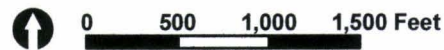


Colorado State Parks

Lory State Park

**2006 Mitigation Units**



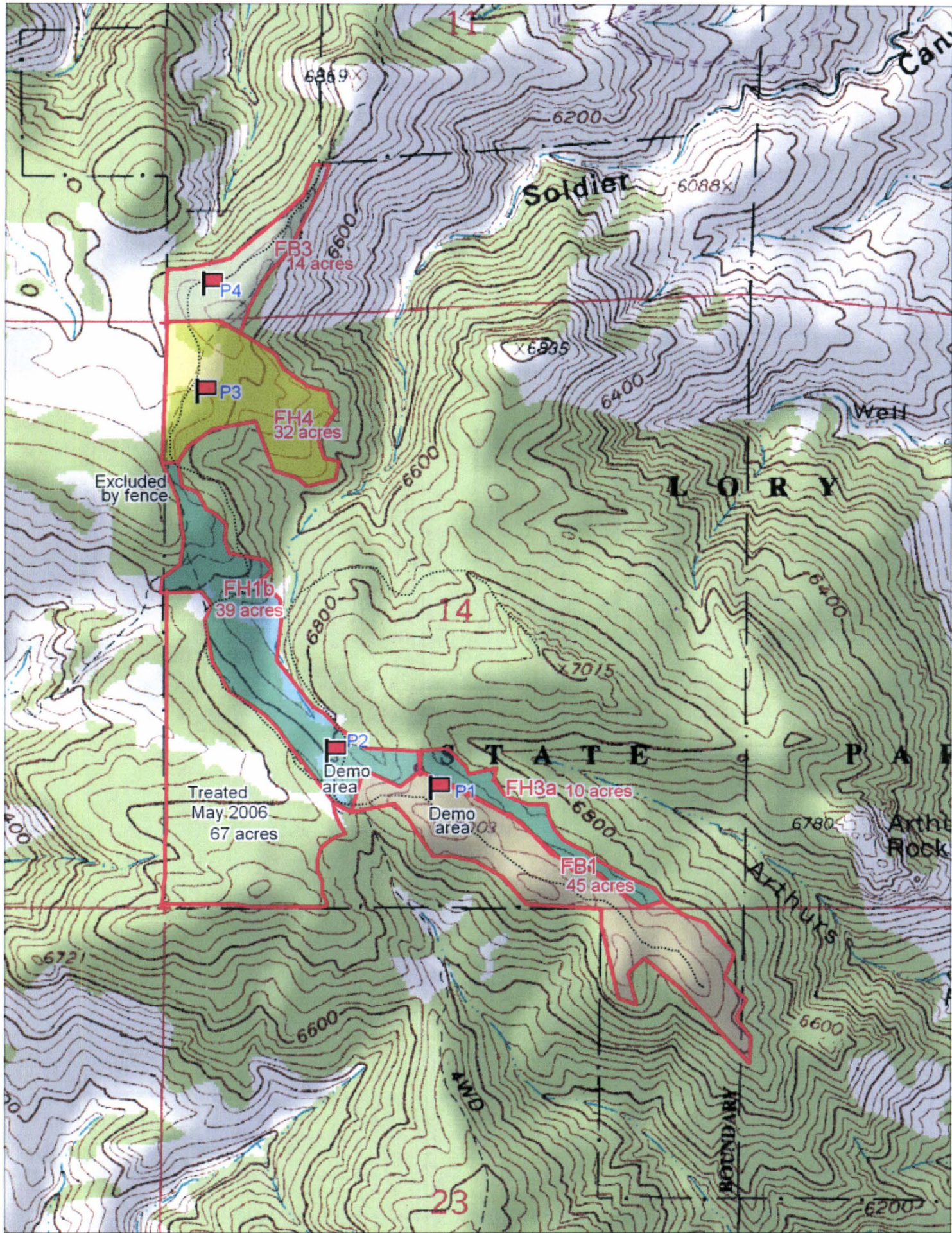
**Legend**

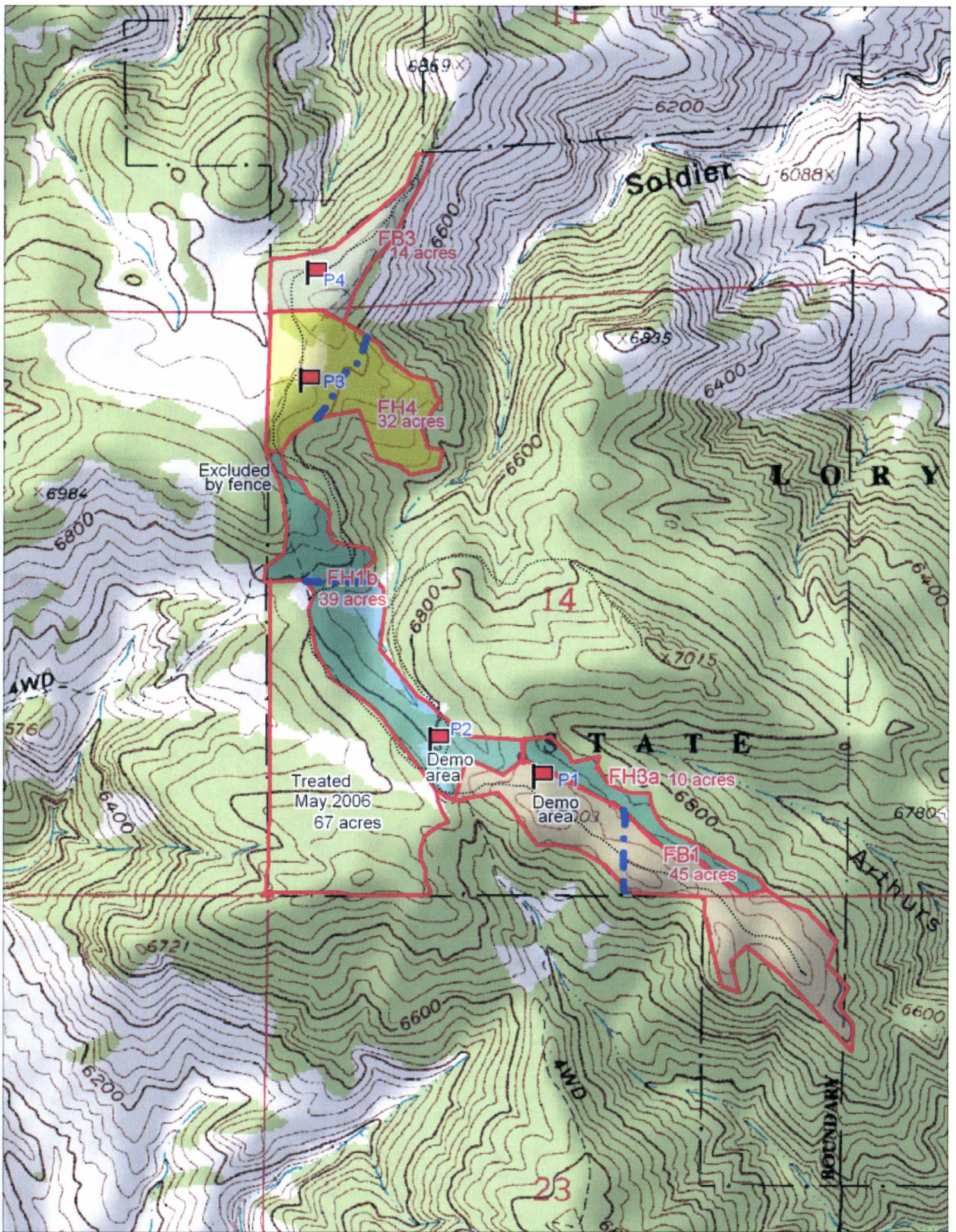
- Lory State Park
- 2006 Mitigation Units

Map Document:  
20060510\_layouts.mxd  
Adobe PDF:  
20060510\_layouts.pdf  
Map prepared by: Lisa Kraft  
Colorado State Parks  
Resource Stewardship Team  
Date prepared:  
May 17th, 2006  
Data Sources:  
Colorado State Parks, USGS  
Additional Information:  
Contour Interval - 40'  
Cartographic Information:  
Map Datum: NAD27  
Map Projection: UTM, Clarke 1866  
Units: Meters  
UTM Zone: 13 North

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5-22-06





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Blue dash lines are flagged with blue and white striped flagging for block divisions. Can use trails and roads to further subdivide FB1 + FH1b.

need CSP named as insured on contractor's insurance?

## Lory State Park 2006 Fuels Management Program Project Review Sheet

**Project Name:** West Side Fuelbreaks and Hazard Reduction

**Date Prepared:** May 2, 2006

**Prepared by:** Jerry E Schmidt, Land Stewardship Associates LLC

**Type of Project:**

<input checked="" type="checkbox"/>	<i>Vegetation Treatment</i>	<input type="checkbox"/>	<i>Prescribed Fire</i>
<input type="checkbox"/>	<i>Tree/Shrub Planting</i>	<input type="checkbox"/>	<i>Defensible Space</i>
<input type="checkbox"/>	<i>Re-vegetation</i>	<input type="checkbox"/>	<i>Other (describe)</i>

**Good Neighbor Project:**  Yes  No

**Property or Parcel Name:** Lory State Park (hereinafter referred to as park)

**County:** Larimer

<b>Total acreage:</b>	Unit FB-1 = 41 ac	Unit FH-1b = 39 ac
		Unit FH-3a = 12 ac
	Unit FB-3 = 14. ac	Unit FH-4 = 32 ac

---

Total 138 acres This will be modified as interested party reviews occur

**Project Description:**

**Treatment Goals:**

- Construct two fuelbreaks
- Reduce fuel loading to decrease the chance of fire passing to or from private lands to the west and to the north.
- Reduce levels of dwarf mistletoe to improve park aesthetics and forest resistance to insects and disease.
- Reduce the number of Douglas-fir on the northern slopes.
- Maintain or enhance recreational settings and wildlife habitat.

### Existing Conditions:

- All treatment units are classified as Ponderosa Pine Woodland. There are a few clumps of mountain mahogany, Douglas-fir and a scattering of Rocky Mountain juniper.
- Two Units (FB-1 and FB-3) are on ridge tops are intended to be part of a fuelbreak system. The other two Units (FH-1b and FH-4) are on a high elevation bench along the west edge of the Park and are to be thinned for fuel hazard reduction as well as forest health improvement.
- All Units are forested while there are occasional open areas and more dense clumps of trees. Average crown closure is about 60%.
- In all units a predominate amount of the ponderosa pine are infected with dwarf mistletoe increasing their susceptibility to insect and disease attack that could cause wide spread tree mortality.
- The Units are very operable, with slopes less than 30% in most places. In Unit FH-1b there is one small area, in the NE corner, where the slope is over 30%. In Unit FB-1 there is little surface rock present and on the north end there is a short steep slope.
- Access to all units is over a poorly maintained 4x4 wheel drive road.
  
- **FB 1** is approximately one mile long and includes approximately 43 acres. The slope is generally 0-25%. There is an abundance of fuel ladders within the unit. The presence of dwarf mistletoe is heavy. Douglas-fir of all ages is prevalent along the northeast side of the ridge. There are a few rock outcrops scattered along the ridge, particularly along the southeast side. The access road is in its poorest condition on this unit and there is a steep road segment on the north end of the unit.
  
- **FB 3** is approximately 1/3 mile long and includes approximately 14 acres. Slope steepness ranges from 0-30%. There is a moderate amount of fuel ladders within the unit and the presence of dwarf mistletoe is moderate. There are a few small rock outcrops on the northeast end. The poorly maintained access road is in its best condition on this unit and the road almost bisects the unit in half.
  
- **FH 1b** is located along the west edge of the park and is about 39 acres in size. Slope steepness ranges from 0-30%. There is an abundance of fuel ladders within the unit and the presence of dwarf mistletoe is moderate to heavy. There are a few openings within the unit and a steep area of small acreage on the northeast end. The area adjacent to the southwest side of FH-1b, 67 acres, was thinned by hydro-axe in April 2006. The access road travels through the northwest side and along the southwest boundary of the unit.
  
- **FH 3a** is located along the northeast side of FB 1 and is about 12 acres in size. Slope steepness ranges from 0-30%. There is an abundance of fuel ladders within the unit and the presence of dwarf mistletoe is heavy. The primary forest vegetation is both ponderosa pine and Douglas-fir very similar to the southeast end of FH 1b.
  
- **FH 4** is approximately 32 acres. Slope steepness ranges from 0-30%. There is an abundance of fuel ladders within the unit and the presence of dwarf mistletoe is moderate to heavy. There are a few openings within the unit. The private land adjacent to the northwest side of

FH4 is an open pasture and meadow. The access road travels through the west side of the unit.

**Table 1: Existing Conditions of Units and Blocks**

<b>UNIT - BLOCK</b>	<b>BASAL AREA (SQ FT/ACRE)</b>	<b>STEMS (#/ACRE)</b>	<b>AVE DBH (IN)</b>	<b>AVE HEIGHT (FT)</b>
<b>FB-1</b>	40 to 100	140 to 1120	Ave 6 inches 2 to 8 inches	10 – 40 feet
<b>FB-3</b>	100 to 120	300 to 500	Ave 4 inches 2 to 14 inches	20 feet
<b>FH-1b</b>	80 to 120	100 to 700	Ave 5 inches 4 to 10 inches	40 feet
<b>FH-3a</b>	100 to 120	200 to 1120	Ave 4 inches 4 to 10 inches	40 feet
<b>F H-4</b>	80 to 160	200 to 900	Ave 3 inches 3 to 12 inches	15 to 50 feet

\*Note: Where more than two generations dominate the units a range of average size classes are shown.

**Treatment Prescription:**

FUELBREAK TREATMENT UNITS

**FB 1 and FB-3** These two units are ridge-top units to be prepared for part of a fuelbreak system. Some of the requirement apply to both fuelbreaks and some of the requirements are for specific to FB3 or FB1 only.

Requirements for both fuelbreaks FB3 and FB1

- ~~All trees to be removed shall be mechanically masticated and no mulched material shall be larger than four feet long and eight inches in diameter. Also, chunk depth will not exceed ten inches.~~
- Disposal of trees over 10 inches dbh shall include pushing the tree over and ~~completely~~ masticating the roots and the top down to ~~9~~ <sup>10?</sup> inches.
- All stumps will be cut as close to the ground as possible. Unless there is rock near the base of the removed tree stump height will not exceed four inches.
- Masticate woody ground fuels.

- No more than 2 snags per acre greater than 10 inches dbh will be retained. Remove or masticate all other standing and down dead trees not currently in use by wildlife.
- Units will be thinned so that small or medium-sized trees with branches growing near the ground are not left underneath the crowns of larger trees.
- Work around rock outcrops.

Requirements specific only to FB 1. FB 1 will be treated in two blocks, one being Douglas-fir and the other being ponderosa pine. The northeast side is dominated by Douglas-fir on and southwest side, north end and south end is dominated by ponderosa pine.

Requirements specific only to the Douglas-fir block of FB 1.

- Treat the demo area first for demonstration and understanding purposes.
- Target basal area is 30 to 60 square feet per acre (down from 100 square feet) for choosing remaining trees to be thinned. Leave trees no less than 10 feet between tree crowns more than 5 inches dbh. Some live “character” trees may be left. Small isolated groups (3-6 trees) of healthy trees may be left. The use of a prism or angle gauge may be needed to meet the target basal area. Residual trees or groups of trees will be left in an uneven and clumpy pattern with a representation of all diameter classes.
- Retain all healthy-looking ponderosa pine and other species (thin from below).
- Retain well-formed, larger, healthy (no dwarf mistletoe or insects) or healthy-looking (i.e. Hawksworth mistletoe rating  $\leq 2$ ) ponderosa pine and other species (thin from below).

Requirements specific only to the ponderosa pine block of FB 1.

- Retain well-formed, larger, healthy (no dwarf mistletoe or insects) or healthy-looking (i.e. Hawksworth mistletoe rating  $\leq 2$ ) ponderosa pine and other species (thin from below).
- Remove poorly formed trees including larger trees with insect/disease that have a Hawksworth mistletoe rating  $> 2$ .
- All trees less than 9 inches dbh that are mistletoe infected trees will be removed.

Unit FB 1 will be treated during the periods of June 15 through September 15 or November 1 through February 28. The purpose is to minimize conflict during the heavy use season for hikers and recreationist.

**Table 2a: Tree Removal Guidelines for Unit FB-1**

SIZE CLASS (DBH)	# TREES (PER AC)	MAX # LEAVE TREES (PER AC)
0-6"	200 to 400	30 to 80
6-9"	70 to 100	30 to 50
9<	40 to 80	30 to 40
<b>Totals</b>	140 to 1120	90 to 170

\***Note 1:** The guideline is not a goal but an estimation of the number of trees that might qualify for retention after the prescription factors have been applied. Usually all maximum numbers for all size classes will not occur on the same acreage.

\* **Note 2:** The forest type within FB 1 is very diverse. On the north end, where the demonstration area is, the trees are small and medium sized and mistletoe infestation is heavy. Douglas-fir is successfully competing for the space. Along the east side Douglas-fir are also becoming dominate. On the south end the pine are larger and less affected by mistletoe and the stands are open. Along the top and the west side the pine is open, infested with mistletoe, and has experienced high mortality, in recent years, from pockets of insect activity and lightning fires.

Trees retained per acre will probably range from a low of 40 per acre where they are large or where the mistletoe is the severest and up to 90 to 170 per acre where the trees are small to medium sized.

Requirements specific only to FB3.

Leave all uninfected PP >12

- Target basal area is 40 to 60 square feet per acre (down from 120 square feet) for choosing remaining trees to be thinned. Residual trees or small groups (3 to 6 trees) of trees will be left in an uneven and clumpy pattern no less than 10 feet between the crowns of individual trees or small groups with a representation of all diameter classes. Some live "character" trees may be left.
- All mistletoe infected trees will be removed.
- FB 3 will be treated as one 14 acre block and not sub-divided.

**Table 2b: Tree Removal Guidelines for Unit FB-3**

SIZE CLASS (DBH)	# TREES (PER AC)	MAX # LEAVE TREES (PER AC)
0-6"	150 to 250	40
6-9"	110 to 170	40
9<	40 to 60	40
<b>Totals</b>	300 to 500	120

FH3a - all feathering

\*Note: The guideline is not a goal but an estimation of the number of trees that might qualify for retention after the prescription factors have been applied. Usually all maximum numbers for all size classes will not occur on the same acreage.

### FUEL HAZARD REDUCTION TREATMENT UNITS

- **FH 1b, FH 3a and FH 4** These three units are hazard reduction treatment units intended to improve forest health, wildlife habitat and long-term aesthetics values as well as reducing fire hazard.

open meadows in FH 1b or FH 4

- Treat the demo area first for demonstration and understanding purposes.



- Target basal area is 60 square feet per acre (down from 100 to 120 square feet) for choosing remaining trees to be thinned. ~~Leave trees no less than 10 feet between tree crowns more than 5 inches dbh.~~ Some live "character" trees may be left. Small isolated groups (3-6 trees) of healthy trees may be left. The use of a prism or angle gauge may be needed to meet the target basal area. Residual trees or groups of trees will be left in an uneven and clumpy pattern with a representation of all diameter classes.

Leave no less than 10' btwn crown edges of clumps

- As a guideline the following numbers of healthy trees below 9 inches dbh should be retained. < 6 inches dbh 40 to 60 trees; 6 to 9 inches 25 to 40 trees.

Leave no less than 10' btwn D# trees less than 5" dbh.

- All trees less than 9 inches dbh that are mistletoe infected trees will be removed.

- Retain well-formed, 9 inches dbh or larger, healthy (no dwarf mistletoe or insects) or healthy-looking (i.e. Hawksworth mistletoe rating  $\leq 2$ ) ponderosa pine and other species (thin from below).

- Remove poorly formed trees including larger trees with insect/disease that have a Hawksworth mistletoe rating  $> 2$ .

grind to 12" \* hand fell > 12"

- Disposal of trees over 10 inches dbh shall include pushing the tree over and ~~completely~~ masticating the roots and the top down to 9 inches.

operator will remove fence @ FB3 + dispose

- Where patches of dwarf mistletoe occur, cut all infected trees except larger ( $> 9$ " dbh), healthy-looking (i.e. Hawksworth rating  $< 2$ ) trees. All smaller infected trees may be removed.

- ~~Mulch depth will not exceed ten inches.~~

- Previously dead and down woody material should not be mulched and larger diameter down logs should be left intact as much as possible.

- ask operator what length of barbed wire will cause problems

- All stumps will be cut as close to the ground as possible. Unless there is rock near the base of the removed tree stump height will not exceed four inches.

GPS road

- ~~Approximately 2 snags per acre will be retained.~~ Approximately two to five existing snags being used by wildlife or snags greater than 10 inches dbh will be retained for each acre. Remove all other standing dead trees.
- There is an ephemeral stream along part of the east boundary for FH 1b that should not be driven in. Unhealthy ponderosa pine or pine in need of thinning within the drainage may be masticated. The segment of stream needing protection is marked with orange flags.
- FH 1b will be sub-divided and treated in two blocks of approximately equal size.
- FB 3a will be treated as one 12 acre block and not sub-divided.
- FH 4 will be sub-divided and treated in two blocks of approximately equal size.
- Unit FH 1b and FH 3a will be treated during the periods of June 15 through September 15 or November 1 through February 28. The purpose is to minimize conflict during the heavy use season for hikers and recreationist,

**Table 2c: Tree Removal Guidelines for Unit FH 1b, FH 3a, and FH 4**

<b>SIZE CLASS (DBH)</b>	<b># TREES (PER AC)</b>	<b>MAX # LEAVE TREES (PER AC)</b>
<b>0-6"</b>	400 to 600	30 to 50
<b>6-9"</b>	70 to 100	30 to 50
<b>9&lt;</b>	40 to 80	30 to 50
<b>Totals</b>	100 to 1120	90 to 150

\*Note: The guideline is not a goal but an estimation of the number of trees that might qualify for retention after the prescription factors have been applied. Usually all maximum numbers for all size classes will not occur on the same acreage.

**Treatment Methods and Equipment**

- The best treatment method for all units is mastication with hydro-axe combined with some thinning by hand, such as near rocks and where there are large leave trees that need pruning.
- The hydro-axe should be a rubber tired 4X4 Forestry Tractor equivalent to an 861 Hydro ax or 721E Hydro ax.

## Cost Estimates

**Table 3: Cost Estimates:**

Cost estimates for fuelbreak work is higher than for fuel hazard reduction. The cost/acre for FB-3 is lower than for FB-1 because there is very little mistletoe and fewer trees per acre to masticate.

\*estimate will be revised as better information becomes available. These costs rates are based on CSFS experience in the South Platte and Lory SP areas.

<b>UNIT - BLOCK</b>	<b>ACRES</b>	<b>COST/ACRE (\$)</b>	<b>TOTAL COSTS (\$)</b>
<b>FB-1</b>	<b>41</b>	<b>\$800</b>	<b>\$32,800</b>
<b>FH-1b</b>	<b>39</b>	<b>\$700</b>	<b>\$27,300</b>
<b>FH-3a</b>	<b>12</b>	<b>\$700</b>	<b>\$8,400</b>
<b>FH-4</b>	<b>32</b>	<b>\$700</b>	<b>\$22,400</b>
<b>FB-3</b>	<b>14</b>	<b>\$700</b>	<b>\$9,800</b>
<b>TOTALS</b>	<b>128</b>	<b>\$717</b>	<b>\$100,700</b>

**Rationale for recommended management treatments:**

The draft Stewardship Plan (2004) for the park states:

*“It is State Parks’ responsibility to protect, preserve, enhance, and manage for the use, benefit and enjoyment of the people of, and the visitors to, Colorado, the natural, scenic, and outdoor recreational area of this state” (CRS 33-10-101).*

The Forest Management Plan (1989) states:

*“maintain and improve the forest’s health and aesthetics while preserving the Park’s natural, scenic and educational value”*

Goals and objectives of Lory State Park include: 1) managing for recreation and resource protection, 2) maintaining plant communities in good condition, 3) concentrating on preserving areas of the vegetation communities that are currently weed free, and 4) sustaining and improving forest health and reducing wildfire risk.

The 2004 Wildfire Hazard and Mitigation Plan for Lory State Park *seeks to provide protection of natural resources in the park while reducing hazardous fuels in a manner consistent with preserving a healthy forest environment that can provide the public an opportunity to experience its resources and provide for firefighter and public safety. Restoration of a healthy forest will be sought through direct fire mitigation and through fuel treatment, harvest of forest products where appropriate, prescribed fire, mechanical treatment and other means for providing breaks in forest fuel continuity.*

*Specific goals for this plan are as follows:*

- *Protect the natural resources, ecological functions and infrastructure in Lory State Park from significant loss in a large wildfire.*
- *Reduce the potential for a stand-destroying wildfire through identification of strategic locations for fuel breaks and fuel treatment opportunities to lower the risk of wildfire.*
- *Protect ecological values, including vegetation, water quality and yield, wildlife, and air resources and social values including public safety, and historic values.*
- *Reduce wildland fire hazards and restore the functions of the ecological communities.*
- *Reduce risk from wildfire ignitions.*

To accomplish the goals listed above a small system of fuel breaks and fuel hazard reduction treatments will be developed along the west side of Lory State Park.

- Fuel-breaks provide a break in the continuity of ground fuel and tree crowns that modifies fire behavior to the extent that firefighters have a relatively safe place to make a stand. Tree crown closure will be less than forty percent and no snags will be protected within these units.
- The fuel hazard reduction treatment units are intended to improve forest health, wildlife habitat and long-term aesthetics values as well as reducing fire hazard. Together they provide an important treatment where a wildfire can more likely be contained due to less fuel continuity including a more open forest canopy.

**Long-term benefits:**

- Reduce wildfire hazards and risks.
- Maintain or improve the health and vigor of the forest stands.
- Reduce presence of dwarf mistletoe and susceptibility of forest stands to insects and disease.
- Maintain or improve the recreational settings and aesthetics of Park.
- Maintain or improve wildlife habitat.

**Future treatment maintenance:**

- Years 1, 2, and 3: treat noxious weeds.
- Year 15: Evaluate need to thin reproduction in all units again.

## Project Implementation:

### Contract period:

- Contractor may operate during daylight hours, *\* but no earlier than 7AM* seven days a week from \_\_\_\_\_, 2006 to \_\_\_\_\_, 2006.
- Project must be completed by \_\_\_\_\_, 2006. No contract extensions will be allowed for this project.

### Operation Restrictions:

- The contract administrator may suspend or limit operations in the case of extreme fire danger, excessive damage due to mud or snow, excessive residual tree damage, or failure to meet contract specifications.
- Unit FB 1, FH 1b, and FH 3 will be treated during the periods of June 15 through September 15 or November 1 through February 28. The purpose is to minimize conflict during the heavy use season for hikers and recreationist.
- Hours of operation will be limited to between 7AM and 7PM seven days a week.

### Marking:

**The contractor will determine which trees to remove based on the management prescription, unless otherwise specified by the contract administrator.**

- **BOUNDARY – (Blue flagging)** The unit boundary will be delineated with blue flags, except the west boundaries for FB-3, and FH-4 which are delineated by fencing. The west boundary of FH-1b is delineated partly by fencing and partly by the access road. The contractor will masticate in a “feathered pattern” along the boundaries according to the tree stand characteristics and operability i.e. If a large tree is down across the boundary masticate the whole top and bottom; If a small clump of small trees straddle the boundary masticate the entire clump in stead of bisecting it; If there are rock outcrops along the boundary work in and out and around the rocks.
- **DEMO AREAS – (Yellow flagging)** Leave trees will be marked with yellow flags. All un-flagged trees are to be masticated. ~~All un-flagged trees are to be masticated.~~
- **EPHEMERAL STREAM PROTECTION – (Orange flagging)** There is an ephemeral stream along part of the east boundary for FH 1b that should not be driven in. Unhealthy ponderosa pine or pine in need of thinning within the drainage may be masticated. The segment of stream needing protection is marked with orange flags.

### Access:

- Access to the project area will be from North County Road 25G, a paved road north of the entrance to Lory State Park. From 25G, travel is on a narrow public gravel road (Red Cedar Drive), which winds through a subdivision for approximately 1.4 miles. Then a private road is accessed through a private locked gate. This section of road is narrower, has very steep inclines, contains sharp turns, and may require a 4-wheel drive vehicle. It is approximately 1

mile in length. A gate owned by Lory State Park is located near the property boundary. The project area begins at the gate. Unit FB-3 straddles the poorly-maintained Park access road from the gate for approximately ¼ mile SW. FH-4 is adjacent to the south side of FB-3 and it also straddles the road for a 1/5 mile south with most of the treatment area east of the road. FH-1b is adjacent to and south of FH-4 and it straddles the road for approximately ¾ of a mile to the south. The access road forms the western boundary of the project area for approximately 2500 feet. FB-1 is adjacent to the SE end of FH-1b and it straddles the road for approximately ¾ mile in a southeasterly direction. The road condition in the south half of FH-1b and within FB-1 are very poor with one steep segment near where the two treatment units adjoin one another.

- The speed limit on Park property is 25 miles per hour. Posted and un-posted speed limits must be observed on all roads leading to the project area.
- The vehicle and trailer used to haul the masticating equipment may not be taken on Red Cedar Drive. These may be left at a designated area on Lory State Park property.
- The contractor must provide a lock for both access gates and leave the gates locked in a way that allows others access with separate locks.

#### **Roads:**

- All access roads will be kept passable at all times.
- Any significant accumulations of mulch on the access road will be removed by the contractor at the end of the project.
- Roads and other improvements will be repaired to the same condition as found prior to the start of work. This repair may include repairing or replacing drainage control features.
- Significant damage to existing roads or other improvements caused by the contractor must be repaired by the contractor as soon as possible.
- The contract administrator will determine if road repair is necessary.
- Any temporary skid trails will be approved by contract administrator prior to development.
- All temporary skid trails will be re-contoured to original condition. Placement of water bars and rolling dips (as necessary) will be the responsibility of the contractor.
- Any stream crossing will need an adequate culvert pipe.

#### **Slash treatment:**

- ~~There will be no slash following mastication. Chips and mulched material will remain around masticated vegetation up to 150 feet.~~ *Chunks*

### Additional Performance Standards:

- Work will begin in the demonstration areas.
- All trees to be removed shall be mechanically masticated and no mulched material shall be larger than four feet long and eight inches in diameter.
- ~~Mulch~~<sup>Chunk</sup> and depth will not exceed ten inches.
- Soil disturbance will be as minimal as possible.
- Ruts and/or depressions in the soil caused by contractor equipment will be less than eight inches deep.
- Ephemeral drainage areas will not be used as primary travel routes.
- Fuel, hydraulic fluid or other chemical spills will be reported to State Parks immediately. Any soil contaminated by loss of fuel, oil, grease, hydraulic fluid, coolant, or other fluids shall be removed and placed in covered drums or other acceptable containers for proper disposal by the contractor.
- In areas where machines have used a path repeatedly, water-bars will be installed by the contractor if the project administrator determines they are necessary.
- The contract administrator may require the contractor to mulch leave trees that have been significantly damaged (broken top, multiple equipment scars, equipment scarring in excess of 12" x 6" on the trunk, or an area encompassing more than two-thirds of the trunk circumference) by the contractor. The contractor must minimize damage to residual trees. The contractor will be charged \$20 for each significantly damaged tree that is 4 inches dbh or greater.
- Damaged gates, fences, or signs will be repaired or replaced by the contractor, at the discretion of the contract administrator or State Parks staff.
- Boundary fences must not be damaged and the mastication debris must not be propelled onto the adjoining private land.
- Smoking will only be allowed in vehicles. Each vehicle must have a Class A fire extinguisher and a minimum of one fire tool per cutting crew member. All vehicles and motorized equipment must utilize effective manufacturer-certified spark arresters and muffler systems.
- Neither trash nor litter will be left by the contractor anywhere on the Park, access route, or vicinity. Daily hauling of any trash generated by the contractor is the contractor's responsibility.

- No camping will be allowed on Park property.
- It is the responsibility of the contractor to follow all rules and regulations established for Lory State Park. Kathy Seiple of Colorado State Parks is the manager for Lory State Park and can be contacted at (970) 493-1623.
- All issues and concerns of adjacent property owners and others shall be referred to the project administrator.

**Performance/damage deposits:**

- A damage deposit in the amount of 15% of the contract value will be required upon contract award. The deposit shall be in the form of cashier's check, certified check, money order, or irrevocable letter of credit payable to the CSFS. One deposit per contractor is required.
- The deposit shall be used in part or in full, to correct deficiency in any work not completed to agreement specifications. The deposit will be retained in full should the contractor fail to complete the contracted work in the time frame specified in the Independent Services Contract.
- The deposit or its balance will be released to contractor promptly upon satisfactory completion of the contract.

**Administration:**

- All treatment units together have a gross acreage of approximately 138 acres. Colorado State Forest Service (CSFS) recognizes that portions of some blocks may not be treatable due to operability restrictions from slope, rock and topography. If 95% (131 acres) or more of the project is completed, the Contractor will be paid for 100% of the contract. If the Contractor completes less than 95% of the project the Contractor will be paid for the acreage completed. If the Contractor does not complete acres within each unit due to inability, the Contractor will submit a detailed invoice to Project administrator, displaying complete and incomplete acres. Project administrator will GPS completed acres to determine final completed acreage.
- Three of the project units (FB-1, FH-1b, and FH-4) are divided into two blocks. The project administrator must approve the first completed block before work may begin on the second block and the second block must be approved before starting work on a new unit. Once each unit or block is approved by the project administrator the contractor may submit an invoice for the completed work.
- Start date must be approved by project administrator. No work will begin without the presence of the project administrator. Work must be started within \_\_\_ working days of the contractor's receipt of the signed contract.
- Upon project completion, the contractor must request a final inspection by the contract administrator. This final inspection will be no later than \_\_\_\_\_, 2006. Any additional work must be completed by \_\_\_\_\_, 2006. Final invoicing for the work

*change to 90% operable areas will be treated*

must be submitted to the contract administrator by \_\_\_\_\_, 2006. Payment will be processed upon successful completion of the project and after final inspection is complete.

**Subcontracting:**

- All subcontractors must be approved by CSFS in writing prior to contract signing and bid approval.

**Environmental & Other Issues:**

**Weed prevention / Rehabilitation / Reclamation:**

- The undercarriage and tires of all trucks and equipment must be washed offsite before entering the project area to reduce the spread of noxious weeds from other projects. Machine operations should avoid driving through weed areas.
- Any and all reseeding will be done by Colorado State Parks in accordance with specifications provided by the State Parks Resource Stewardship Coordinator.
  - If the roads are widened, roadside berms will be reseeded with a native grass mixture. This reseeding will be done at an appropriate time of year to ensure success.
  - Skid paths and temporary roads will be reseeded with a native grass mixture.
  - All seed mixes, straw, hay materials used in re-vegetation must meet Colorado Weed-Free specifications.

*Parks has \$3000 for weeds + any rd repair/gate for goodwill*

**Air Quality:** NA

**Endangered and Sensitive Species:**

- Based on the above Biological Assessment (BA) the US Fish and Wildlife Service in a letter of March 24, 2005, determined the proposed hazardous fuels reduction projects “will not result in the taking of the bald eagle, Preble’s meadow mouse, or any Federally listed threatened or endangered species.

**Sensitive Areas to Avoid:**

- Use cautions to not damage boundary fence or propel mastication debris onto the private land.
- Use caution to not drive equipment into ephemeral stream tributary along southeast boundary of FH-1b.

**Impacts to Recreation:**

- Because the treatment units are all within low use areas the impacts will probably be negligible.

**Archeological/Cultural Resources to Avoid:**

- A cultural resource survey is being conducted for the Park. Prior to implementation of this project, and upon completion of the survey, any important cultural sites will be identified and flagged, and restrictions described.

- If unidentified cultural resources are discovered during project activities, work must be halted until the resources have been evaluated in terms of Federal Register criteria, 36 CFR 60.4, in consultation with the Colorado Historical Society.

**Other:**

- None

**Permits Needed:**

- None

**Attachments:**

1. USFWS Approval Letter of March 24, 2005
2. CHS/SHIPO letter of February 23, 2006
3. Map
4. Forest Plot & Photo Point Table
5. Photos and Plot Summary Tables
6. CSFS Cost Worksheet } to be added by
7. Parks Budget Match } CSFS and CSP

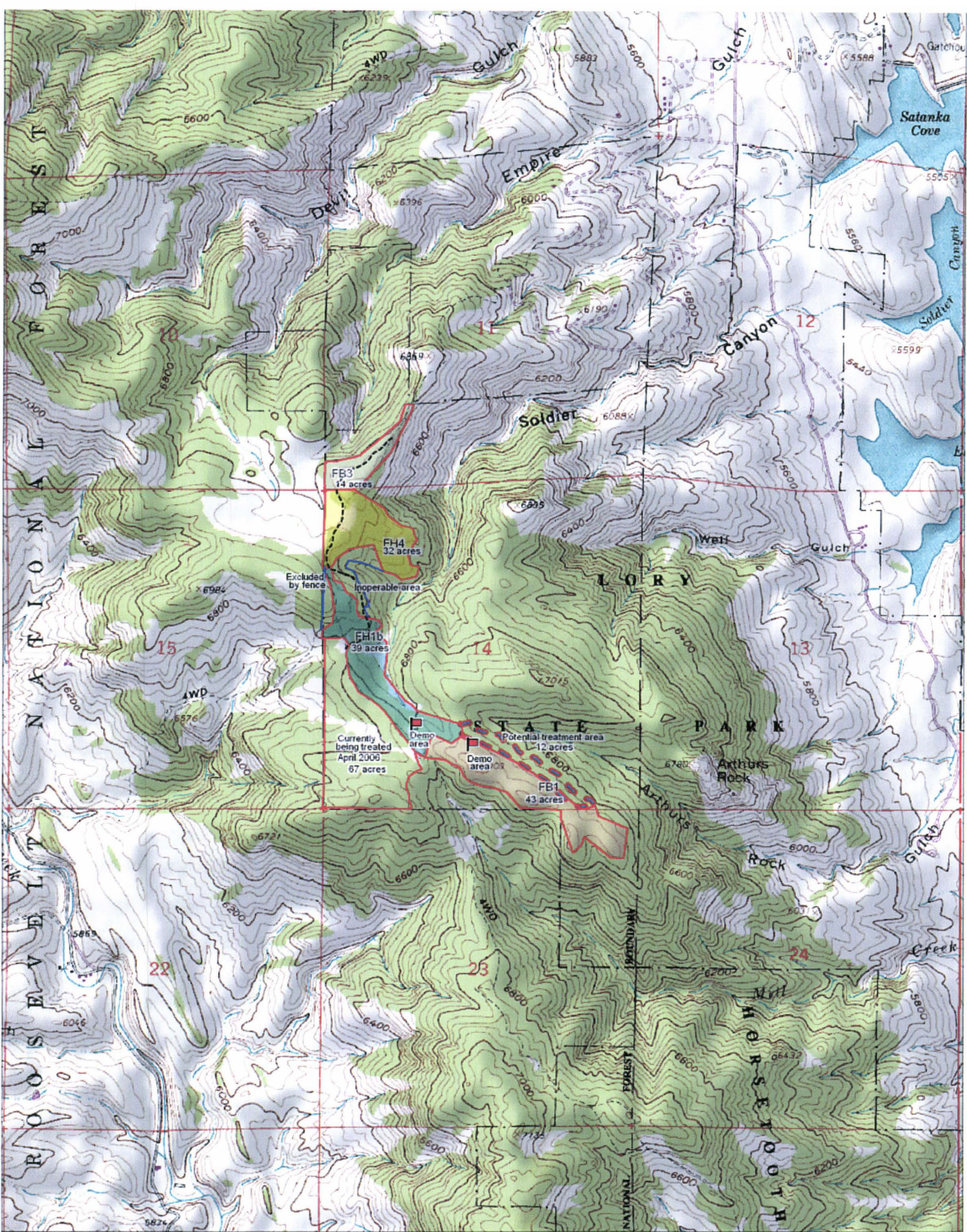
\* \* \*

<b>Proposal Submitted by:</b>	_____ <b>, CSFS Forester</b>
<b>Reviewed by:</b>	_____ <b>, Park Manager</b>
	_____ <b>, Region Manager</b>
	_____ <b>Lyle Laverty, Director</b>

**Action Items:**

\_\_\_\_\_ Project is consistent with the management objectives of this State Park and no additional review is required.

\_\_\_\_\_ Colorado State Parks and CSFS will meet to review the project. Modification to the project design and plan may be needed before the project can proceed.



## SCOPE OF WORK FOR FUEL MITIGATION PROJECT LAYOUT

2/17/06

### A. General Scope

The goal of this PO is to lay out fuel mitigation implementation projects at parks as if you were the CSFS district staff. Layouts will roughly correspond with the budgets provided, and be in line with the goals of the fuel plan for that park and the priorities identified by the project manager. The flagging/painting and the “project review sheet” must be detailed enough that they can be used to proceed with contracting with a fuels management contractor. The project review sheet will be used as a scope for that mitigation contract, so it needs to be very detailed and include all specifications. It will not present several options or broad brush info – it will state exactly how the project will be conducted. Project boundaries must stay within the areas approved through the BA process – if the project boundaries go outside those approved areas, they will not be acceptable, as we will not have approval from the USFWS or from the CHS. Project specs will be written in the “Project Review Sheet” format provided (Attachment A) and must include “blackout dates” from the BA’s, details about avoiding sensitive areas, including any areas identified in cultural surveys. Project specs will include dates of operation for the actual mitigation contract.

### B. Cost – Itemized by park.

Park / Project Review Sheet	Project Areas	Your Quote
LOR	West side FB1 = 39 acres - 1 block FH1b = 50 acres - 1 block FH4 – approximately 32 acres within a 46 acres area -1 block FB3 = 15 acres - 1 block	\$6,542.00
MUE / #1	A5 = 29 acres - 1 block B1 = 141 acres - 2 blocks	\$6,525.00
MUE / #2	B2 = 107 acres - 2 blocks B3 = 95 acres - 2 blocks B4 = 105 acres - 2 blocks	\$7,020.00
STN	Davis Ranch 5a = 68 acres - 3 blocks 5b = 84 acres - 2 blocks 5c = 102 acres - 2 blocks	\$4,858.00
<b>TOTAL</b>		<b>\$24,945.00</b>

**C. Timeline** – PO to be processed with a start date of about Feb 13th and all work to be completed by May 25, 2006. There will be no extensions – all work must be completed by this date. We need this info in order to put through agreements and solicit bids from mitigation contractors so that work could start in the fall.

To minimize problems with snow accumulation, LSA is planning to conduct field work in April and May, 2006. In order to have sufficient information to conduct the work, CSP will provide LSA with CDs containing all fuel plans, biological assessments, USFWS approval letters and restrictions, CHS approval letter and restrictions, additional GIS data (boundaries, orthophotos, shapefiles, PDF maps of culturally sensitive sites, etc.) not already provided and Project Review sheets that are partially filled out by March 6, 2006.

### D. Information provided to the contractor

The tables below will give the overall details on the size and scope of the projects to be laid out per park. Some of the priorities or methods differ from those specified in the fuel plans, but where they differ, use what is specified herein. CDs containing all fuel plans, biological assessments, USFWS approval letters and restrictions, CHS approval letter and restrictions, sample Project Review Sheets and GIS data (boundaries,

orthophotos, shapefiles etc.) and PDF maps (including maps of cultural sites that are highly sensitive) will be provided to the contractor by March 6, 2006.

**E. List of Parks, Project Areas, and Goals for Layout**

Park / Project Review Sheet	Project Areas for PRS	Suggested Methods	Goals	# of Units to layout	# of Blocks	Approx. Total Acres
LOR	West side FB1 = 39 acres - 1 block FH1b = 50 acres - 1 block FH4 – approximately 32 acres within a 46 acre area -1 block FB3 = 15 acres - 1 block	hydro axe	Thinning to reduce fuels, create a fuel break, and treatment of mistletoe in Ponderosa.	4	4	136
MUE / #1	A5 = 29 acres - 1 block B-1 = 141 acres - 2 blocks	hydro axe	Create fuel breaks and evac routes in a mixed conifer forest.	2	3	170
MUE / #2	B2 = 107 acres - 2 blocks B3 = 95 acres - 2 blocks B4 = 105 acres - 2 blocks	hydro axe	Create fuel breaks and evac routes in a mixed conifer forest.	3	6	307
STN	Davis Ranch 5a = 68 acres - 3 blocks 5b = 84 acres - 2 blocks 5c = 102 acres - 2 blocks	thinning or hydro-axe	Contractor to evaluate hydro-axing or restoration thinning - (with slash piling) in Ponderosa.	3	7	254
<b>TOTAL</b>				<b>12</b>	<b>20</b>	<b>867</b>

**F. Steps for Layout**

1. Review fuel plans, BA’s and mapping information including cultural info for the park.
2. Discuss areas to be addressed in layout with Rob Billerbeck, Scott Woods, the Park Manager, and a CSFS District Representative (hereafter referred to as Interested Parties). Rob Billerbeck has final decision-making power when comments or parties disagree.
3. Draw a prelim project boundary on topo and identify a demo area (at least 1 acre). Using the Project Review Sheet (PRS) template, write clear goals of treatment in this area, clear statement of methods for mitigation and slash treatment. It is understood that at this stage much of the PRS will be blank, but these key items (Treatment Goals, Proposed Treatment, Rationale, Slash Treatment) need to be complete and clearly written.
4. Submit a preliminary Project Review Sheet and map (PDF or JPEG) of project boundary and demo area on topo base to Interested Parties via email for comments.
5. Discuss project with Interested Parties and make revisions based on comments.
6. Proceed with marking project boundary, unit boundaries, road/off road access to units, and demo area with flagging. All marking is to be on “take” trees unless it is more appropriate to flag leave trees on the demo area to better visualize the visual impacts of the proposed treatments.
7. Add more detail to the Project Review Sheet based on additional field time PRS will be 80-90% completely filled out now and distribute the more detailed PRS via email to Interested Parties.
8. Schedule and conduct a field walk-around the boundary and all of the demo area with Rob Billerbeck, Scott Woods, the Park Manager, and a CSFS District Representative (and/or delegated staff from each). Modify flagging as appropriate.
9. Based on the field walk-around, modify the Project Review sheet, demo area marking, or boundaries. Send revised sheet (now 100% completely filled out) to Interested Parties.
10. Schedule and conduct a second field walk-around for Interested Parties and Parks Region Staff and Leadership Team.
11. Make final revisions to demo area, project/unit boundaries and PRS based on comments during that walk-around.
12. Produce a final Project Review Sheet, and final maps, final photos and table information and send to Interested Parties.
13. Paint take trees in demo area and paint project and unit boundaries.

## **G. Additional Specifications:**

For all field visits that require the attendance of Interested Parties, please give at least 3 weeks notice to Interested Parties. Your attendance at a joint CSFS/State Parks meeting on approximately March 29, 2006 is required.

The project design, as reflected in the Project Review Sheet (PRS), will include considerations of fuel continuity, effect of wind at the edges of patch cuts, regeneration and follow-up maintenance, retention or creation of wildlife snags, scenic and aesthetic priorities, effects on wildlife habitat, avoiding sensitive areas (riparian areas, rare plant populations, cultural sites, etc.), using methods and equipment to minimize environmental impacts (soil compaction), operability for mechanical treatment, and access planning will be considerations during layout. Design should also consider and list in the PRS a range of acceptable equipment for the treatment method. If landing areas, large pile burns or culverts are required, then actual point locations will be recorded with a Garmin GPS unit and specified on the map. Potential skid paths and riparian crossings should also be addressed, though it is not necessary to actually draw those on the map.

Units will generally be laid out as specified in the table above and divided into approximately even sized blocks where specified (i.e. if a units calls for 2 blocks – try to make them about the same acreage). Contractor may deviate somewhat in the size of the blocks if necessary in order to capture significant changes in condition or operability within the project boundaries (i.e. if one area is significantly lower density or will require different slash treatment). The PRS will specifically address the conditions at each unit and block in terms of:

1. stems per acre
2. BA/acre
3. average diameter
4. average height

These should be stated both before treatment as well as the target values after treatment. It will also specifically address (per each unit) the average slope and aspect, notes on operability, and special issues/sensitive sites to avoid (cultural sites, riparian crossings, etc.). The PRS will also specifically address tree classes (species/size) that will be favored or selected against and to what extent (i.e. leave 30% of larger diameter Douglas fir).

Documentation of the project areas will be accomplished by setting at least one forest inventory/photo point in each project block (the suggested number of units and block s is specified in the table above and the contractor must lay out at least that many units). That point (or points) should be chosen to be representative of the conditions in that unit. The point location will be recorded with a Garmin GPS unit, and from that location 4 digital photos will be taken to show approximate conditions with the unit. The direction of the photos will be recorded and the photos will be named to indicate the direction – these should generally be north, south, east, west, but the contractor can alter this if it improves the usability of the photos. File names should be as follows: <park 3 letter code> <point number> <direction> - examples: tri003w.jpg or rox005nnw.jpg. Within project units, several representative 20 factor basal area (BA) prism measurements will be taken. At the actual location of the photo points, 3 representative prism measurements will be recorded. At this location the contractor will also make estimates of:

1. stems per acre
2. BA/acre
3. average diameter
4. average height
5. Average slope and aspect
6. observations on operability (including rock outcrops, ridgebreaks, etc.)
7. observations regarding ecological and succession issues (such as aspen regeneration, wildlife habitat, etc.)

The point and the values will be chosen to be representative for the unit. The boundary of each unit will be paint marked with a vertical slash at breast height and butt as “take” trees and the number of the unit will be marked periodically on the same boundary trees for identification.

**H. Deliverables for each park will include:**

1. The project review sheet – based on the template provided and including all sections. It will be filled out with the level of detail specified in the steps above. If the project review sheet in the final step does not include sufficient detail to be used as a scope for a mitigation contractor, then it will not be acceptable. All project review sheets will include a map attachment as specified below (#2). The final project review sheet will also include the table and photos.
2. **Maps** using DeLorme Topo Quad (USGS topo base) zoomed to each unit at a scale of 8,000-1:12,000 in an 8.5”X11” format. An overall map, showing the whole project area and the units within it, will also be produced at whatever scale is needed (up to 1:24:000). The maps will depict the overall project boundary, the project units, the demo area boundary, and show labeled inventory point/photo locations. The map will also show road access (as lines) to the project areas, or landing areas if landing areas are needed for the project. These areas on the map will be based on GPS locations established with a GARMIN unit.
3. **A Table** that will include the coordinates for inventory points/photos locations will be provided as an Excel file (electronic, as well as a table attached to the PRS). This will include these attributes:
  - a. label (a point number that is labeled on the map)
  - b. X and Y coordinates in UTM Zone 13 NAD27 meters,
  - c. average stems per acre,
  - d. BA/acre
  - e. average diameter
  - f. average height
  - g. average slope, aspect
  - h. number of photos taken
  - i. date photos taken
  - j. Operability notes
  - k. Other notes (as stated above)
4. All documents provided will be in MSWord and PDF. All spreadsheets provided will be in Excel and PDF. All deliverables produced as a part of this effort will become the property of State Parks upon delivery. Meetings will occur as necessary between LSA and Rob Billerbeck to pick up documents and information and to provide feedback and status updates.

**I. Supplies:**

The contractor will provide all supplies including their own GPS unit and mapping software, flagging and paint, etc. Any overhead costs including travel, office supplies and printing costs are built into the price and will not be charged separately.

**J. Payment:**

Payment will be made in response to invoices after receipt of deliverables and in accordance with this schedule:

Park	Deliverables from Steps 1-6	Deliverables from Steps 7-9	Deliverables from Steps 10-13
Each PRS	30%	30%	40%
Due Date	Approx. before April 1, 2006	Approx. before May 1, 2006	On or before May 25, 2006

**K. Attachments**

1. Project Review Sheet template
2. Maps



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## **Dwarf Mistletoe and Lory State Park Forest Management**

### **GENERAL ECOLOGICAL COMMENTS**

The Lory fuel management project is found on elevations between 6600 and 7000 feet. This ponderosa pine forest likely fits within the 'Lower elevation Montane forest' category determined by both the FRFTP (<7500 ft. for Larimer County) and research done in Boulder County by Sherriff and Veblen of CU (<6900 ft.). Therefore, based on findings by multiple groups, it is likely that ponderosa pine forests found in the project area may be out of their Historic Range of Variability for fire. Fire suppression may have left these forests denser than before pre-European settlement. As a result of higher stand density, these forests may have higher rates of dwarf mistletoe (DM) infection (Dahms and Geils 1997). Therefore, treatment of the forest to reduce the level of dwarf mistletoe may have an ecological basis.

However, without direct scientific evidence that similarly high dwarf mistletoe levels were *not* present historically, asserting that the reduction of DM is 'ecological restoration' may be an overstatement. Particularly since the current goals are to 'eradicate' DM in the area. Dwarf mistletoe has been present in western forests for over 20,000 years (Van Devender and Hawksworth 1986) and are known to have infected all Colorado 'conifer timber species' as early as 1911 (see Veblen & Donnegan 2004). Therefore, the eradication of DM is most likely *not* ecological restoration. Alternatively, it would be more accurate to portray the treatment as reducing an excessive dwarf mistletoe infection for the purpose of improving forest aesthetics, with an added benefit of fuel mitigation.

### **MANAGEMENT COMMENTS**

Given that (1) dwarf mistletoe (DM) is a natural component of Front Range forests that has several ecological benefits (Bennetts and Hawksworth 1991, Bennetts et al. 1996, Veblen and Donnegan 2004), and (2) the complete eradication of DM is unlikely even with extensive treatment (Conklin, 2000), the goal to "Eradicate dwarf mistletoe to improve stand health", as stated in the Project Review Sheet, may be unrealistic. This goal may be changed to "Reduce levels of dwarf mistletoe to improve park aesthetics and forest resistance to insects and disease."

To accomplish the above goal, it is recommended that complete eradication, which would require the removal of all trees with any signs of DM infection, be tempered. Conklin, in a USFS publication from 2000, comments on the removal of all visibly infected trees as a treatment for DM:

*"Except in very lightly infected stands, this type of treatment can greatly alter stand structure and have significant visual impact. Moreover, even when attempts are made to remove all infected trees, considerable infection remains in most treated areas, due to latent infection."*

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*Follow-up treatments (before the next scheduled entry) are often difficult to justify economically, except in very young stands.”*

Given these concerns with aesthetics, the effectiveness of the treatment and the likelihood of follow-up treatments, Conklin recommends a less intense approach to DM management:

- For areas of low to moderate DM infection: “As a rule, the most vigorous dominant and codominant trees should be retained. Selection of ‘leave trees’ should be based on overall tree qualities rather than just mistletoe. A lightly infected dominant or codominant tree is usually a better choice for retention than an intermediate or suppressed tree without visible infection.”
- For areas of heavy DM infection: “some heavily infected stands have been treated more recently with *shelterwood* cuts, which retain a higher density of seed trees. This prescription has less visual impact than the seed-tree cut, and may be more conducive to natural regeneration since it doesn’t change site conditions as much.”

The current Lory Project Review Sheet outlines the following prescriptions that are particularly concerned with DM:

1. General Treatment Requirements: Retain larger, healthy (no dwarf mistletoe or insects) well formed ponderosa pine and other species (thin from below). Remove poorly formed trees and those with insect/disease.
2. For FH-1b and FH-4: Patch Cut To Sanitize Dwarf Mistletoe – where patches of dwarf mistletoe occur, cut all infected trees to sanitize the stand. These patch clearcuts will generally not exceed five acres in size for wildlife considerations. However, on the southwest side of the park the mistletoe presence is so intense it may be necessary for patch cuts be up to 10 acres and shaped as necessary to effectively reduce the mistletoe presence.

As an amendment to prescription #1, we recommend to retain larger (>9”), healthy-looking (i.e. Hawksworth rating  $\leq 2$ ) trees in the infected areas. This recommendation is based on Conklin’s observations that it is generally preferred to retain trees “based on overall tree qualities rather than just mistletoe” and, in heavy infestations, it is better to retain a higher density of seed trees (both for aesthetics and regeneration). While Conklin’s suggestions are largely based on the assumption that trees will be retained for timber purposes, and this is not a goal for Lory State Park, we believe that the retention of some large, healthy-looking trees in DM areas will meet Park goals to:

*“Protect ecological values, including vegetation, water quality and yield, wildlife, and air resources and social values including public safety, and historic values.*

In particular, this treatment will maintain park aesthetics and provide a mosaic of wildlife habitat, while simultaneously reducing the level of DM infestation and fire hazard. The point concerning aesthetics is particularly important in areas FH-1b and FB-1, where public trails occur.



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Prescription #2 stated above is specifically targeted at FH-1b and FH-4. We recommend retaining larger (>9”), healthy-looking (i.e. Hawksworth rating  $\leq 2$ ) trees in these areas as opposed to creating open patches. The reasoning behind this recommendation was discussed above. In particular, patch-cutting to eradicate DM is not likely to be effective, and retention of some larger, well-formed trees will maintain Park aesthetics while providing seed sources for regeneration and wildlife habitat mosaics. Retaining live, well-formed trees will do more for the aesthetics of the area than the current prescription to girdle all larger DM-infected trees; this recommendation may also reduce the cost of girdling up to five trees per acre.

Finally, the Douglas fir treatment goal is to “Reduce the number of Douglas-fir on the northern slopes”. Since the DM species that occurs in Lory State Park is an obligate species on ponderosa pine, the goal of reducing the number of Douglas fir must be approached carefully. Leaving a moderate number of Douglas fir on northern slopes may serve to reduce DM infection of the forest while also maintaining preferred aesthetics. Of course, the level of Douglas fir that is kept will depend on fuel continuity issues and should meet the goal of reducing the potential spread of fire in Fuel Break areas.

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