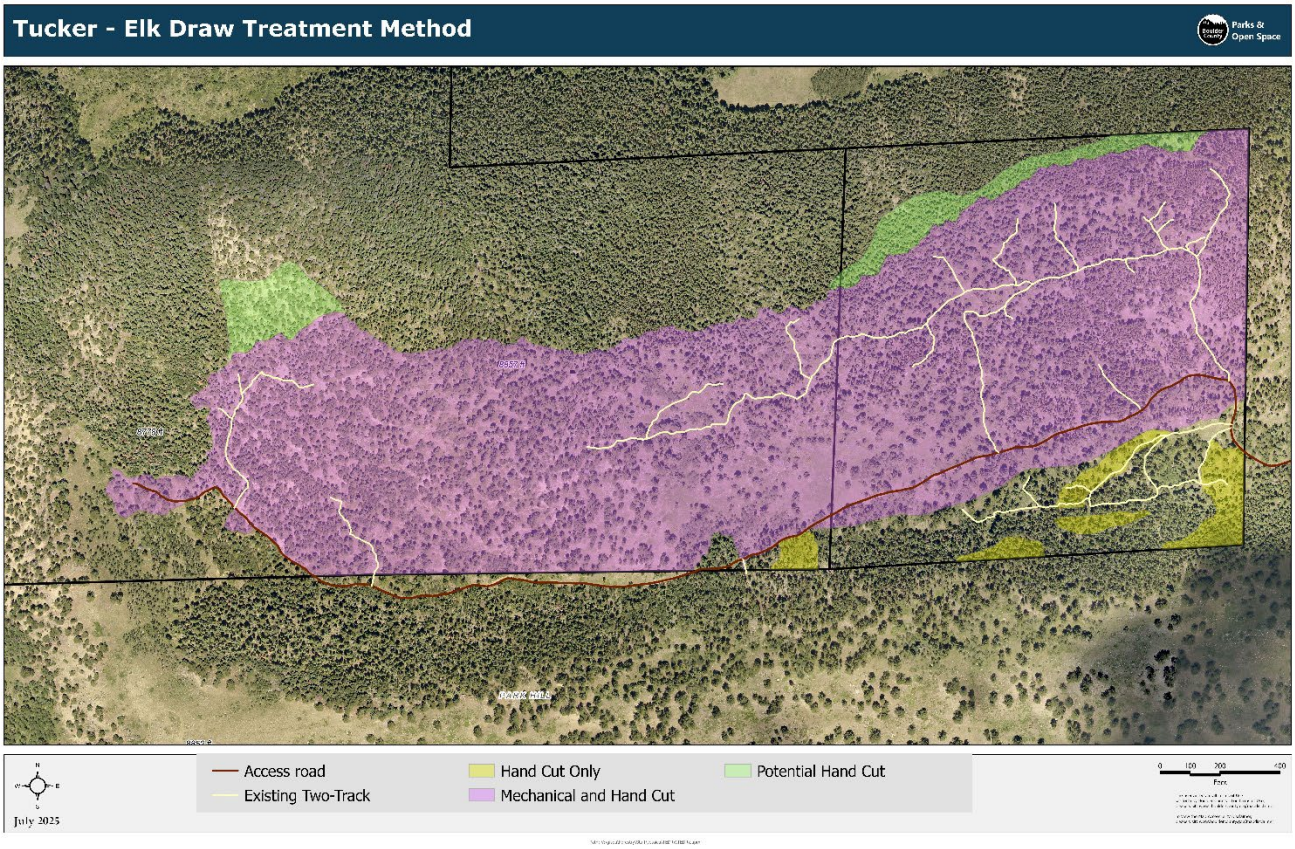


Figure 9: Tucker – Elk Draw map showing the access road and existing old roadbeds as well as types of operations

Road improvement on the main access road will be limited to work improving road sustainability and decreasing erosion. Upon project closeout, the road will be accessible by a Type 3 engine in the event of prescribed or wildland fire operations. Some light work such as pruning of branches and removal of small trees along the road edge may occur this fall.

The target basal area for the project is an average over the whole project area, however exact basal area will vary from location to location with some areas having higher BA than others. This spatial arrangement of density should consider the effects of wind and the potential for blow down. The wind patterns in this area are predominantly westerly. Minimal blowdown is acceptable and expected, but widespread blowdown should be avoided when possible.

Thinning of small diameter understory trees can occur in most areas without impact to the wind firmness of overstory trees, but greater care should be taken for moderate diameter and overstory trees. Fewer overstory trees should be removed in areas that receive greater wind loading, such as the western aspect of the projects area's high point. Conversely, more trees may be removed in wind sheltered areas such as the east aspect of the high point and local low points. WindNinja, a wind modeling program, was used to assess areas with heavier wind load by running the program using weather data from some past high wind advisory days (See

Appendix 2). These higher wind load areas are identified on the project map. See Appendix 1. Within these areas more trees will be retained especially in the overstory.

Any significant trees such as legacy trees as defined in Identification and Ecology of Old Ponderosa Pine Trees in the Colorado Front Range (Huckaby et al., 2003) and any potentially culturally modified trees will be retained and flagged to prevent their accidental removal.

If unforeseen circumstances necessitate a significant deviation from the plans described in this Scope of Work, permission will first be obtained from the BCPOS Forestry Interdisciplinary Team.

Resource Impacts & Mitigation Measures

Wildlife Concerns

Wildlife surveys were conducted from September 2024 - July 2025, including multiple site visits with forestry staff to discuss wildlife concerns and provide input for treatment planning on TED.

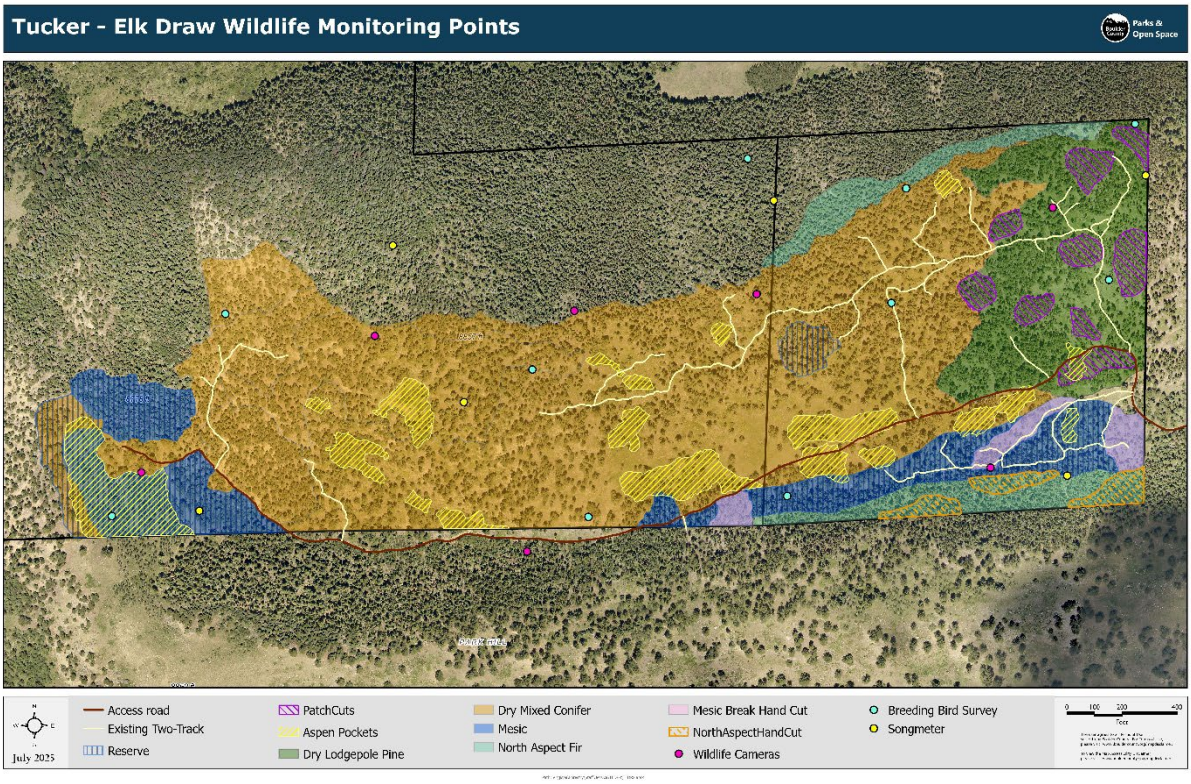


Figure 10: Tucker – Elk Draw map showing wildlife monitoring and data collection locations.

Formal wildlife surveys were conducted at 24 point locations across all forest types and aspects, to capture the broadest dataset possible. See Figure 10. Informal field surveys and wildlife

sightings from staff and external sources captured additional information used to provide recommendations.

Camera Data breakdown and recommendations:
Remote cameras were deployed in March 2025 to assess migratory timing of elk, species richness across TED, and overall temporal activity of wildlife. One camera was deployed on adjacent USFS to capture animal movement on a well-used access road to and from the Elk Draw and east Tucker properties. A complete review of data is pending; however a 4-month subset of data was summarized for this draft.

Eleven mammal species were documented on cameras across the property with species richness varying by location: Elk, Mule deer, Moose, Red fox, Coyote, Black bear, Mountain lion, Bobcat, Pine squirrel, cottontail and Snowshoe hare. Additional species not identified or not included in this data subset include American marten, Least chipmunk, Golden mantle ground squirrel, and species rarer in Boulder County such as porcupine.

Highest diversity of species was detected in mesic forest type along the southern boundary of the TED project area and the Aspen stand on the far west end of the unit. Wildlife staff recommendations include retention of thermal and hiding cover, and structural diversity spanning this west-east corridor, considering its use by large mammal species such as moose, elk, and mule deer, but also black bear, coyote and red fox. The western aspen pocket is not thriving and shows evidence of decline and heavy browsing by elk. Wildlife staff recommends enhancing this particular stand, and more broadly consider increasing generation of similar habitat to support higher biodiversity where feasible. Small, often suppressed aspen pockets exist across the parcel but few have reached maturity. Cameras deployed across the northern boundary of the project documented fewer species, but recorded repeated use by large species including moose, elk, and mule deer and associated predators like mountain lion. Thermal and hiding cover on the northern aspects outside the treatment unit provide an additional sheltered movement corridor with significant game trails present. Presence of elk peaked during spring, and camera data shows some individuals remain on the property. Cameras may remain deployed into fall to record fall migration activity, as it is preferred the timing for forestry operations occur outside of elk migration and calving seasons.

Avian Data Breakdown and recommendations:
Formal in-person avian surveys occurred on June 11 and June 24 and detected 27 species; however additional species were observed during field visits and from survey data from external sources. Avian Songmeters (bird song recording devices) were deployed in June at six locations across the property to supplement in-person songbird surveys. Songmeters recorded an additional 5 species not detected during in-person surveys, however only initial datasets have been processed at this time and more species will likely be added from the thousands of recordings.

Boulder County Species of Special Concern that have been documented utilizing habitats on the property in 2025 or previous years include Golden-Crowned Kinglet, Northern Flicker, Olive-Sided Flycatcher, Pine Siskin, Northern Goshawk and Virginia's Warbler. Due to the diversity of

birds and variety of habitat types on TED, Wildlife staff recommendations can be applied at the stand level. Staff strongly recommend operations occur outside of the spring and summer breeding season (May to early-August) to avoid impacts to local populations and unnecessary nest failures.

Avian data was used to recommend modification of stand treatments, reduce removal in some locations, and to completely exclude specific sites currently favorable to Species of Special Concern. Delineation of exclusion areas for Golden-Crowned Kinglet and Olive-Side Flycatcher, both experiencing decline in habitat availability, were mapped in the field and shared with forestry staff. For more common species, such as shrub-nesting and ground-nesting species, Wildlife staff recommends balancing areas of removal of low vegetation or ladder fuels on least resilient areas and stands closer to the town of Nederland. Low-growing juniper, for example, provides nesting cover, a food source for wintering birds, and is the host plant for the Juniper Hairstreak butterfly, and retention of this habitat type in areas of lower risk are preferred.

Wildlife monitoring and data collection of the TED project area is continuing, and additional information updates will be added to this section when data processing is complete.

Sensitive Plant Communities and Species of Special Concern

There is one Significant Natural Community (SNC) within the TED project area: Quaking Aspen – Ponderosa Pine Rocky Mountain Forest. There is also a uniquely high graminoid cover of Geyer's sedge (*Carex geyeri*) in the understory, especially toward the eastern end of the TED project extent, representing a vegetation community type seldom seen among BCPOS properties. The SNC and the Geyer's sedge area are significant simply due to their rarity in the Colorado Front Range and presence within a narrow elevational range.

Only one species of special concern was identified in the project area in 2025: the Calypso orchid, or Eastern Fairy-Slipper (*Calypso bulbosa var. americana*) (Figure 11). This uncommon orchid is a perennial herb often with a single basal leaf and a slender flowering stem, usually no higher than 15 cm. The orchid bears one pink to purple flower and blooms in spring to early summer. The orchids were found in areas consistent with known habitat requirements: in cool, moist, shady coniferous or mixed forest stands, often among thick duff and moss layers with minimal ground disturbance. The orchid is often associated with mature or old-growth forests. Because it relies on a specific

Figure 11. The Calypso orchid, or Eastern Fairy-Slipper (Calypso bulbosa var. americana) growing in the TED project area near a drainage.

mycorrhizal fungus for germination and survival, it is very sensitive to habitat alternation and disturbance.

Ten distinct vegetation communities were mapped to the association level using US National Vegetation Classification (USNVC) system within the TED project area, including Lodgepole Pine / Geyer's Sedge Forest (42 acres), Douglas-fir / Common Juniper Forest (22 acres), Quaking Aspen - Ponderosa Pine Rocky Mountain Forest (17 acres), Subalpine Fir - Engelmann Spruce / Grouse Whortleberry Forest (7 acres; SNC with a rank of G3S1), Ponderosa Pine / Kinnikinnick Woodland (5 acres), Quaking Aspen/ Timothy Semi-natural Forest (3 acres), Ponderosa Pine / Geyer's Sedge Woodland (2 acres), Ponderosa Pine - Douglas-fir / Geyer's Sedge Forest (2 acres), Ponderosa Pine / Common Juniper Woodland (2 acres), and Populus tremuloides - Pinus contorta / Juniperus communis Forest (1 acre). See Figure 12 for a map of these vegetation communities.

Figure 12: Vegetation Communities within the TED project boundary.

The footprint of the single CNHP-designated SNC in the TED boundary (Quaking Aspen – Ponderosa Pine Rocky Mountain Forest), is illustrated in the map below in red, comprising 17 acres (16%) of the project area (Figure 13). It is ranked by CNHP as G3S1 (Globally vulnerable, State critically imperiled). Occurring only within a narrow band of elevation in the Colorado Front Range, this successional, mixed aspen-conifer forest has a moderately open to closed canopy with occasional presence of other conifers such as lodgepole pine, limber pine, and Douglas-fir. The open growth form of aspen allows more light to penetrate the canopy compared to pure conifer stands, promoting a richer understory, particularly in younger or more mesic sites. The short-shrub understory is comprised mostly of common juniper, but wax currant and mountain ninebark are other common shrubs. Geyer's sedge comprises a notable

cover in the herbaceous cover, as well as a wide variety of forb species. This forest type is ecologically significant for its structural diversity and transitional nature, and for the uncommon assemblage of dry-tolerant Ponderosa pine and other upland species with mesic plants such as aspen. Care should be taken to retain understory shrubs in these areas. No other specific management actions are recommended at this time.

In addition to the one CNHP-designated significant natural community, there are several areas within the project, comprising multiple USNVC community types that exhibit a high Geyer's sedge understory, despite a sometimes dense conifer canopy (see Figure 13). These vegetation communities within the TED project boundary represent most of the known forested land managed by BCPOS that have a high sedge understory, making this area unique among BCPOS

Figure 13: Highlighted in red, the significant natural community Quaking Aspen – Ponderosa Pine Rocky Mountain Forest is ranked as a G3S1 community by the Colorado Natural Heritage Program.

properties. Thinning conifer stands with a high Geyer's sedge understory does not necessarily confer a benefit to the sedge. In a 1992 study on whether competition from overstory Ponderosa pine trees limited growth of understory vegetation, particularly Geyer's sedge in northeastern Oregon forests, Riegel, Miller, and Krueger (1992) found canopy thinning alone did not significantly increase biomass production of Geyer's sedge. Canopy thinning did significantly increase light (photosynthetically active radiation (PAR)) and midday air temperature, while it reduced midday relative humidity. The study found that root trenching around sedge populations – severing Ponderosa pine roots entirely – had a strong positive effect, indicating that belowground competition for water and nutrients is the primary factor limiting Geyer's sedge growth in that forest system, unlike increased light availability.

In June 2025, BCPOS Plant Ecology staff evaluated several conifer stands (mix of mostly lodgepole, Doug-fir, and Ponderosa) on the eastern end of the project area that contained a

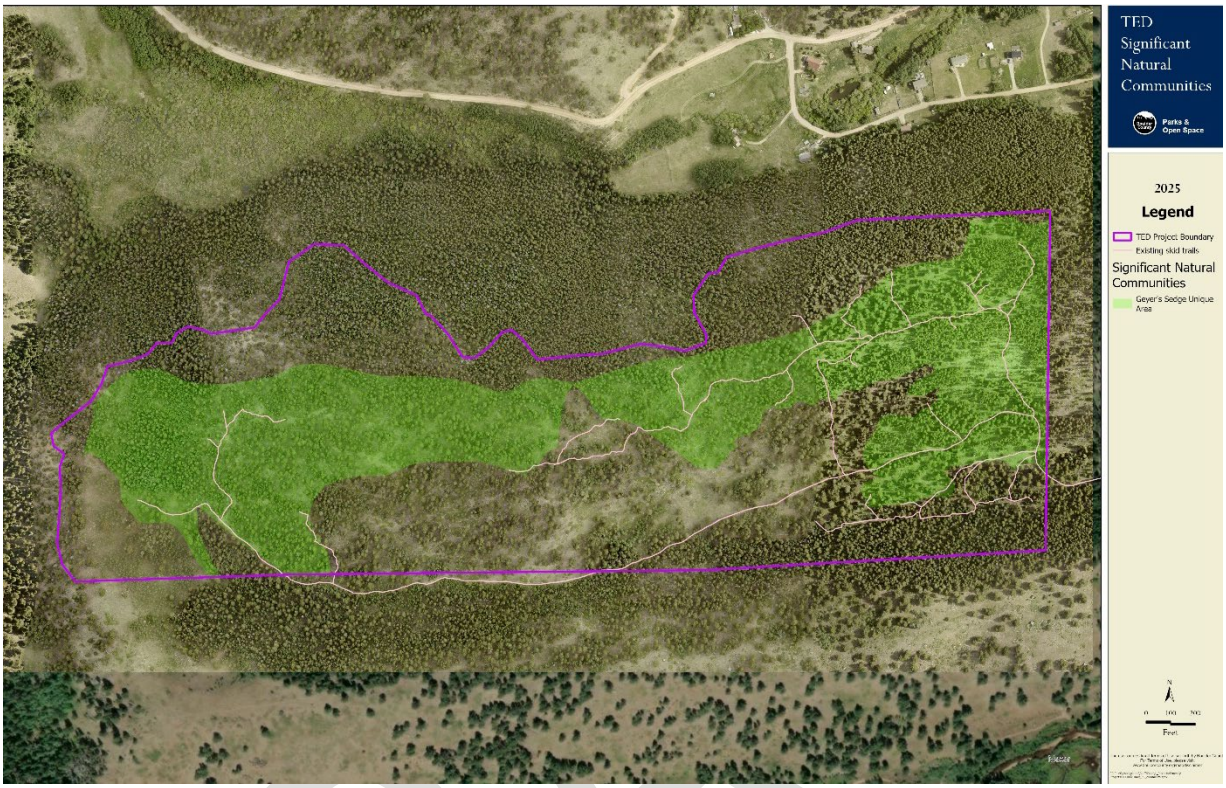


Figure 14. Highlighted in green, conifer stands with a high Geyer's sedge understory represent a unique assemblage of USNVC community types among BCPOS properties, totaling roughly 46 acres (44%) of the TED project area.

high Geyer's sedge understory (30-50 percent cover in the herbaceous stratum) and found that in areas with the highest sedge cover, conifer canopy cover ranged from about 25 to 55 percent. While the sample size was small and this brief evaluation does not meet the standard of high-quality research, it may provide a general concept of acceptable canopy cover range for ideal Geyer's sedge habitat within the project boundary.

Geyer's sedge often increases in cover after lighter disturbances such as trampling but is highly susceptible to more intense disturbances such as during logging operations where its rhizomes can become damaged. For this reason, it will be important that logging equipment is restricted to existing skid trails, and that operations are completed during times of high snowpack or during frozen conditions. Geyer's sedge often increases after fire, but its success is largely dependent on fire severity, with cover decreasing after stand-replacing wildfires (and clearcuts), and increasing in cover after low severity burning. The intensity of fire during slash pile burning would likely be detrimental to the sedge in the immediate vicinity, and piles should be kept off or minimized when possible, in these heavier sedge understory areas. Plant Ecology staff will work with Forestry staff to identify the best locations of patch cuts to avoid areas with the highest density of sedge cover.

Invasive Weeds Issues

Invasive Plants has conducted a review of this project site for presence of invasive plants and noxious weeds in 2024. Consistent with high altitude sites, presence of noxious weed species is limited on the Tucker, Elk Draw Open Spaces. General species encountered:

State of Colorado List A Eradication Species – None. The area will be monitored for the potential presence of Orange Hawkweed (*Hieracium aurantiacum)* which is found in the general surrounding areas of Nederland.

Other Boulder County designated eradication weeds for this site would include Musk Thistle (*Carduus nutans)*, Common Teasel (*Dipsacus fullonum)* and Oxeye Daisy (*Leucanthemum vulgare*). State and County List B Suppression species found on site were Canada Thistle (*Cirsium arvense*), Common Mullein (*Verbascum thapsus*) Downy Brome (*Bromus tectorum)* and Diffuse knapweed (*Centaurea diffusa*). These noxious and invasive weeds will be monitored post forest mitigation by the Invasive Plant group's Restoration and Eradication Specialists.

Contractors conducting land management activities on Boulder County lands must follow Best Management Practices (BMPs) to prevent the introduction and spread of noxious weeds. All equipment, vehicles, and tools must be cleaned of soil, seeds, and plant materials before entering and after leaving the site. Contractors should avoid disturbing weed-infested areas during peak seed production and must promptly report new infestations to the project manager lead. When soil disturbance is necessary, prioritize early revegetation may be required. Any revegetation efforts should be done with weed-free seed mixes, approved by Plant Ecology or the Invasive Plants group. If the contractor will be applying herbicide, they must comply with all label directions and applicable State or Boulder County regulations, and only target species identified by the agency. Adherence to these BMPs helps protect native ecosystems, reduce long-term control costs, and ensure compliance with Boulder County land stewardship goals.

Despite these types of precautions new populations of weeds are usually created. In general, this is due to soil disturbance and changes of light penetration through the canopy reaching the forest floor after treatment and having noxious or invasive weed seed already in the soil seed bank. Depending on length of time to complete these projects, periodic inspection for new noxious weed populations and an aggressive noxious weed treatment plan post forest management can help prevent new extensive populations of noxious weeds especially in high disturbance areas.

General integrated weed management techniques shall be utilized in the management of existing and

future noxious weed populations. This can consist of the use of mechanical, chemical or biological controls or some combination thereof. If herbicide options will be utilized, care should be taken to not impact plants that are rare or species of concern across the site.

Cultural Resources

A Class III cultural resource inventory was completed by a qualified archaeologist in June 2025 and a report will be prepared prior to the start of any ground-disturbing activities within the area. The survey will identify any historic or archaeological resources that may be present within the treatment unit. Results from the survey will guide avoidance, mitigation, or documentation measures as necessary in consultation with the Boulder County Cultural Resource Program Coordinator.

The Tucker-Elk Draw properties lie within a culturally significant region historically used by Indigenous peoples. Although no previously recorded cultural resources are known within this area, there is evidence of long-term occupation and seasonal use of the surrounding montane environments. Because cultural landscapes and traditional use areas may not always leave visible or formally recorded traces, all project activities will adhere to Boulder County's **Unanticipated Discovery of Cultural Resources Protocol**:

Unanticipated Discovery of Cultural Resources

If any materials or features potentially associated with historic or Indigenous cultural use are encountered during excavation or construction activities—including artifacts, foundations, structural remnants, or bone—all work in the immediate vicinity must be halted.

The Contractor must notify the Boulder County Parks and Open Space Cultural Resource Program Coordinator immediately.

The following response tiers apply:

- Non-significant or Isolated Finds
  If the materials are determined by the Cultural Resource Coordinator to be non-significant (e.g., scattered modern refuse, isolated artifacts, or features lacking integrity), the Contractor may resume work without further delay. In most cases, the feature may be left in situ with minor adjustments to avoid further disturbance.
- Potentially Significant Finds
  If the discovery appears to have potential historical or archaeological significance, a cultural resource professional will assess the site. Work will remain paused in the affected area until the evaluation is complete and Boulder County provides authorization to proceed. Mitigation measures (e.g., documentation, avoidance, or data recovery) may be required.
- Human Remains
  If human remains are discovered, all work must cease immediately in accordance with Colorado Revised Statutes § 24-80-1301–1305. Local law enforcement and the State Archaeologist will be notified, and no work may resume until authorized by the appropriate authorities.

This protocol applies to all ground-disturbing activities, including excavation, mechanical thinning, forwarding, and grading.

All contractors and subcontractors will receive a project briefing that includes cultural resource protection policies and the importance of maintaining sensitivity to cultural landscapes during project implementation.

Mechanical Harvesting - Specifications & Considerations

Felling, delimbing, and bucking will be accomplished at the stump, either with fully mechanical equipment or a chainsaw. All material generated will be pre-bunched trailside and yarded to the designated landing/loading area by a mechanical forwarder along pre-designated forwarding routes.

Operational Specifications

- Due to proximity to the Town of Nederland, active forestry operations will only occur Monday through Friday. Active operations are prohibited on Saturday and Sunday as well as federal holidays. As a safety measure the property will be closed to the public Monday through Friday during operations.
- This is a fully marked project utilizing both individual 'take' tree mark (ITM) and boundary marking. All take trees will be marked at approximately breast height with Blue paint. Patchcut = vertical blue stripe facing into unit, project boundary = Blue/White candy stripe flagging.
- All operations will cease if Colorado Parks and Wildlife staff or Boulder County wildlife staff inform the Project Manager of significant elk movement occurring in the project area. Operations will also cease if the Operator or Project Manager observe significant elk movement through the current operational area. Operations may resume when Colorado Parks and Wildlife staff or Boulder County wildlife staff give their approval.
- Stump height will not exceed 6" on the uphill side. If this is not attainable with fully mechanized harvesting, a chainsaw may be used to lower the stump to specs. The stump height standard will be enforced. Stumps should be cut flush for aesthetics.
- All designated stems to be harvested will be felled, de-limbed, and processed at the stump. Stems will preferably be processed to tree length, but no less than a minimum of 8' log length and to a minimum top diameter of 5". Material less than 8' in length, and not meeting the minimum top diameter of 3", may be delimbed and piled according to the specific unit's slash guidelines
- Slash treatment, other than grinding, will primarily consist of hand piles. Due to multiple factors, the average pile size needs to be kept in the range of 8-10' diameter, 6-8' in height, compact as possible, and free of oversize material and contaminants. In order to avoid scorching of the residual overstory, piles should not be constructed under the crown/canopy.

- Forwarder traffic will only operate when adequate snowpack (>1 foot depth) is present and the soil is frozen to decrease disturbance and soil compaction. At no time will operations be allowed if soil conditions are above the plastic limit.
- All equipment and haul traffic will be restricted to operating on pre-designated landings and established haul roads.

Operational Considerations

- All equipment must be maintained and in good working order. Continuous and/or excessive oil, hydraulic, coolant fluid, or fuel leakage will not be tolerated and will be cause to have the machinery removed immediately from the site. The contractor will be held liable for any site contamination, including removal of any contaminated soil by the contractor.
- All bulk fuel storage/transfer tanks shall either be contained in a vehicle or, if stationary on-site, placed within a lined catchment basin or tank.
- All equipment used on site shall be cleaned prior to arrival to ensure that noxious/invasive weed seed is not present. Machinery will be subject to the Project Manager's inspection before unloading at the site.
- All machinery, other than mechanical harvesters~~,~~ will be restricted to operation on the pre-designated landings, established skid/forwarding trails, and haul roads.
- Any equipment maintenance and repair on site shall be done in a responsible manner with proper prevention/mitigation measures taken to alleviate any site contamination. Welding, outside of County burn bans, may only take place over bare mineral soil with a fire extinguisher and shovel within easy reach.
- Equipment operations will only be conducted when surface conditions are frozen, and at least 1' snowpack is present. All reasonable measures will be taken to avoid rutting and excessive soil compaction. Significant and unnecessary site damage, as deemed by the Project Manager, will be the responsibility of the contractor to rehabilitate at the direction of the Project Manager or their designee.
- Excessive site damage and rub trees will not be tolerated.
- Standard forestry "Best Management Practices" (BMPs') as outlined by the CSFS, are to be adhered to for all harvesting/treatment activities. Contractor is responsible for a thorough working knowledge of the current updated 2023 BMP Standards for the State of Colorado. All exclusion areas for wildlife, riparian areas, etc. will be clearly marked by the Project Manager.
- All equipment operators shall have the skills to operate the machinery in a responsible, safe, and efficient manner while being conscientious of natural resource and public values.
- The contractor will maintain a clean operation. All trash, refuse, and waste will be disposed of properly and hauled off site, daily, by the contractor. The contractor must provide on-site portable toilet facilities for their staff.
- Overnight camping by Contractor and/or designees is not permitted.

- Contractor must abide by, and is responsible for being familiar with, all applicable BCPOS rules and regulations found here: Parks & Open Space Rules and Regulations - Resolution No. 2023-024

Transportation of Harvested Forest Products

In order to facilitate efficient and cost-effective transportation of the harvested material, the contractor will be required to transport all harvested material designated for removal as outlined below. Final destination for material removed from the project is the BCPOS Forestry Storage Yard located at 7698 Saint Vrain Road, Longmont CO 80503

- Material will be loaded from the landing/decking area, transported, and unloaded to the final destination located at 7698 Saint Vrain Road, Longmont CO 80503 No hauling will take place on Saturdays, Sundays, or Federal holidays.
- The haul distance, one way, from the center of the primary landing to the final destination is approximately 40 miles. Transportation route includes segments of Municipal, County, State, and Federal paved roads. The contractor is solely responsible for any required transportation fees/permits associated with project.
- Contractor will have the sole responsibility for all resources and personnel needed to load, transport, and unload the material. No equipment or operational support will be provided by Boulder County. A loader may be staged at the final destination area if the contractor desires to do so. Self-loader trucks may be used as the primary means of product transportation, negating the need for an additional loader.
- Decking areas at the final destination will be clearly identified by the Project Manager.
- Decks at the destination area, 7698 Saint Vrain Road, Longmont CO 80503, will be constructed in a neat and orderly fashion at the pre-designated area.
- Caution signs, indicating heavy truck traffic, will be provided by the contractor and shall be placed at appropriate intersections located adjacent to the project.
- All truck drivers, whether employees or sub-contractors, will be fully licensed and experienced CDL drivers. Drivers must be experienced with driving in adverse conditions, on unimproved roads, that include steep/rough terrain. All transport equipment must be in fully operable safe condition as set forth by CDOT regulations.

Site Rehabilitation

The contractor will be responsible for mitigating and repairing adverse equipment impacts at the project site. This will include all skid/forwarder trails, landings, and access roads.

- Landing rehabilitation will be the responsibility of the contractor. This may include ripping and seeding. The landing will be inspected by the Project Manager and rehabilitation actions will be determined at that time.

- Forwarding/yarding trails will be rehabbed by the contractor to deter unauthorized trail creation after operations
- The contractor will be responsible for negative and unnecessary impacts to forwarding/yarding trails within the units. The Project Manager and/or designee will inspect the forwarding/yarding trails and rehabilitation actions will be determined at that time. Most likely this will not involve ripping but may involve seeding.
- BCPOS will provide the required seed mix.
- Contractor will be held responsible for any damage to public roads sustained during the project.

Safety and Conduct

The Contractor and its employees, as well as any sub-contractors, are expected to maintain a high degree of professionalism and safety while being present on Boulder County property. The units being treated are on public land; therefore, it is highly likely that the Contractor will encounter public citizens utilizing trails and other available resources. In areas within the management unit that have established trail corridors, Boulder County will supply safety signs to be placed along appropriate trail corridors. It is the Contractor's responsibility to maintain adequate safety zones with regard to all components of its operation. Aspects of safety and conduct include, but are not limited to:

- All personnel associated with the Contractor will wear O.S.H.A. approved P.P.E. appropriate for their current duties.
- First aid equipment/supplies will be readily available for all workers as well as reliable means of communication in the event of an emergency situation.
- Equipment operators will be responsible for maintaining an awareness of the safety zone surrounding their particular application/operation.
- One (1) 5# fire extinguisher will be in place on mobile operational equipment as well as trucks.
- One (1) hand tool (shovel, Pulaski, etc.) will be readily available for each employee currently on site for fire suppression, if needed.
- Unlawful, rude, or aggressive behavior will not be tolerated.

Monitoring of Post-Project Conditions

Implementation monitoring will be completed within 1 year of the end of the treatment. This monitoring will focus on the prescriptive elements of the SOW. Monitoring efforts will be focused on the variables: basal area; tree density; species composition; distribution of snags; and spatial heterogeneity. The sampling design can be the same as the baseline inventory or a new sampling design can be created. Information gathered during this process will be used to inform or adjust future SOW for the area.

Monitoring for project effectiveness will be completed within 1 year of the end of the project. This type of monitoring will focus on the stated objectives and desired future outcomes. The purpose of this monitoring is to determine if conditions have moved towards the stated goals. Sampling design for this monitoring will use the same protocols as the baseline inventory. Key metrics such as structure, composition and function will be modeled and compared to pre-treatment conditions.

Specific areas that require site rehabilitation will be monitored annually for 3 years. Any presence of Colorado 'List A' Invasive Vegetation will trigger immediate notification to the Invasive Vegetation Senior Resource Specialist and may require direct control such as but not limited to chemical application or removal depending on the recommendations of the Invasive Vegetation group. Presence of List B or C Species will trigger the same notification, but the corrective action may be delayed until staff is available to deal with it. Any deterioration of erosion control features that are deemed necessary will require maintenance or replacement as determined by staff.

Ongoing monitoring and maintenance will be conducted by BCPOS forestry staff. Regeneration of saplings within patch cuts is expected and dense regeneration will be maintained by thinning the saplings while young. The area will be monitored for any new unauthorized trail creation following operations. Resource Protection and Trails Staff will be notified of any authorized usage, so that enforcement or remediation can occur.

Slash piles will be burned by the Boulder County Sheriff's Office Wildland Fire crew in subsequent winters once the piles are sufficiently cured and as weather conditions allow. The project area will be monitored regularly for issues of blowdown, detrimental insects, and excessive regeneration. Reentry into the unit to address any issues will be assessed as needed. Broadcast prescribed burning would be the ideal tool for long-term project maintenance and may be considered for future use based on fire personnel willingness, community acceptance, and financial and logistical capacity.

Budget Items

Grant Award: 2024 COSWAP-LRI

Match Requirement: N/A No match required

This will be completely funded by CAST. COSWAP-LRI funds are going to Arapahoe Ranch, USFS, etc.

Tentative Milestone dates

Q3/2025: Layout/mark project

Q3/2025: Release RFP; conduct pre-bid tour; select contractor

Q4/2025-Q1/2026: Initiate and complete mechanical operation weather permitting

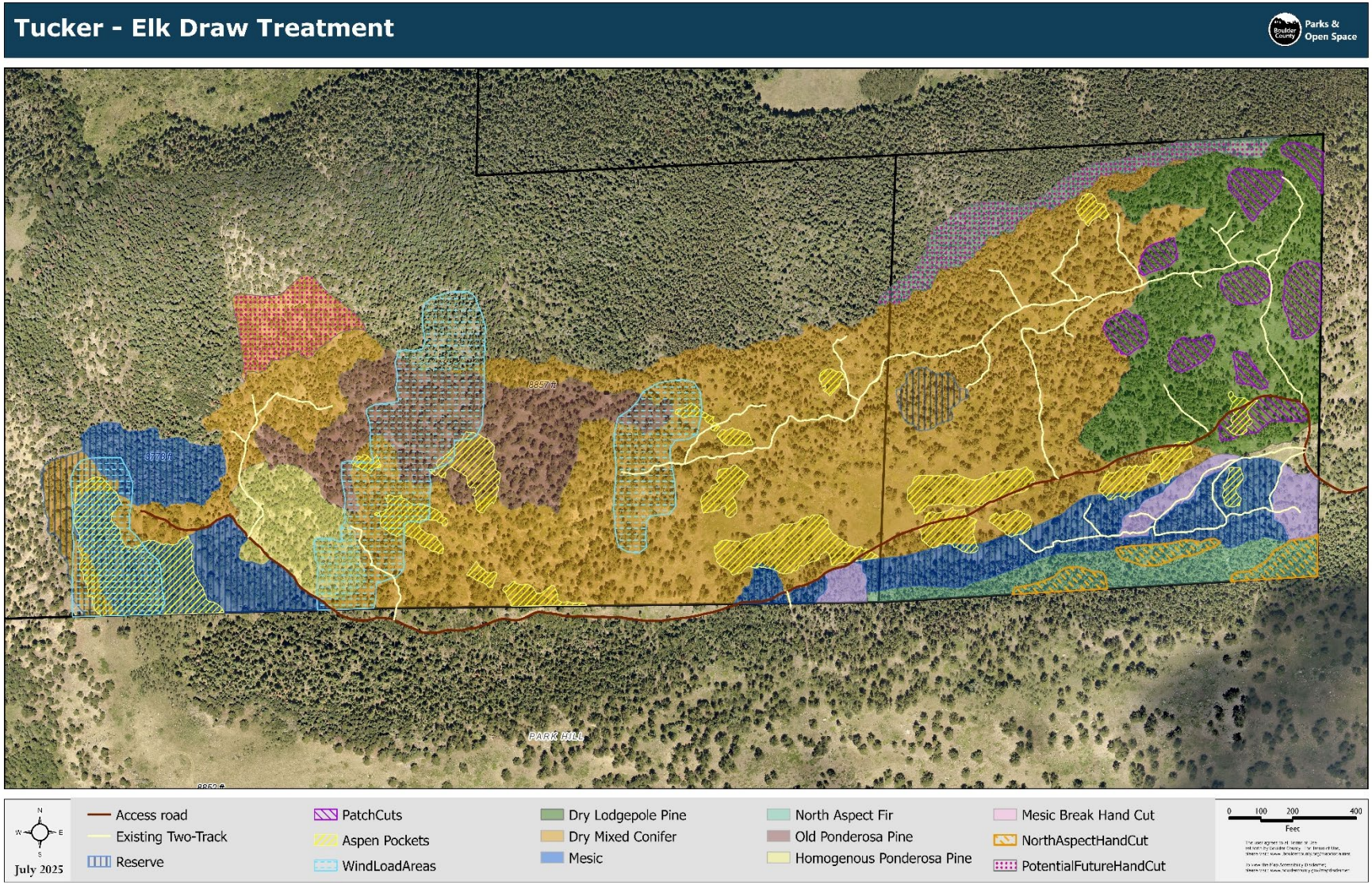
Q2/2026: No action; monitor

Q3/2026: Initiate hand cut and pile with wildlife staff approval; complete contract and close out if mechanical operation is complete

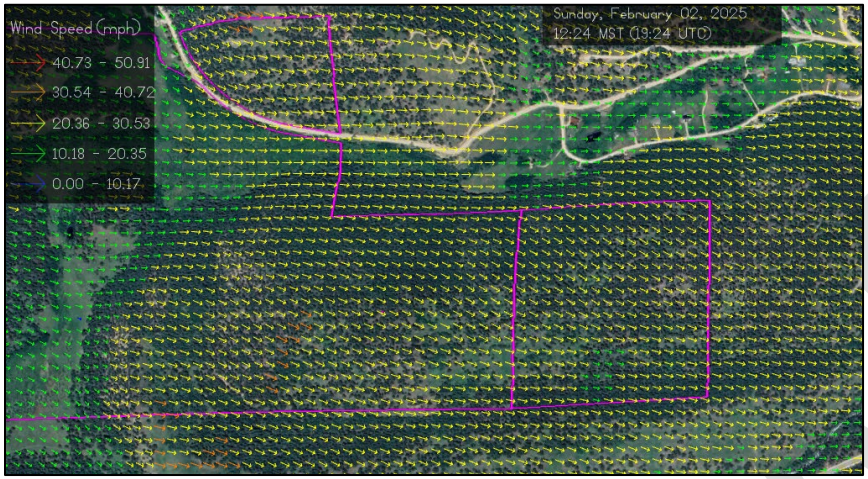
Q4/2026-Q1/2027: Resume mechanical operation if not completed previous winter; complete contract and close out

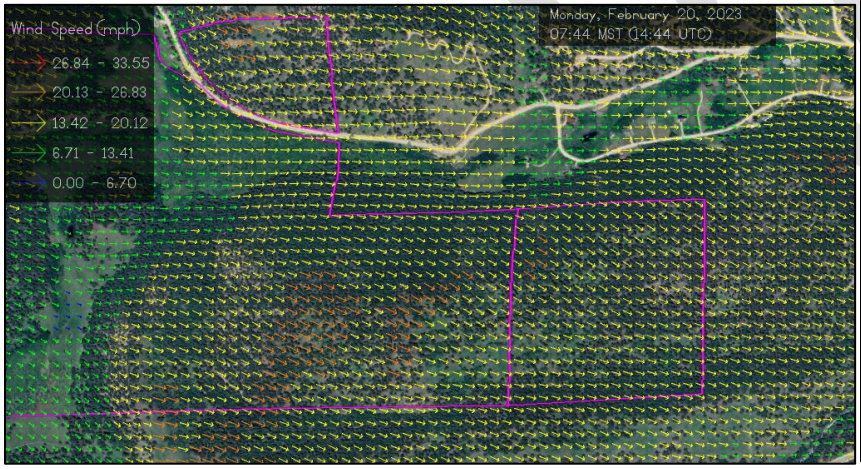
Q1/2027 and beyond: BCSO burn hand piles during suitable operational periods; invasive weed control and post-treatment monitoring.

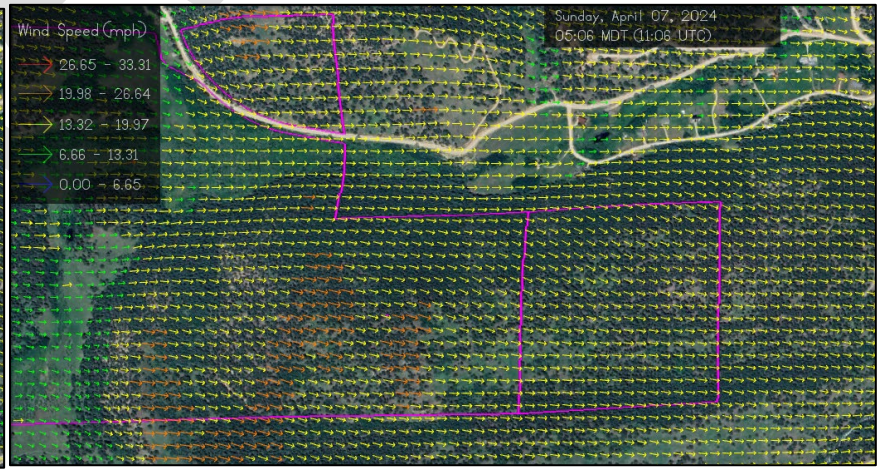
Appendix 1: Tucker – Elk Draw Treatment Map



Appendix 2: Example WindNinja Outputs







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