

**WILDFIRE RISK EVALUATION
and MITIGATION PLAN**
for

LOST LAKES DEVELOPMENT COMPANY, LLC
Submission to Madison County, Montana
Overall Development Plan (ODP)



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Introduction

The Lost Lakes Development Company proposes to develop a residential subdivision on 307 acres in eastern Madison County, Montana. This land is adjacent to, and immediately west of the Moonlight Basin Ranch, and is located in the east half of Section 16, T6S, R2E.

Lost Lakes Development Company has requested Blackbull Wildfire Services of Missoula, Montana to conduct a Wildfire Risk Evaluation and Mitigation Plan for the area in their proposal; it is intended to become a component of the Overall Development Plan (ODP) that will be submitted to Madison County for review and approval.

The area being proposed for development is located between 6500 and 7200 feet in elevation in a forested setting that has no structures or other improvements at this time. There is a single lane unimproved road that runs along the west side of the property, as well as several other primitive access roads that were used for timber harvest in previous decades.

Fire & Fuels Situation

The Lost Lakes Development area currently has a variety of forest and fuel conditions across the landscape. Some areas have been subject to clearcut timber harvest, with the residual logging slash burned. These areas have now regenerated with 10-20 foot tall conifers, mostly Lodgepole Pine; there are also smaller numbers of grand fir, Douglas-fir, Englemann Spruce and subalpine fir in the area. These areas have little residual ground fuels since the timber harvest activity, appear to be healthy at this time, and generally are considered to be a low risk for active fire behavior except under the most extreme fire weather conditions. They are, however, densely stocked, providing a continuous fuel source and inter-connected crowns. These areas are not represented in the "Photo Guide for Appraising Downed Woody Fuels in Montana Forests" (USFS-GTR-INT-98, 1981), and meets the criteria described as TL1 (*Low Load Timber Litter*) in the June 2005 "Standard Fire Behavior Fuel Models (USFS-RMRS-GTR-153).

Other areas of the property have been selectively logged over the past 30-50 years: these areas have a residual overstory of conifers, with an in-growth of conifer reproduction. Many of the older trees in the stand are mature or over-mature, with some mortality occurring. In addition, there is a heavy accumulation of logging slash and natural fuels on the forest floor that dry out during the fire season and will support active wildfire spread. There are also areas adjacent to the access roads where unutilized woody material was left untreated during timber harvest activities that remain a fire hazard (see photo). These stands are similar to those described in GTR-INT-98 as having an Overall Fire Potential of "Moderate".



Photo #1: Ground fuels in mixed aged timber stand.

Unwanted wildfires on the Lost Lakes property do not appear to have ignited in recent history; there is no sign of any fire activity, and the US Forest Service Dispatch Manager in the Dillon Interagency Coordination Center reported no lightning or human-caused fire ignitions during the past 12 years.

The risk of wildfire impacting this property will more likely come from fires that ignite off of the site and burn onto the property: both the surrounding private land, and the National Forest lands to the southwest have vast

tracts of forested land where a fire could ignite and then spread onto Lost Lakes. Because of the high elevation of the area, and the relatively short (2-3 month) fire season, such a threat is unlikely during most years. The Fire Danger Pocket Cards showing average and extreme fire danger conditions for the most representative areas (Gallatin NF - West Zone and the Beaverhead-Deerlodge NF Zone 111) are included in the Appendix of this report. The Lost Lakes property is located in Fire Weather Zone 111.

The protection responsibilities for wildland fire on private ownerships such as the Lost Lakes property lies with the State of Montana Department of Natural Resources and Conservation (DNRC). Because the private land in the area of Big Sky/Moonlight Basin Ranch/Lost Lakes is nearly surrounded by National Forest lands of the Beaverhead-Deerlodge and Gallatin National Forests, the Montana State DNRC has an "offset" agreement with the USFS whereby they provide wildfire protection. The nearest wildfire suppression resources include a Type 6 wildland engine and a helicopter with crew, both located at the Shenango Helibase in the Gallatin Canyon, east of the Lost Lakes Development.



Photo #2: Dense stands of Lodgepole Pine reproduction.

Because there are no buildings or other facilities on the Lost Lake property at this time, no affiliation with any organized structural fire department is in place for the area. Portions of the property to the east (Moonlight Basin) are protected by the Big Sky Fire Department in the Gallatin Valley Consolidated Fire Protection District. However, the portion of Moonlight Basin immediately adjacent to the Lost Lakes property has not yet been annexed into that Fire District, and Montana statutes prohibit non-adjacent properties from being annexed into a Fire District, so Lost Lakes will not be able to apply for annexation until the remainder of the Moonlight Basin properties is annexed.

The western access road into the Lost Lakes property from the Big Sky Roadway (Montana Hiway 64) is 13.2 miles from the fully staffed Main Fire Station, and 7.1 miles from Mountain Village Fire Station, which has equipment but no full-time staffing at this time.

Applicable Standards and Guidelines

A review of fire protection standards and guidelines for structural fire and wildfires shows that there are several National organizations with Standards that have direct application to the proposed development at Lost Lakes: these are the National Fire Protection Association (NFPA) and the International Code Council (ICC).

In addition, Madison County has developed specific fire issues in their Subdivision Review that must be addressed, and has "*Fire Safety Guidelines for Homes in the Wildland Urban Interface*" and "*Defensible Space Proposed Guidelines*".

The Madison County Subdivision Review for Emergency Planning addresses the key topics of:

1. Access
2. Water Supply
3. Maps and Signage
4. Landscaping/Defensible Space
5. Construction Standards

6. Siting
7. Utilities
8. Nearby Hazards

Fire Management Plans have been prepared for the Big Sky area in February 2000 (including the Big Sky community, Jack Creek drainage, and the surrounding private and public forested lands), and for the Moonlight Basin in December 2006. The *Big Sky Fire Management Strategy* addresses general wildland fire situations that exist throughout the geographic area, offering a number of generic fuel treatment and fire prevention options available to mitigate fire risk and hazards. The *Moonlight Basin Fire Management Operations Guide* also uses many of the same treatments and strategies, tailored to the specific conditions on the Moonlight Basin property.

Access and Egress

The Lost Lakes property planned for development can be accessed from the East, using Montana Highway 64 and then traveling on the Big Sky Roadway through the Moonlight Basin Ranch: several primitive roads lead into the property at this time, and are planned for improvements as the property is developed. It is also possible to access the area from the west, leaving from Ennis, Montana and using the Jack Creek Road.

The main access/egress roads are well suited for all types of vehicular traffic, ranging from passenger automobiles to Type 1 & 2 fire engines; grades, widths and clearing limits meet all current standards for emergency response vehicles. The lower-standard roads that currently access the Lost Lakes Development are older logging roads that do not meet the roadway design criteria specified in NFPA 1141.

The main access roads from both the east and west will enable egress from the area in two (2) different directions for residents in the event of a wildland fire, consistent with the specifications in NFPA 1141.



Photo #3: Road accessing the western portion of Lost Lakes property.

Coordination and Consultation

In the preparation of this Fire Management Overview for the Lost Lakes property, numerous local, State and Federal fire and emergency management personnel were contacted and offered input concerning the hazard and risks of fire, both from wildfire and structural fires.

Some of these individuals include:

1. Madison County Risk Mitigation Coordinator Joe Husar;

2. Big Sky Fire Department Chief Jason Revisky;
3. Montana DNRC Bozeman Unit Forester Craig Campbell;
4. Bozeman Interagency Fire Dispatch Coordinator Bert Starr;
5. USFS Gallatin NF Forest Fire Management Officer Mike Gagen;
6. Dillon Interagency Dispatch Center Manager Judy Heintz.

These individuals all offered insights into the history of fire occurrence in the area, the capabilities of their agencies to respond, specific fire and fuels management concerns such as smoke management issues, and ideas to reduce and/or mitigate the impacts of unwanted wildland and structural fires on the Lost Lakes property.

In addition, the proposed fuel modification treatments were reviewed with Tom Olenicki, wildlife biologist with Trail Creek Wildlife Planning, to insure that the needs of key wildlife species were not adversely impacted by the fire management recommendations.

Fire Management Objectives

Before making recommendations for wildland fire and structural fire hazard and risk reduction, the overall fire management objectives for the area must first be established. For the proposed Lost Lakes Development as presented, the following fire management objectives are offered:

1. Maximize resident safety from all unwanted fire, both wildland and structural;
2. Maintain the aesthetics and natural setting of the area where ever possible;

3. Reduce wildland fire occurrence from both lightning and human causes;
4. When wildfires do occur, manage the fuels complex so that the fire remains on the ground and is burning at an intensity where existing fire suppression resources can be successful;
5. Meet the criteria in NFPA 1141, 1142 and 1144 in the planning and implementation phases of the development;
6. Implement the concepts of "FireWise" and defensible space to minimize property damage from fire.



Fire Management Recommendations

Based upon my review of the current on-the-ground conditions, and the proposed development on the Lost Lakes property, the following recommendations are offered:

A. Fire Protection Responsibilities and Organization

- a. Fire protection responsibilities for wildfire suppression is currently under the Montana Department of Natural Resources and Conservation; because of land ownership patterns in the area, they have an agreement with the US Forest Service

(USFS) to provide that protection. I recommend continuing the existing situation, given the small size of the development holdings and the suppression resources available through the USFS in the area.

- b. When residences and other structures are constructed at Lost Lakes, it will be necessary to have reliable year-round fire protection capability for the development. The nearest full-service fire department is the Big Sky Fire Department, part of the Gallatin Canyon Consolidated Fire Protection District. At this time, they have an agreement to provide fire protection and other emergency services to the eastern portion of the Moonlight Basin Ranch; negotiations are currently under way between the Fire District Board and Moonlight Basin to annex the remainder of the property into the fire district. When that occurs, it will be possible for the Lost Lakes Development to petition the Fire District Board for annexation. According to Montana State statute, a fire district is not allowed to annex a property that is not immediately adjacent to their existing district boundary. When the portion of the Moonlight Basin property adjacent to the Lost Lakes Development is annexed into the fire protection district, I recommend that Lost Lakes Development request annexation into the fire protection district.

B. Structural Fire Protection

When the development concept as planned is implemented at Lost Lakes, there will be residential units that have full-time and part-time residents. The risks from structure fires may be more pronounced in rural settings like the Lost Lakes Development. For that reason, the following recommendations are offered:

- a. Building construction materials and practices should follow the "FireWise" guidelines where ever possible to help minimize the risks of structural ignition from wildfires;

- b. All residence and other structures should follow the NFPA 13 Standard for installation of sprinkler systems.
- c. Design of roads, hydrant systems and other infrastructure should follow the guidelines in NFPA 1141 *Standard for Fire Protection Infrastructure in Suburban and Rural Areas* (2008 edition).

C. Wildland Fire Protection and Risk Mitigation

The risks of wildland fire are everywhere in the Northern Rockies, including the area of the Lost Lakes development proposal, but can be effectively mitigated while still retaining the natural character of the area. Unwanted wildfires can be ignited by lightning storms, or caused by human activities such as debris burning, smoking, recreation activities, vehicle use, fireworks and other causes. There are several categories of wildfire risk that are relevant to the Lost lakes property:

1. Wildfires that start outside of the property and burn into it. This would include fires starting on adjacent private lands as well as on National Forest lands in the area;
2. Wildfires that start within the property, either from lightning, human activities described above, or structural fires that spread into wildland fuels.

There are several components of a successful plan to eliminate and/or minimize wildfire in a planned development such as Lost Lakes:

1. Fire Prevention;
 2. Fuels treatment and modification;
 3. Vegetation management.
1. **Fire Prevention** - a fire prevention program is an essential part of eliminating the unwanted human-caused wildfire ignitions within the Lost Lakes development. Some recommended components of a fire prevention program include:

- a. Create a "FireWise Community" concept, emphasizing the items that individual residents can do to make their property more fire safe;
- b. Establish a fire prevention signing protocol for informing residents and visitors about the fire danger levels during the summer fire season;
- c. Restrict open burning by residents and construction crews. Require a burning permit from the local fire authority'
- d. During construction of residences and other structures, enforce the following requirements:
 - i. All construction sites should not permit smoking by workers;
 - ii. During periods of high fire danger, require "watchman services" for 2-3 hours after the completion of construction activities for the day;
 - iii. During periods of "Very High" and "Extreme" fire danger ratings, consider requiring a Type 6 wildland fire engine be on site. These are available from local wildland fire contractors.
- e. Utilize the NFPA 1144 "Wildfire Checklist" (see Appendix) to evaluate the fire hazard rating for the proposed development, and mitigate those factors that cause the rating to increase.

2. Fuel Treatment and Modification – changing the amount, type and configuration of the existing wildland fuel bed can significantly the rate of spread and burning intensity when a wildfire does occur. In addition, site-specific fuel treatments can reduce the incidence of wildfire occurrence, and help insure the safety of access and egress routes for both residents and fire personnel. Some of the recommended fuel treatments include:

- a. Remove and/or significantly reduce the existing ground fuels along roadways, and treat new fuels that are created during new road construction activities;
- b. Create a shaded fuel break around the perimeter of the property by thinning out the timber overstory to break up the crown continuity, and cleaning up fuel accumulations on the ground. This will allow firefighters to take effective

suppression action on fires trying to burn into Lost Lakes from adjacent ownerships while still retaining the natural setting of the area.

- c. Remove dead and dying trees ("red tops" and "snags"), especially those within 100 feet of structures;
- d. Remove natural and logging-generated ground fuels in throughout the property so that fire suppression methods such as hand tools and engines can successfully suppress most wildfires without using bulldozers or other heavy equipment;
- e. Burn fuels removed for the area and along road rights-of-way using tools such as an "air curtain destructor" with eliminates most of the residual smoke, thereby preserving air quality in the area;

3. **Vegetation Management** - the 3rd component of the recommended wildfire risk mitigation plan is the management of the vegetation that is a key component of the fuels complex (live fuels as well as dead woody fuels). Some recommended vegetation management practices to enhance wildfire protection include:

- a. Thin the existing stands of 10-20 foot tall reproduction that has come back after earlier timber harvest. Selected trees should be 14-16 feet apart: this will open up the crowns so that fire will not easily move through the crowns under most fire conditions;
- b. While the majority of these trees are Lodgepole Pine (LPP), it is recommended that selection bias towards the other tree species present whenever possible: LPP has a 80-100 year life cycle in the northern Rockies, and will be susceptible to insects, disease and mortality in future years, creating an increased fuel load and fire danger;
- c. Prune the thinned stands to a height of 10-12 feet, thereby eliminating the "ladder fuels" that can carry a ground fire into the crowns of the trees;
- d. Material from thinning and pruning should be chipped and/or mulched on the site to reduce the fuel available in wildfires and to enhance the soil conditions on the site;

- e. In mixed-age stands with both older overstory trees and younger reproduction, selectively remove those trees that are declining in vigor, and thin the younger understory to the distances specified in "a" above. Treat the resulting slash by piling and burning, or chipping the residual material.

4. **Other Wildfire Considerations** - besides the recommended practices and fuel treatments listed above, there are several other factors that will affect the wildland fire situation in the Lost Lakes Development as proposed:

- a. The planned ski lift line and downhill ski runs that are planned will transect the property, creating effective fuel breaks that will be beneficial in stopping the spread of unwanted wildfires;
- b. New and reconstructed roads will also serve a similar function, as well as increasing the access for fire vehicles;
- c. The presence of several lakes and ponds on the property can be a valuable water source for the helicopters involved in fighting wildfires. USFS fire personnel should be encouraged to visit those sites and record their locations with GPS for future needs.

APPENDIX