

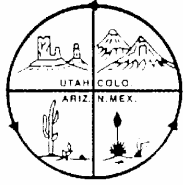
**FOREST MANAGEMENT PLAN**  
**FOR TWIN BUTTES**  
**LA PLATA COUNTY, COLORADO**



Prepared for:  
Lightner Creek Ranch, LLC

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March 2008



## ECOSPHERE ENVIRONMENTAL SERVICES

August 11, 2008

Dear Reader,

This document was completed in March 2008 and is currently in *draft* form. Ecosphere staff prepared it for Lightner Creek Ranch, LLC (LCR) to promote forest health, reduce wildfire hazard, and improve wildlife habitat on the property. It was prepared with conceptual plans provided by LCR, field surveys, and the best scientific information available at the time.

This is not a regulatory document; rather, it is intended to serve as a guidance document for mitigating and managing impacts to wildlife from the proposed development. Further, it has been advanced as a draft because the mitigation measures recommended within this document are subject to revision pending public comment and any changes to the proposed development that may occur throughout the planning process.

This document will become final at the time City Council approves the final plan for Twin Buttes, should that occur. Updates to the final document may take place if deemed appropriate by the governing body responsible for implementing the plan.

Sincerely,

Mike Fitzgerald  
Owner

## EXECUTIVE SUMMARY

Ecosphere Environmental Services was contracted by Lightner Creek Ranch, LLC to prepare a Forest Management Plan for the proposed Twin Buttes Development in January 2008. This proposed development is located immediately west of Durango, Colorado, near the intersection of Highway 160 and Colorado Highway 141 (Wildcat Canyon Road). The Twin Buttes Development 2007 Conceptual Plan for the proposed 597-acre property consists of a generalized development area, known as the Village Areas with 595 dwelling units, new road construction to access the housing units, and recreational and shared use trails. Lightner Creek Ranch has committed approximately 80 percent of total acreage as undeveloped areas.

The Forest Management Plan provides recommendations on how to manage these undeveloped areas for forest health, wildfire hazard reduction, and improved wildlife habitat. Ecosphere developed a custom thinning plan to create defensible space and reduce wildfire hazard to the future community. This plan is based on vegetation type, topography, wildlife needs, and the proposed road and trail development. The Forest Management Plan also provides recommendations for protecting special vegetative communities, emphasizes using native plant species in project landscaping, addresses weed management and discusses using wood harvested onsite for proposed construction projects.

This plan is meant to be a flexible, working document and will be amended as necessary.

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# INTRODUCTION

## 1.1 PROJECT DESCRIPTION

Ecosphere Environmental Services (Ecosphere) was contracted by Lightner Creek Ranch, LLC (LCR) to prepare a Forest Management Plan (FMP) for the proposed Twin Buttes Development (TB). This proposed development is located immediately west of Durango, near the intersection of Highway 160 and Highway 141 (Wildcat Canyon). Twin Buttes location and land ownership maps are included in Figure 1. The legal description for the development is:

Township 35 North, Range 10 West,  
Sections 23, 25, and 26  
New Mexico Prime Meridian (NMPM)  
La Plata County, Colorado

The TB 2007 Conceptual Plan for the proposed 597-acre property consists of a generalized development area, known as the Village Areas with 595 dwelling units, new road construction to access the housing units, and recreational and shared use trails. LCR intends to leave 80 percent of the property undeveloped, as open space. The Forest Management Plan will address these undeveloped areas.

## 1.2 EXISTING VEGETATION CONDITION

The Twin Buttes area encompasses several different plant communities, including: shrublands, grasslands, riparian forests, pastureland, pinyon-juniper woodlands, pine-fir forests and pine-oak woodlands. The total acreage associated with each of these vegetation types are provided in Table 1 and are described in the Twin Buttes Development - Wildlife Management Plan, which was also prepared by Ecosphere.

The majority of the Twin Buttes area is dominated by a ponderosa pine and gambel oak woodlands. Historically ponderosa pine forests were relatively open and “park-like”. Low-intensity ground fires burned ponderosa pine forests every few years, charring the ground but leaving large trees standing. Ponderosa pine trees are very well adapted to fire because of their thick, insulating bark and their high crown (branch) heights. By consuming pine needles, recycling nutrients and thinning young pine trees, fire stimulated native wildflowers, shrubs, and grasses to grow in the sunny interspaces (Covington and Moore 1994).

When Euro-Americans settled the West in the late 19<sup>th</sup> century, their extensive livestock grazing, timber harvesting and fire suppression activities lead to the cessation of this natural fire regime (Allen et al. 2002). This allowed young pine seedlings and shrubs to establish and grow into a thicket-like forest in many areas. Increased forest density diminished the diversity of all the other plants found in the forest, which also negatively influenced wildlife habitat. Now lightning caused wildfires are more likely to travel from

the ground up into the crowns of the trees and creating fast-moving fires that can eliminate large trees and threaten subdivisions (Covington and Moore 1994).

Selective thinning can help to recreate a historic park-like ponderosa pine forest. By reducing competition for water and nutrients, thinning can improve the health of the remaining trees and increase forest resiliency to drought and insect attack. Thinning can also help protect old ponderosa pine trees from wildfire, increase plant diversity on the forest floor, and improve wildlife habitat (Covington and Moore 1994).

The other vegetation types found in the TB are either more arid or more mesic than the ponderosa pine dominated areas, thus they did not evolve under the same fire regimes. Thinning in these areas is generally not needed for forest health, but may be necessary to reduce wildfire hazard risk to the future TB.

### **1.3 PROJECT NEED**

The vegetation in Twin Buttes typifies forested regions that are common throughout Colorado. Historically, forested areas likely burned every few decades from lightning ignitions. This natural fire cycle helped shape the forest structure and composition. Because fires have been suppressed the last 100 years, the vegetation has changed and in many places is overgrown. This condition represents an accumulation of fuels and poses a potential fire threat to housing developments and surrounding areas.

Lightner Creek Ranch, LLC recognized this situation and sought professional advise on fire mitigation. Understanding that fire mitigation and forest management are components to overall proper land-use management practices, the Forest Management Plan has been coordinated with the Twin Buttes Wildlife and Trails Management Plans.

## 1.4 GOALS AND OBJECTIVES

The overall goal of this Forest Management Plan is to bring the forest back to a more natural state. Consequently, this will improve forest health and wildlife habitat. It will also reduce the risk of wildfire to the Twin Buttes Development property and surrounding areas in the future. The recommended thinning will be based on the existing fuel structure, topography, and the proposed Twin Buttes Development plan. In cooperation with the Wildlife Management Plan, the FMP provides recommendations for protecting special vegetative communities, utilizing native plant species in landscaping and using wood harvested onsite for building.

In summary, the goals of this Forest Management Plan are to:

- Reduce the risk of wildfire to people and property
- Improve wildlife habitat
- Increase biodiversity and improve forest health
- Protect vegetative communities of special concern
- Control and eradicate non-native weeds

Therefore, this Forest Management Plan will address:

- creating defensible space zones around structures
- creating fuel breaks
- managing open space areas
- utilizing locally harvested wood
- maintaining thinning in the future
- protecting vegetative communities of special concern
- using native landscaping
- weed management

The FMP is divided into two main sections. The first section addresses thinning for wildfire mitigation and the second section addresses all the other vegetation related topics.

## 2.0 WILDFIRE MITIGATION

### 2.1 WILDLAND URBAN INTERFACE

The Wildland Urban Interface (WUI) is the geographical meeting place of two diverse systems- wildlands and structures. In the WUI, structures and vegetation are sufficiently close so that a wildland fire could spread to structures or a structure fire could ignite vegetation (CSFS 2006). During the last few decades, the majority of new housing development has been in the WUI in La Plata County (La Plata County CWPP 2006). This condition poses a challenge to firefighters, local land managers, and homeowners. Conversely, complete fire suppression negatively affects the forest and wildlife by allowing excessive fuels (plants) to accumulate. When fires do occur, the denser vegetation creates a more destructive and dangerous fire for both the human and plant communities.

According to Dennis (2003), a home's ability to survive a wildfire is primarily based on two factors- the home's roofing material and the quality of defensible space surrounding it. The Universal Building Code rates roofing materials effectiveness against fire as Class A, B, or C. Class A is the most fire resistant and Class C is the least fire resistant rating. Class A roofing materials include brick, concrete, tile, slate, clay, asphalt, metal-fiber and cement. Class B roofing materials include pressure-treated shakes and shingles. Class C roofing materials include wood shakes or shingles, plywood, and particleboard.

We recommend using Class A or B roofing materials. More information about fire resistance and roofing materials is available from the "Firewise Construction: Design and Materials" by Peter Slack, published by the Colorado State Forest Service (available online at [http://csfs.colostate.edu/library/pdfs/fire/construction\\_booklet.pdf](http://csfs.colostate.edu/library/pdfs/fire/construction_booklet.pdf)).

Thinning (selective tree cutting) and brush removal can improve forest health and reduce wildfire danger to property. Defensible space is defined as an area around a structure where fuels and vegetation are treated, cleared, or reduced to slow the spread of wildfire (Dennis 2003). This defensible space provides room for firefighters to do their jobs, and provides an area that is relatively free of wildfire fuels.

To create the most effective defensible space plan possible, Twin Buttes has been divided into three different zones (Figure 2a). The custom map of the thinning plan is found in Figure 3. Zone 1 is the area of maximum modification and treatment, which extends 15 feet from a structure. Zone 2 is an intermediate zone of fuel reduction, and extends 75-125 feet from structures. Zone 3 is an area of general forest management and extends from the edge of the defensible space to the property boundaries.

Creating defensible space involves breaking up both the vertical and horizontal continuity of fuels. Removing ladder fuels are of special importance. Ladder fuels are vegetation with vertical continuity that will allow a fire to travel from the ground up into the crown of a tree (CSFS 2006). Creating quality defensible spaces also requires taking slope, fuel quantity and fuel quality into consideration.

## **2.2 TWIN BUTTES THINNING PLAN**

A custom defensible space prescription has been developed for each of the three management zones, based on the Colorado State Forest Services' publication, "Creating Wildfire-Defensible Zones" (Dennis 2003). A custom map of the three zones is found in Figure 3. Since not all of TB requires thinning, priority areas have been identified in Table 2.

We recommend hiring a professional forester to mark trees to cut and trees to keep once the building envelopes and roads have been developed. This will ensure the following suggestions are applied correctly, with consideration towards wildlife, aesthetics, and any other relevant factors.

We recommend that the forester draws up a thinning contract and then hosts an onsite day for all the interested contractors. Then the contractors will be able to accurately bid on this thinning project. A short description of potential contractors and their contact information is found in Table 3.

The following are suggestions and are meant to be evaluated on a case by case basis.

### **2.2.1 Zone 1**

As mentioned above, Zone One is 15 feet from the edges of a structure. Within this zone, the following treatments are recommended:

1. Remove all trees to reduce fire hazard. If you decide to keep a tree (because it is usually large or a wildlife tree), make sure the tree is not touching the structure or any other trees. Prune the tree at least 10 feet above the ground and remove all surrounding ladder fuels.
2. Frequently prune and maintain existing plants in Zone 1. Remove dead branches, stems and leaves as these act as kindling.
3. Mow grasses (or remove with a weed trimmer) to be below six or eight inches in height. This is especially important in the fall after the grasses have died and in the spring before the grasses green up.
4. Do not store firewood or other combustible material in this area. Enclose or screen in decks with metal screening and extend gravel coverage under decks.

### **2.2.2 Zone 2**

Zone 2 is an area of fuel reduction designed to reduce the intensity of any fire approaching a structure. The area of Zone 2 depends on the slope of the land being developed and extends a minimum of 75 feet from any structure. Figure 3 provides measurements for the extent of Zone 2, based on slope. Within this zone, the following treatments are recommended:

1. Blend the thinning requirements for Zone 1 into Zone 2, and then Zone 2 into Zone 3 to create an aesthetically appealing forest.
2. Leave clumps of trees and shrubs, but make sure there are spaces in between the clumps. The forester doing the pre-thinning marking should apply the spacing suggestions found in “Creating Wildfire-Defensible Zones” (Dennis 2003).
3. All slash (limbs, branches or other woody debris) created by thinning should be disposed of by chipping. If chipping is not an option, lop and scatter the slash by cutting it into small pieces and distributing it over the ground. Avoid heavy accumulations of slash. Larger diameter trees (greater than 12 inch diameter trunks at 4.5 foot height from the ground) should be saved and utilized in the building process.
4. Carefully prune all trees to a height of at least 10 feet.
5. Limit the amount of snags (dead trees) to 1-2 per acre for wildlife. Make sure these snags will not fall on structures, power lines or roads.
6. Prune and maintain trees and shrubs annually.
7. Mow grasses (or remove with a weed trimmer) as needed throughout the season to keep them under six or eight inches. This is especially important in the fall after the grasses have died and in the spring before the grasses green up.
8. Locate propane tanks, firewood stacks and woodpiles uphill or on the same elevation as the structure but at least 30 feet away. Clear all flammable vegetation within 10 feet.

### **2.2.3 Zone 3**

Zone 3 goes from the edge of Zone 2 to the property boundary. Zone 3 will be managed not only for wildfire hazard concerns, but also for wildlife habitat where higher cover levels will be allowed to persist. Given the matrix of forest types in the TB, the management recommendations for Zone 3 should be applied on a site by site basis. Within this zone, the following treatments are recommended:

1. Thin for forest health objectives, not for defensible space as outlined in Zone 2. The principals of forest health vary extensively by vegetation type, and the forester should mark accordingly.
2. Allow for denser cover for wildlife and retain all snags.
3. Use slash to create woodpiles for small mammal habitat in areas with low groundcover (Hellmund 1998).
4. Manage for multiple ages and sizes of trees. This will require thoughtful thinning and maybe some planting in open areas to increase the age diversity of the forest.
5. Leave all mature trees (generally greater than 18 inches in diameter). Remove ladder fuels surrounding mature trees protect them from scorching or crowing during a wildfire.
6. Pruning and mowing are not necessary in Zone 3.

### **2.2.4 Fuel Breaks**

A fuel break is an easily accessible strip of land of varying width (depending on fuel and terrain), in which fuel density is reduced (CSFS 2006). Fuel breaks are strategically located to break up large, continuous tracts of forest, thus limiting the uncontrolled spread of wildfire (Dennis 2005). Fuel breaks can aid firefighters by slowing fire spread under normal burning conditions. However, during extreme weather conditions even the best fuel breaks can be ineffective due to spotting. Fuel breaks have proven to be effective in Colorado and have saved many subdivisions and structures. Even during the extreme weather conditions of the 2002 Hayman Fire, a fuel break saved Denver Water's entire complex of offices, shops and homes without any firefighting intervention (CSFS 2006). Fuel break design and placement must take slope, topography, possible ignition sources, crowing potential, natural barriers, and fuel loads into consideration.

The fuel break design for TB has been developed to utilize the proposed road and trail system and is based on slope (Figure 3). It also takes into account the habitat need as described in the Wildlife Management Plan. The fuel break design is based on the Colorado State Forest Service publication, "Fuel Break Guidelines for Forested Subdivisions and Communities."

Within fuel break areas, the following treatments are recommended:

1. A minimum of 10-foot-spacing between the edges of tree crowns (not tree trunks) is recommended on level ground (Figure 2b). Crown separation should increase as slope increases.
2. If small groups of trees are left for aesthetic or wildlife reasons, crown spacing should be greater than the minimum 10 foot recommendations.
3. The remaining trees should be the largest, healthiest, most wind-firm trees in the stand.
4. Clumps of shrubs may be left, but there should be space between the clumps. Spacing recommendations are found in "Creating Wildfire-Defensible Zones" (Dennis 2005) and are usually 2.5 times as wide as the height of the shrub clump, depending on slope.

### **2.3 PROPER SLASH DISPOSAL**

Slash (limbs and branches left from thinning) must be properly disposed of in all three zones and the fuel break areas for this wildfire mitigation design to be effective. There are three common ways of dealing with slash: lopping and scattering, piling and burning, or hand-feeding slash into a chipper. We recommend including slash disposal in the thinning contract.

Piling and burning is the most cost effective way to handle large amounts of slash. Piles should be built in open places where once lit, they will not scorch surrounding trees. Burning should only take place under the appropriate conditions and the local fire department should be notified. After the ashes are completely cooled, we recommend

raking some surrounding soil onto the burned area to help rehabilitate the soil and avoid future weed infestations (Korb et al. 2004).

If the slash is lopped and scattered around the forest floor, we recommend avoiding heavy slash accumulations as they are a fire hazard. Slash should be no deeper than 12 inches above the ground (Dennis 2005) and should not touch the trunk of the remaining trees.

To preserve wood that is desirable for future use, we recommend peeling the bark of all logs and branches. Once the wood is peeled, it should be stacked in a log deck that is elevated off of the ground to deter rot (Tim Reader, CSFS, personal communication).

## **2.4 TRANSFERRING LAND MANAGEMENT RESPONSIBILITY**

Ecosphere recommends that LCR clearly transfers the maintenance responsibilities to the future Home Owner within Zone 1 around the houses. The thinning and maintenance responsibility for Zone 2 and 3 (the undeveloped common areas) will be transferred to the land owner, association, or government entity receiving ownership of the land.

If the undeveloped land is protected by a conservation easement, a provision regarding thinning needs to be written into the easement. This provision should clarify that thinning for forest health and wildfire hazard is allowed, both by hand and with machinery. The La Plata County Open Space Conservancy does not budget or implement land improvement projects on properties, that responsibility is in the hands of the property owner.

## **2.5 PRECONSTRUCTION PRESCRIBED BURN**

Prescribed fire is the controlled application of fire to the land to accomplish specific land management objectives (CSFS 2006). Reintroducing ground fire into a fire-dependent landscape like the TB area has many potential benefits such as:

1. *Fuel Reduction*- Due to over a century of fire suppression, there is an excessive buildup of fuels, especially pine needles, on the forest floor. Prescribed fire can consume these ground fuels, thereby reducing wildfire hazard for years to come (Finney 2001).
2. *Nutrient Cycling*- Prescribed fire can help transfer the nutrients bound in the dead material on the forest floor back into the soil, thus acting as a fertilizing effect for grasses and forbs (Covington et al. 1997).
3. *Seedbed Preparation*- Ponderosa pine seedlings evolved to germinate in bare mineral soil, which is exposed after a fire. Prescribed fire can help diversify forest age and structure by creating areas conducive to seedling establishment (Bailey and Covington 2002).
4. *Improve Wildlife Habitat*- Because of the inherently patchy nature of fire, prescribed fire can help diversify the structure of the forest, and thereby improve

- wildlife habitat. Wildlife also benefit from the flush of new growth after a prescribed burn (Pilliod et al. 2006).
5. *Stimulate plant growth*- Prescribed fire can consume mature, dry grasses and forbs and create growing space for young, succulent plants (Covington et al. 1997).

Ecosphere acknowledges the beneficial effects of conducting a prescribed burn and recommends that if LCR is interested in pursuing a prescribed burn, they start by collaborating with a forester, the proposed wildlife management team, and the surrounding land management officials (Figure 1).

## **2.6 PROPOSED THINNING SEQUENCE**

Step 1- LCR lays out all the roads and building envelopes

Step 2- Forester's Pre-thinning Work

- a. Define the zones and fuel breaks on the ground
- b. Mark trees to remove in all zones and fuel break
- c. Conduct forest inventory
- d. Write a thinning contract, including slash disposal specifications
- e. Solicit proposals from local logging/hydromowing companies

Step 3- Thinning (Fall is preferable, to reduce wildlife impacts)

- a. Landowner approves a bid and selects a logging/hydromowing company
- b. The logging/hydromowing company begins thinning
- c. Forester monitors their progress
- d. Forester inspects job for completion
- e. Logging/hydromowing company completes the job and is paid by landowner

Step 4- Prescribed Fire (optional- in consultation with a forester and fire authorities)

- a. Landowner collaborates with forester and neighbors
- b. Burn plan and smoke permit are completed
- c. Dig any line needed to contain fire
- d. Notify appropriate parties
- e. Wait for an appropriate burn window
- f. Burn
- g. Monitor fire effects (erosion, weed, wildlife, and smoke concerns)

## **3.0 ALL OTHER VEGETATION MANAGEMENT**

### **3.1 UTILIZING LOCALLY HARVESTED WOOD**

As part of their vision for sustainable development, LCR intends to use some of the wood harvested during thinning and clearing activities as building materials for the subdivision. The quality and quantity of wood available will not be known until the roadways have been cleared, and the forest inventory and thinning activities are completed.

### **3.2 PLANT COMMUNITIES OF SPECIAL CONCERN**

As explained in the Wildlife Management Plan, the TB encompasses three unique ecological plant communities: riparian forests and wetlands, a small aspen patch, and mature Douglas-fir and ponderosa pine trees. The riparian forest, wetlands, and the aspen have been excluded from the thinning design. We recommend prohibiting any firewood cutting in the riparian areas. The aspen area should be evaluated by a forester in next field season.

Approximately 2 acres of mature Douglas fir and ponderosa pine are scheduled for development. We recommend retaining as many of the mature trees as possible when laying out the buildings and roads. We also recommend that the forester marking the thinning project retain as many mature trees as possible. If the area is burned, we recommend raking the excessively deep pine needle layer (duff) away from the base of mature trees to avoid girdling.

### **3.3 NATIVE PLANT LANDSCAPING**

We recommend landscaping in the Village Areas with native plants. Native plants are the plants that grow naturally in the area. Using native plants provides food and shelter for wildlife, creates a smooth visual transition between the developed and undeveloped areas, and lessens effect of the development on the surrounding plant communities. The Wildlife Management Plan contains lists of plant species and relative abundance observed in July of 2007 (Table 3, page 49). We recommend this plant list be given to the landscape architect overseeing the landscaping for the TB.

### **3.4 WEED MANAGEMENT**

Weeds are plants that are not native to the United States (La Plata County Weed Website). They grow unchecked in the absence of their suite of predators, like insects and disease. Weeds can outcompete native plants for water, nutrients, and growing space. Heavy weed infestations can degrade ecosystems, negatively effect wildlife, and imperil native plant communities.

We recommend that LCR works with a contractor to treat weeds throughout the development construction and building process. We also recommend that LCR transfers

the responsibility for managing weeds to the future Home Owner Association and land owner of the undeveloped areas.

### **3.5 EDUCATION AND INTERPRETATION**

LCR has done an exemplary job of incorporating defensible space and forest health into development planning. Their planning and thinning efforts should be communicated to future homeowners. We recommend having the forester on the Proposed wildlife management team develop a brochure, informational packet, or fact sheet for the future homeowners (as mentioned in the Wildlife Management Plan). This literature would help educate homeowners on the thinning that was done before they arrived, and the future maintenance that will be necessary. We also recommend adding information about thinning (with before and after pictures), forest health, and fire ecology to the interpretive trail signs (as mentioned in the Wildlife Management Plan). The forester could also help create a “what’s blooming now” section in the community newsletter, to spark people’s interest in native plants.

### **3.6 ROLE OF THE FORESTER**

Ecosphere recommends that the proposed wildlife management team includes a forester. This person will help see that this plan is implemented and that the thinning for defensible space and forest health is maintained by working with a contractor and the LCR. This forester can also help educate the future Home Owners Association and homeowners on the importance of maintaining defensible space.

The forester could also help guide the future homeowners in creating a Community Wildfire Protection Plan (CWPP) if they are interested. Creating a CWPP is a collaborative process that involves an entity (like the Twin Buttes Development), the surrounding landowners (both state and federal agencies in this case) and the local fire department to identify and prioritize fuels treatments and to recommend measures for reducing structural ignitability. Much of this work has already been done in this Forest Management Plan. Once a CWPP is complete, Twin Buttes could be eligible to receive federal and state funding to maintain defensible space, as outlined by the Healthy Forest Restoration Act of 2003.

### **3.7 FUTURE WORK NEEDED**

Since this plan was created in the winter, we recommend the following fieldwork be done in the summer of 2008 to complete this Forest Management Plan:

1. The forester and the wildlife biologist need to walk the property together before marking begins, to identify any areas of concern for wildlife. Specifically, they need to discuss thinning in the wildlife corridor and the possibility of re-creating a meadow.

2. The forester needs to conduct a forest inventory of TB to aid in the discussion of existing conditions in this Forest Management Plan.
3. The forester needs to inventory the aspen stand and make any possible management recommendations needed.

## **4.0 CONCLUSION**

Ecosphere has created a custom defensible space and forest health plan for the Twin Buttes Development in this Forest Management Plan (Figure 3). This plan is meant to be executed by a forester, in concert with the Wildlife Management Plan and the Trails Management Plan.

Developing defensible space is only going to become more valuable in the future, as the Wildland Urban Interface expands and the time since the last natural wildfire fire grows. The Western United States has experienced a six fold increase in wildfire since 1986, and this trend is expected to continue due to global climate change (Westerling et al. 2006). Creating and maintaining defensible space and healthy forests is a solid investment in the safety and well being of the Twin Buttes community.

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## 6.0 TABLES AND FIGURES

Table 1. The acres of each Vegetative Association that are scheduled for development, i.e. will be lost from construction of the Village Areas. These data do not include the proposed Community Gardens/Agricultural Regions.

VEGETATION ASSOCIATION	Total Acres	Acres Scheduled for Development	% of land to be developed
Gambel Oak-Mountain Mahogany Shrubland	119	1	1%
Mesic Aspen Woodland	0	0	0%
Montane Grassland	48	34	71%
Narrowleaf Cottonwood-Thinleaf Alder-River Hawthorne Riparian Woodland	12	0	0%
Pastureland	16	2	13%
Pinyon-Juniper Woodland	25	14	56%
Ponderosa Pine-Douglas Fir Forest	110	2	2%
Ponderosa Pine-Gambel Oak Woodland	251	56	22%
Urban Disturbance	14	11	79%
Grand Total	597	119	20%

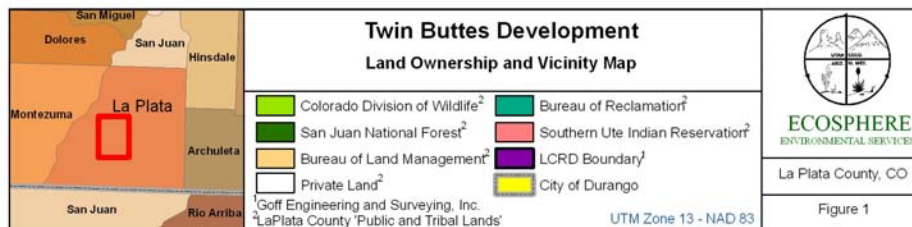
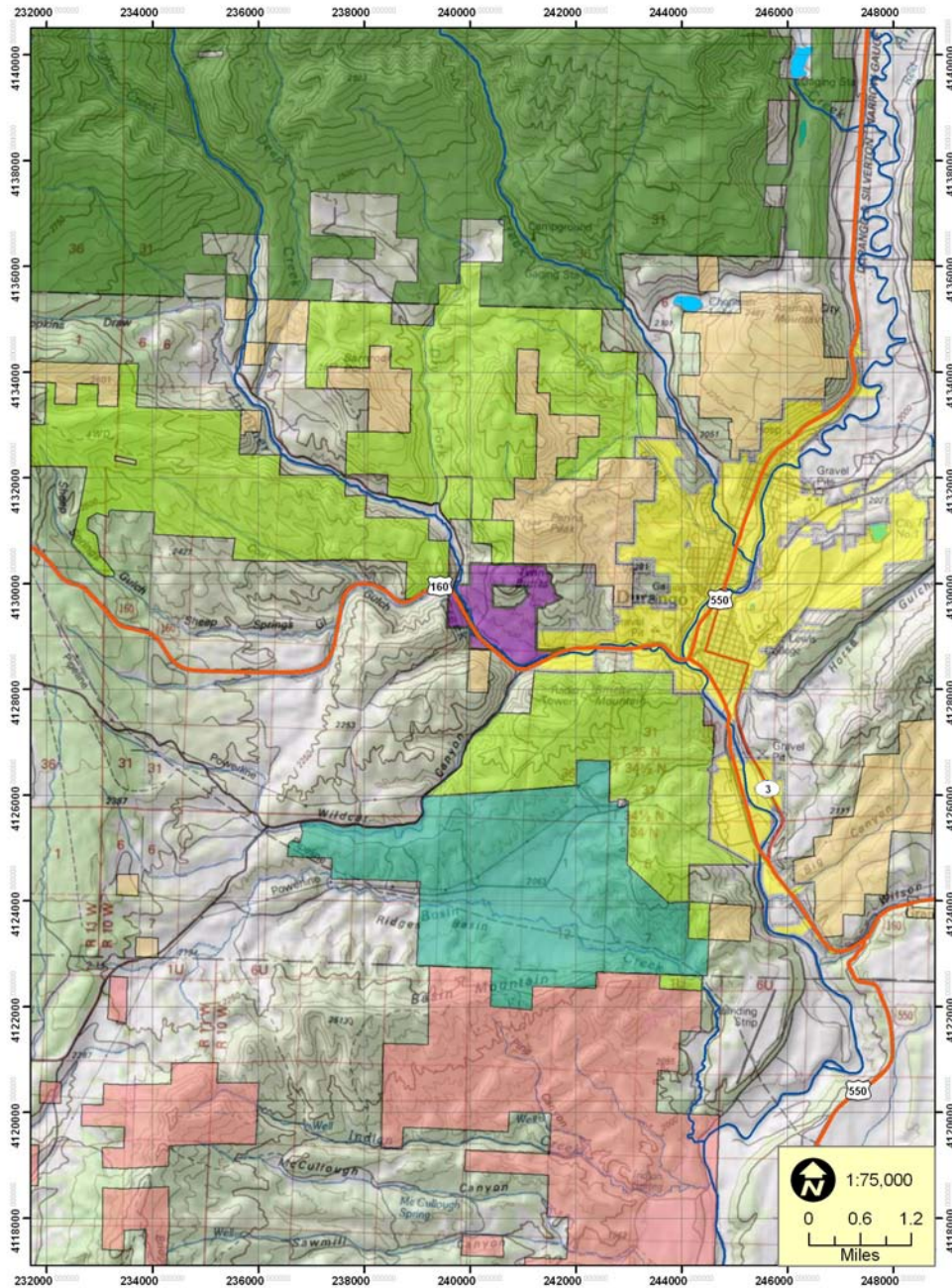
Table 2. The acreages of the thinning design broken into vegetation types for Twin Buttes\*. The primary priority thinning areas are highlighted in yellow and the secondary priority thinning areas are highlighted in blue.

Vegetation Type	Acres				
	Fuel Break	Zone 1	Zone 2	Zone 3	Total
Ponderosa Pine-Gambel Oak Woodland Association	50	38	37	133	258
Gambel Oak-Mountain Mahogany Shrubland Association	3	0	0	119	122
Ponderosa Pine-Douglas Fir Forest Association	4	2	0	103	110
Montane Grassland	4	32	2	10	49
Pinyon-Juniper Woodland Association	7	10	4	4	25
Pasture	9	0	0	8	17
Urban Disturbance	9	0	0	8	17
Grand Total	96	87	47	364	594
Primary Priority Thinning	65	50	41	0	156
Secondary Priority Thinning Areas	0	0	0	360	360

*\*The riparian and aspen communities have been excluded from this thinning design.*

Table 3. Incomplete List of Local Thinning Companies

<b>Thinning Company</b>	<b>Phone Number</b>	<b>Slash Disposal Technique</b>
Ron Tyner	749-0607	mulcher on track
Mike Kane w/Fire Ready	533-7078	handfed into chipper
Bob Ewing (works with Tom Ross and Ron Tyner)	259-2079	mulcher on track
Tom Fischer	479-21307	buck and remove for firewood
Don Hinkley (previously worked with LCR)	588-3409	chip or pile and burn
Tom Ross	259-1853	buck and remove for firewood
Eric Husted, Lorax Forest Care	884-4047	logging and milling



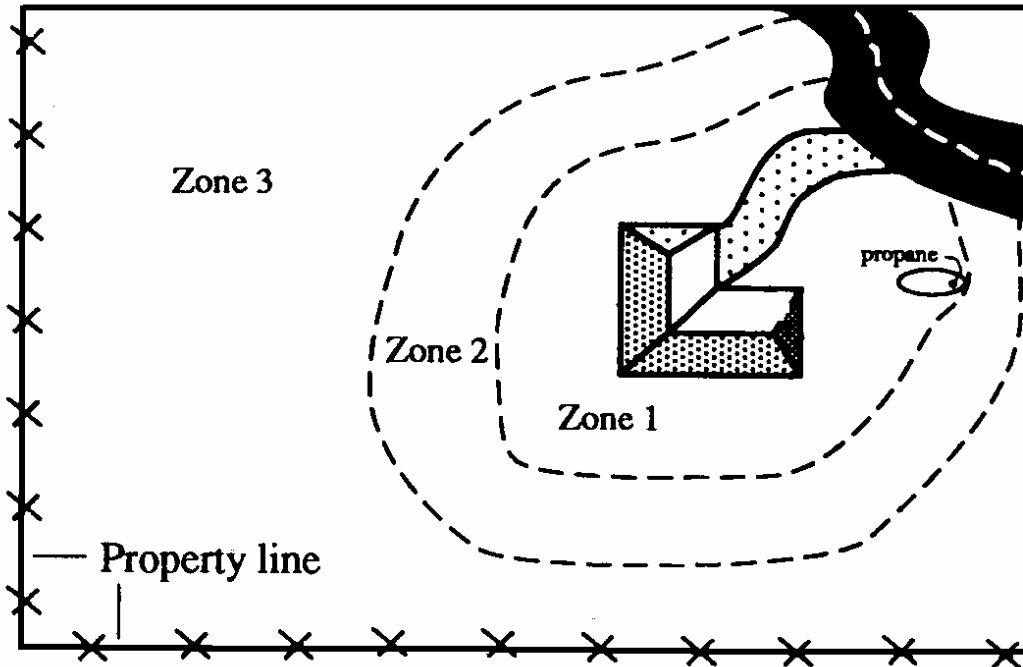


Figure 2a. Example of a property that has been divided into 3 management zones (Dennis 2003).

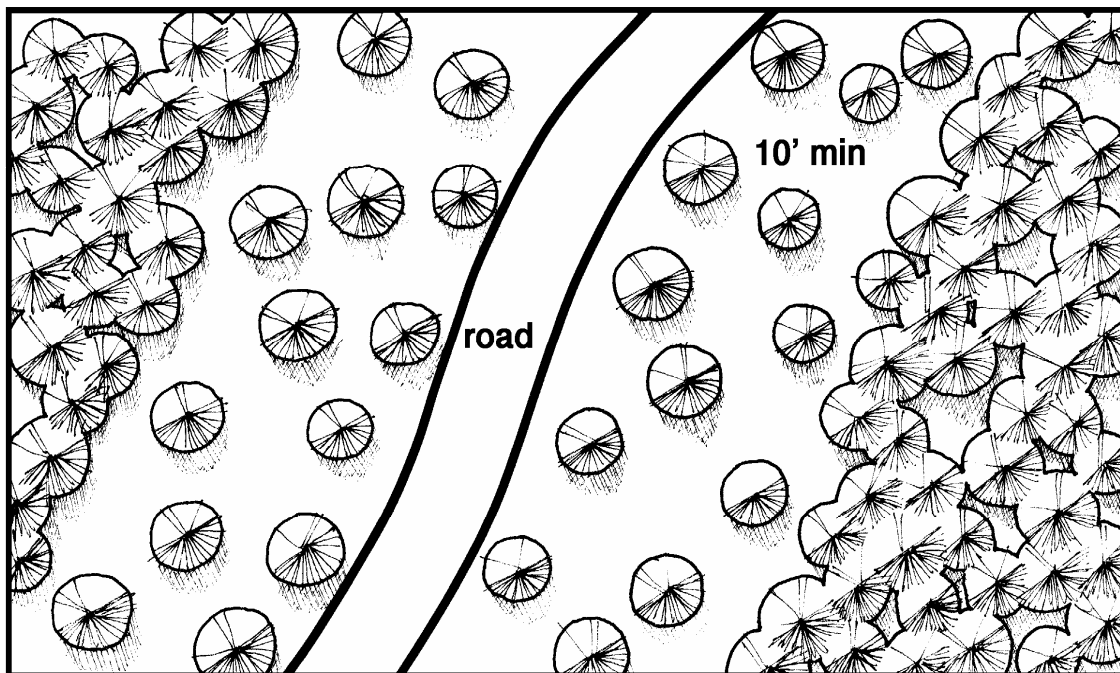


Figure 2b. Illustration of the tree spacing in a fuel break (Dennis 2005).

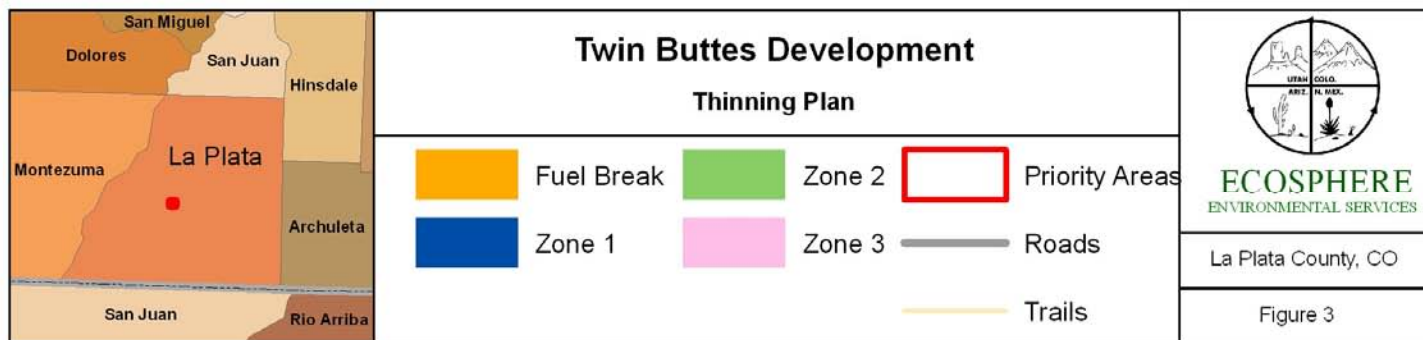
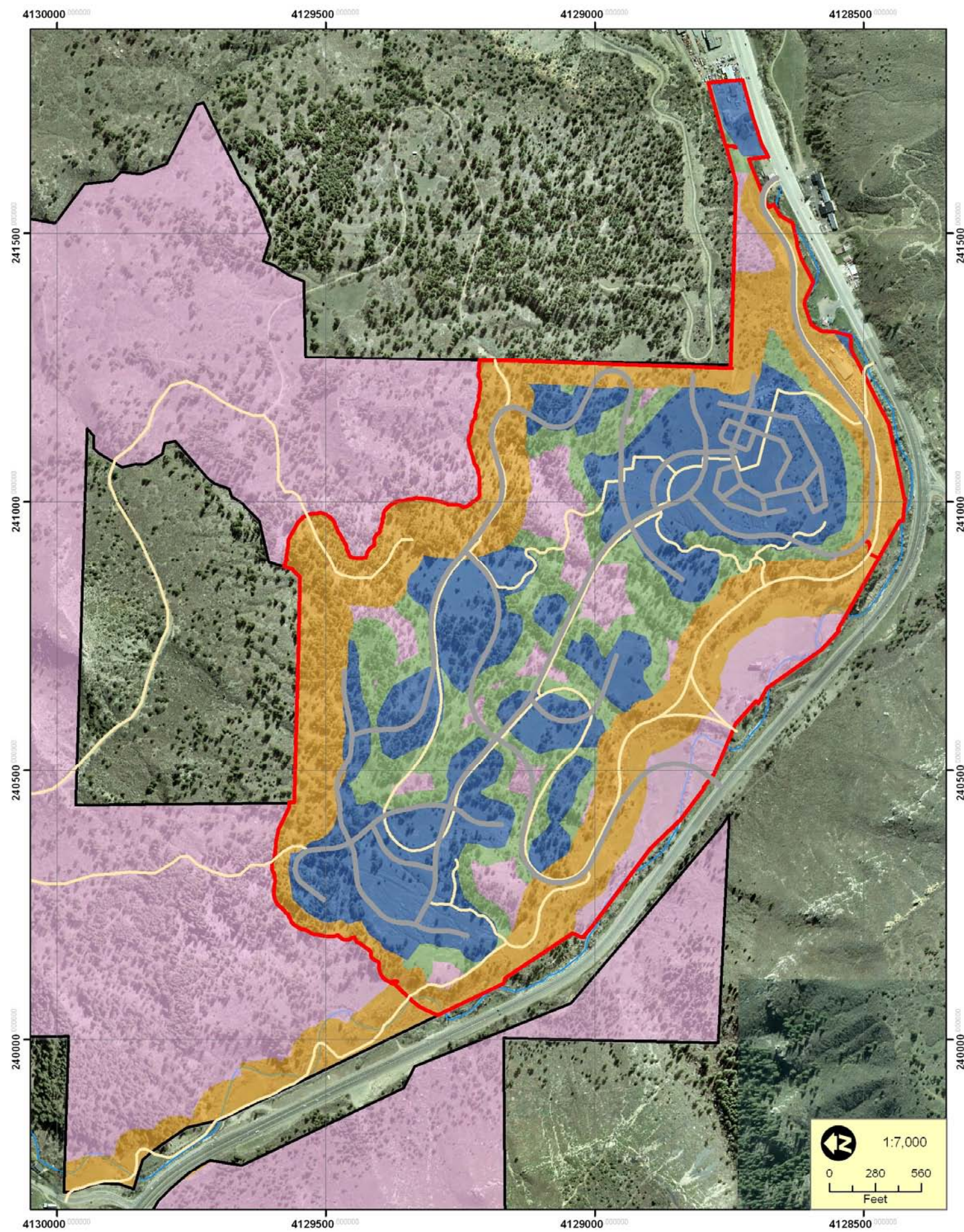


Figure 3. Thinning Plan Map for Twin Buttes. This thinning plan is based on the proposed building envelopes, roads (shown in grey) and trails (shown in yellow) for the Twin Buttes. The property has been divided into Zones and Fuel Breaks based on vegetation type, slope, and proximity to proposed structures. Zone 1 (in blue) is the immediate vicinity of the proposed structures and is an area of heavy fuels reduction. Zone 2 (in green) extends from Zone 1 based on slope and is an area of moderate fuels reduction. Zone 3 (in purple) extends from the boundary of Zone 2 to the property boundary and is an area of light fuels reduction. The fuel break strips (in orange) are strategically placed areas of heavy fuels reduction. The primary priority thinning is the area around the future development, and is outlined in red.