ELK MEADOWS SUBDIVISION FIRE WISE AND FORESTRY ASSESSMENT

2022

Committee Members Kurt Krueger, Tom Wilson, and Mark Petroni

Summary and Management Recommendations

The Forests in the Elk Meadow Subdivision are for the most part healthy and diverse. Tree species native to this area found within the subdivision include Douglas fir, lodgepole pine, subalpine fir, Engelmann spruce, limber pine, rocky mountain juniper, horizontal juniper, aspen and perhaps white bark pine. Other species native to Montana but not generally found at the elevation of Elk Meadows Subdivision have been introduced since the 2010 logging. They include ponderosa pine, western larch, spruce, and white bark pine. Many planted ponderosa pines have grown to sapling size and are dispersed in the common areas and some lots. Lodgepole pine and Douglas fir dominate vegetation throughout the subdivision.

Dense stands of lodgepole pine saplings can be found on the north slopes between the ridge top and Discovery Lane. These dense sapling stands are the result of logging that occurred prior to 1995, most likely in the early 1990s. Between 2009 and 2011 most of the rest of the subdivision was logged to remove beetle killed lodgepole. The heaviest logging was located along Mule Deer Lane and Moose Track Lane extending upslope to the ridgetop along Elk Meadows Lane.

Climate Change: *The direct effects of climate change on forests include increased temperatures and shifts in precipitation that together alter humidity, soil moisture, and water stress. Direct effects can be beneficial or detrimental to forest growth and survival. The results of this analysis on the direct effects of climate change on Montana's forests produced several key messages, some of which are shown below (for a complete list of key messages, see the Forests chapter):*

- *Increased temperatures will have positive or negative effects on individual trees and forest wide processes, depending on local site and stand conditions, but impacts from increased extreme heat will be negative. [high agreement, moderate evidence]*

- *Direct effects of climate change on individual trees will be driven by temperature in energy limited forests and moisture in water-limited forests. [high agreement, moderate evidence]*

- *The speed and magnitude of climate change may mean that increased forest mortality and contractions in forest distribution will outpace any gains in forest growth and productivity over the long run, leading to a net loss of forested area in Montana. [medium agreement, limited evidence] (2017 Montana Climate Change Assessment, https://davidjkatz.files.wordpress.com/2017/09/2017-montana-climate-assessment-executive-summary-lr.pdf)*

How climate change will affect the forested vegetation in the Elk Meadows Area is a matter of interpreting the data and predictions presented in the 2017 Climate Change Assessment. It is highly likely that longer summer droughts will change the vegetation composition of the area.

Homeowners must take responsibility for their property and provide survivable space with the expectation that fire suppression forces cannot protect all the property in the subdivision at once and that a rapidly moving wildland fire could exceed suppression forces capabilities very quickly. The 2009 "Living with Fire" publication produced by FireSafe Montana is an excellent guide to developing survivable space. (www.firesafemt.org) Given fuel loading and predicted longer, hotter summers the question is not if the area burn it is when it will burn and how often.

A. Asessment Methodology and references

This report was assembled using data from the Deerlodge County Soil Survey produced by the USDA Natural Resource Conservation Service (1993). The soil survey provided topographic, vegetation type, precipitation amounts, and growing season information.

Observations from the established roads and walk through inventory of the Common Areas provided addition information concerning forest condition, tree species, and canopy coverage.

History of logging and plantings was provided by reviewing Google Earth historical records and from Kurt Krueger who lead these efforts in 2009 and 2010.

Assessment of fire hazard and potential fire spread was provided by Mark Petroni who was involved in wildland fire management for nearly 40 years. Firesafe information was provided from FireSafe Montana and their 2009 guide for homeowners.

Climate change information is from "The 2017-(2021) MONTANA CLIMATE ASSESSMENT
By: *Cathy Whitlock[1], Wyatt F. Cross[2], Bruce Maxwell[3], Nick Silverman[4], and Alisa A. Wade[5].*

The subdivision was divided into areas of similar soil types, vegetation types, aspects and roads.

Information concerning fire regimes and fire effects is from the National Fire Effects Information System.

Forest Service publication "Fire Ecology of Montana Forest Habitat Types East of the Continental Divide" (1983) was the source for fire ecology information.

B. Weather for the Elk Meadows and Georgetown Area

Seasonal variations in weather: Moist springs give way to hot/dry summers. Snow can be expected in mid to late fall that will last all winter melting off in May and June. Wind can blow from any direction given frontal passage however, the prevailing wind is from the south to west. Thunderstorms can generate strong erratic wind from any direction. Most thunderstorm build over the Continental Divide to the south and move north easterly along the Dividenproviding a glancing effect on Elk Meadiows/ Georgetown Area.

impacts to Montana's water, forests, and agriculture from climate change. MCA presents 35 key messages, seven of which serve as important foundations to the work of this report:

- *Annual temperatures have risen 2-3°F (1.1-1.7°C) since 1950, and our growing season is now 12 days longer. Montana has experienced an increase in warm days and nights, both in summer and winter. There is no trend in precipitation since 1950. [high agreement, robust evidence]*
- *Climate models project that temperatures will continue to increase and by the end of the century average annual temperature may be 9.8°F (5.4°C) higher than those recorded between 1971-2000, given our present rate of greenhouse gas emissions. [high agreement, robust evidence]*
- *Precipitation received at a state level may increase slightly in the future, but these gains will be offset by evaporation and transpiration due to higher temperatures. More precipitation will be received in winter, spring, and fall; summers will become drier than at present. [moderate agreement, moderate evidence]*
- *Rising temperatures will result in a shift from snow to rain earlier in the year than at present. In turn, this shift will result in earlier dates for the onset of snowmelt and associated peak stream runoff by the end of the century. [high agreement, robust evidence]*
- *The number of days >90°F (>32°C) will increase significantly by the end of the century, with the greatest warming in eastern Montana. The eastern part of the state will also experience more extreme heat (i.e., days when the heat index[1] exceeds 105°F [41°C]). [high agreement, moderate evidence]*
- *Increased wildfires are expected as wetter springs result in increased fuel accumulation, and drier summers lead to fuel desiccation. The size of fires and the length of the fire season will increase in both forest and grassland. [high agreement, robust evidence]*
- *Unforeseen climate-related weather events will occur with projected increases in temperature and drought in the coming decades, including greater likelihood of spring flooding, severe summer drought, and extreme storm events. [high agreement, moderate evidence]*

INDIRECT EFFECTS OF CLIMATE CHANGE ON FORESTS

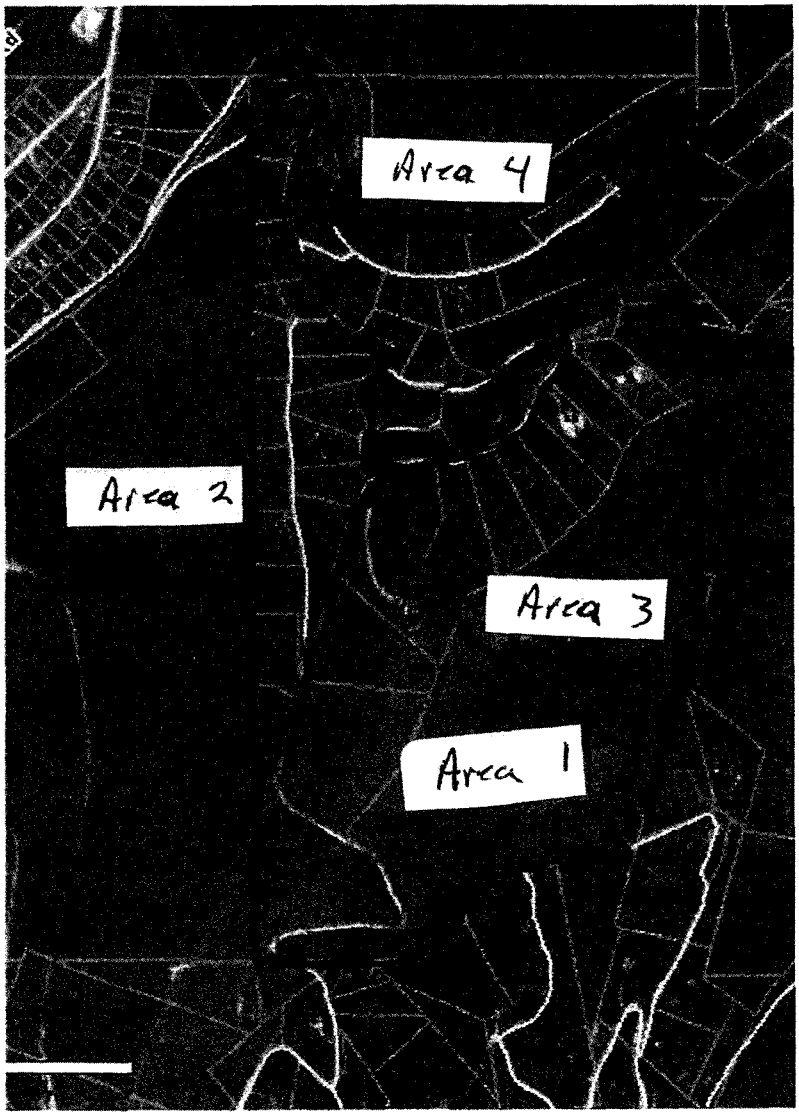
Key Messages

• *An increase in fire risk (i.e., probability of occurrence)—including an increase in size and possible frequency and/or severity (i.e., tree mortality)—is expected in the coming century as a result of a) prolonged fire seasons due to increased temperatures, and b) increased fuel loads from past fire suppression. Spatial patterns of fire activity will be complex and dependent on disturbance history and current stand condition. Fire risk may increase in all forests; fire severity may increase the most in lower elevation forests.* [high agreement, robust evidence]

• *Rising temperatures are likely to increase bark beetle survival* [high agreement, strong evidence], *but climate-induced changes to other insects and forest pathogens are more varied*

Area 3 includes the northern portion of the Common Area from the powerline and includes the Common Area along the west and east side of Elk Meadows Lane, and the Common Areas along the ridge top. lots 4,5,6,7,8,9,10,11,12 are included as well.

Area 4 includes the lots between Elk Meadows Lane and Moose Track Lane (lots 30,31,32) and all lots north of Elk Meadows Lane (lots 13,14,15,16,17,18,19,21,22,23,43,44,45).



Elk Meadows Subdivision
with lot #s
CA - Common area

Given time and lack of disturbance (fire) this area would become more timbered. Shade tolerant species such as Douglas Fir will become dominant and outcompete limber pine, aspen, lodgepole pine and ponderosa pine. However, fire and climate change will likely accelerate this successional change from lodgepole to more scattered Douglas fir. Less moisture availability will favor shade tolerant species that can capitalize on early spring moisture and survive drought conditions. Lodgepole is a seral species that is relatively shallow rooted and less capable of withstanding drought conditions than Douglas fir.

Wildland fire hazard and risk is tied directly to topography, fuel type and weather. Grass is the primary fuel type in this area. A fire could move rapidly upslope (4-6MPH) with 8-10' flame lengths pushed by prevailing southwest wind. The shallow drainage along the east side of the area, through the common area could act as a chimney funneling a fire upslope as the drainage may modify wind direction and concentrates wind speed. This drainage has a more continuous timber component that will generate longer flame lengths (10' +), short and moderate range spotting, and greater resistance to control. Patches of timber throughout the area could burn intensely and generate spotting accelerating fire spread down wind and upslope. While this area is more susceptible to a rapidly spreading wildfire than any of the other areas it also offers the best opportunity to control a fire. Fires in grass are easier to control than timber fires. The combination of fine fuels coupled with the Elk Meadows Road offers an opportunity for fire suppression resources to check fire spread in this area.

There is high risk of human caused fires in the area give the number of homes below the subdivision along Elk Meadows Lane. Several of these homes are vacation rentals the attract visitors who may not be as fire aware as long term residents. Travelers on Elk Meadows Lane increase risk. Lightning is a risk as well.

Fires that can generate high intensity and long-range spotting (1-2 miles) pose a risk to this area. Such a fire south of Georgetown Lake along the Anaconda-Pintlar Wilderness could generate enough energy to cause burning embers to shower this area of the subdivision.

Fire regime is the "pattern, frequency, and intensity of the wildfires that prevail in an area over long periods of time". For this mixed stand of Douglas fir, lodgepole, shrubs and grass the fire regime frequency is 19-43 fire return intervals. If ponderosa pine becomes more established the fire return interval may become 6-50 years.

Climate change may influence this area with drier conditions resulting in less conifer coverage especially lodgepole pine. Douglas fir and ponderosa pine can

Given time and lack of disturbance (fire) this area will become more timbered. Shade tolerant species such as Douglas Fir and ponderosa pine will become dominant and outcompete limber pine, aspen, lodgepole and other introduced species. This successional change may be accelerated due to climate change. Less moisture availability will favor shade tolerant species that can capitalize on early spring moisture and survive drought conditions. The effects of climate change on this vegetation type would be less shallow rooted conifers such as lodgepole giving way to more shade tolerant and drought resistant Douglas fir and ponderosa pine with deeper roots and ability to survive droughty conditions. Douglas fir and ponderosa pine are better adapted to surviving wildland fire. The predicted moist springs followed by dryer summers could reduce the overall density of the conifer forest.

Wildland fire hazard and risk: Fire on this northwest facing aspect dominated by lodgepole saplings would be characterized as having moderate rate of spread (1.5 MHP) under normal summer conditions. However, sever drought could cause the lodgepole reproduction to burn much more intensely. The entire area is a large basin that has the potential to direct and concentrate wind. Even though the fire may not have rapid rates of spread it would be difficult to control due to the continuous sapling stands and residual down fall. Short range spotting would contribute to fire spread and complicate control efforts

There is high risk of human caused fires in the area given the number of homes below the subdivision along Highway 1. Lightning is a risk as well.

Fires that can generate high intensity and long-range spotting (1-2 miles) pose a risk to this area. Such a fire south of Georgetown Lake along the Anaconda - Pintlar Wilderness could generate enough energy to cause burning embers to shower this area or downslope of the subdivision.

Fire regime for this northwest facing mixed stand of Douglas fir, and lodgepole, suggests 25-100-year fire return intervals. If ponderosa pine becomes more established the fire return interval may become 6-50 years.

Climate change may influence this area with drier conditions resulting in less conifer coverage especially lodgepole pine. Douglas fir and ponderosa pine can handle drought conditions and survive fire therefore, will likely survive in the wake of increased summer temperatures and decreased summer precipitation. Other species such as sub-alpine fire and Engelmann spruce are less capable of surviving summer time drought and will likely not survive. Lodgepole stands will become less dense with drier conditions but could still survive on this aspect given predicted climate change temperature increases. More frequent fires would favor Douglas fir and ponderosa pine further reducing lodgepole pine

moist springs followed by dryer summers could reduce the overall density of the conifer forest.

Wildland fire hazard and risk: Fire on this ridge top and southeast facing aspect dominated by lodgepole saplings would be characterized as having moderate rate of spread (1.5 MHP) under normal summer conditions. However, severe drought could cause the lodgepole reproduction to burn much more intensely. Most of the area faces east overlooking Daly Gulch which is a fairly narrow drainage that could easily act like a chimney modifying prevailing wind direction and speed up slope. This area is at risk from fire burning up slope from Daly Gulch and from the south up the draw described in Area 1. A fire moving up slope in these areas could have rapid rates of spread 4-6 MPH and once established in the lodgepole reproduction become very difficult to control.

The overstock stands of saplings resulting from the 1995 logging pose a unique fire hazard. Even though these stands are located in generally moist areas they can be dry enough to support a fire in normal fire seasons. Simply stated there are too many trees in the stands and there is not enough moisture to support them all. Therefore, these young dense stands could burn with higher intensity than expected during any fire season.

There is high risk of human caused fires in the area give the number of homes below the subdivision in Daly Gulch. Lightning is a risk as well.

The fire regime for this mixed stand of Douglas fir, lodgepole pine, shrubs and grass indicate a 19-43-year fire return intervals. If ponderosa pine becomes more established the fire return interval may become 6-50 years.

Climate change may influence this area with drier conditions resulting in less conifer coverage especially lodgepole pine. Douglas fir and ponderosa pine can handle drought conditions and will likely survive in the wake of increased summer temperatures and survive fire better than other species. Other species such as limber pine and juniper are also drought hardy and will likely survive. However, fire return intervals may become more frequent. There is ample evidence of past fires in this area. Other conifer species such as subalpine fire and Engelmann spruce are less capable of surviving summer time drought and will likely not survive. Lodgepole pine stands will become less dense with drier conditions but could still survive the predicted climate change temperature increases on this aspect and elevation. More frequent fires would favor Douglas fir and Ponderosa pine further reducing lodgepole pine

Area 4 13,14,15,16,17,18,19,21,22,23,4,30,31,32,43,44,45

Soil: Whitore gravelly loam, 15 to 35 percent slopes (92E)* is the primary soil type in this area.

and spruce will likely die out. More frequent and intense fire will also favor Douglas fir over lodgepole, subalpine fir and spruce

Wildland fire hazard and risk: During normal fire seasons this area would generally remain moist. Fires could still start but would likely be small and easily controlled. However, during extreme drought similar to 2021 the heavy continuous fuel in this area can quickly ignite and generate a high intensity fire that is very difficult to control Fire on this north facing aspect dominated by dense stands of lodgepole saplings and unlogged stands with ladder fuels in close proximity to homes creates a very dangerous situation. While fires on this north aspect may not have rapid rates of spread, resistance to control is very high given the ladder fuels, dense sapling stands, and down fall. A fire that becomes established in this area (escapes initial attack) would pose a high risk to homes in the area.

The overstock stands of saplings resulting from the 1995 logging pose a unique fire hazard. Even though these stands are located on a generally moist slope they can be dry enough to support a fire in normal fire seasons. Simply stated there are too many trees in the stands and there is not enough moisture to support them all. Therefore, these young dense stands could burn with higher intensity than expected during any fire season.

There is high risk of human caused fires in the area give the number of homes below the subdivision along Fire Lane and in Old Georgetown. In addition, the area immediately north of the Elk Meadows Subdivision boundary is being developed introducing additional human caused fire risk. Lightning is a risk as well.

Fires with rapid rates of spread approaching from the west or south could easily spot into this area increase the risk.

Fire regime for this mixed stand of Douglas fir, lodgepole, subalpine fir, and Engelmann Spruce indicates a 35-100 years fire return intervals. Stand replacement fires have been recorded at 200+ year intervals

Climate change may influence this area with drier conditions resulting in less conifer coverage especially lodgepole pine. The area may be too cool for ponderosa pine but Douglas fir will likely thrive. Subalpine fir and Engelmann Spruce are less drought hard and may be lost to this area. Introduced species such as western larch may survive drought conditions but would likely not thrive in the wake of hotter, drier conditions.

For more information contact members of the Forestry Committee