ROCKY MOUNTAIN ECOLOGICAL SERVICES, INC.
NEPA••WILDLIFE••VEGETATION••WILDFIRE MITIGATION••WETLANDS••PLANNING

Mountain Pine Beetle Hazard Analysis
Town of Breckenridge Open Space Parcels

TOWN OF
BRECKENRIDGE
OPEN SPACE & TRAILS

July 2008

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TOWN OF BRECKENRIDGE OPEN SPACE PARCELS, MPB HAZARD REPORT

BACKGROUND

Mountain pine beetle (*Dendroctonus ponderosae*) ("MPB") infestation and mortality of lodgepole pine (*Pinus contorta*) trees is a widespread and major impact to the forested ecosystems in Summit County and surrounding counties. As citizens and land managers observe the effects of MPB, strategies for handling the anticipated effects are being developed throughout the counties being affected. As the MPB epidemic progresses and spreads, land managers are more often concluding that there is nothing that can be done at a landscape scale to protect or preserve lodgepole pine from MPB mortality. At very small scales, the only method that has shown some level of effectiveness at protecting lodgepole pine trees is application of insecticides on individual trees as a prophylactic against MPB. However widespread insecticide treatment is cost prohibitive and can have negative impacts on wildlife and water quality and is therefore not recommended for large treatment blocks. Land management agencies dealing with areas ranging from a few acres to hundreds of thousands of acres are now faced with how to manage seemingly inevitable MPB mortality.

Lodgepole pine seedlings in the Moostone Open Space Parcel, after a 2004 harvest of "doghair" lodgepole pine.

Some general considerations which need to be considered during the decision-making process when determining how to manage MPB and its effects include the following:

1. **Desired Forest Conditions**- (Goals or guiding management strategies) the following are options to consider:
    a. Keep the forest "as is" at all costs (only effective at very small scale)
    b. Emphasis on natural processes, even if MPB kills of a majority of trees
    c. Realize that MPB will likely kill majority of lodgepole pine, so implement management for "future forest"
    d. Reduce wildfire concerns through strategic fuel breaks, etc.
2. **Limitations to Managing MPB Mortality**
    a. Access
        i. Proximity to roads (to haul in equipment and haul out logs)
        ii. Viability of helicopter use
    b. Terrain
        i. Steep terrain (over 30% slopes) rules out most ground based salvage
        ii. Steep terrain can be salvaged with helicopters
        iii. Gentle terrain allows more options
    c. Resource Concerns
        i. Important wildlife habitat
        ii. Wetlands
        iii. Erosive soils
        iv. Visual impacts
3. **Cost-Benefit Analysis**

    Based on items 1 and 2 (above), a cost-benefit analysis should be conducted to determine if managing MPB and possible mortality is suitable and if it's even plausible for the land in question. This is the process that was conducted for the Open Space parcels owned by the Town of Breckenridge.

During the spring of 2008, Rocky Mountain Ecological Services was contracted by the Town of Breckenridge's Open Space and Trails department to assess the MPB situation within the various Open Space & Trails parcels, and present recommendations to mitigate the effects of MPB on these parcels.

FOREST STAND DESCRIPTIONS

Many of the Open Space & Trails parcels (OST parcels) are dominated by mature lodgepole pine stands. But in order to assess the risk of the site to MPB, three main forest types were mapped: lodgepole pine, Engelmann spruce /subalpine fir (*Picea engelmannii* and *Abies bifolia*), and mixed conifer stands which had all three coniferous trees (lodgepole pine, Engelmann spruce and subalpine fir trees).

Lodgepole Pine Forests

As much of the area around Breckenridge was historically logged during the mining era, subsequent lodgepole pine regeneration has produced fairly homogenous lodgepole pine stands across the valley. Average diameter breast height (dbh) of trees is 5 to 10 inches. Understory regeneration of seedling conifers in these lodgepole pine stands in general is marginal and patchy. Understory conifer species (where they do occur) generally consists of lodgepole pine, Engelmann spruce, or subalpine fir. Grasses and forb composition in the understory is dependant upon the individual stand location (slope and aspect). For instance, stands on hillsides where drainage is more rapid and sites are drier, understory cover and composition is more limited. Stands located on benches and on shallow slopes where topography is fairly level and moisture retention is higher and has higher forb cover.

Aside from mountain pine beetle, overall forest health in these lodgepole pine stands is good at this time, but species and age class diversity is very low. Mountain pine beetle will likely produce significant mortality across most of these stands. Overall stand mortality in the mature lodgepole pine stands will likely approach 90%, with smaller isolated stands of small diameter lodgepole, and mixed coniferous understory species persisting. MPB will likely kill off most of the lodgepole pine stands within the next 3 years (by 2010 into 2011). Red needles will persist into 2014, and lignin breakdown in the xylem (heart-wood) will begin to occur around 2015-2020. At this time, significant numbers of trees will begin to lose branches, and trees will begin to be blown down by high wind events. Within another 5 to 10 years (2025 to 2030), most of the trees will have fallen down. In areas with stand thinning from MPB mitigation activities (i.e. dead lodgepole pine trees are being actively removed), blowdown will be ongoing. Lodgepole pine is such a shallow-rooted species that opening up the canopy more than 30% in any one area will likely produce some level of blowdown of residual trees. The level of blowdown will be determined by slope, aspect, level of thinning or stand perforation, and soil conditions.

Management options in these stands are dependant upon access, slope, and stocking of MPB prone lodgepole pine. Currently, most stands are in good condition, with approximately 15 to 20% MPB infestation, but as previously stated, mortality approaching 90% is expected within the next few years.

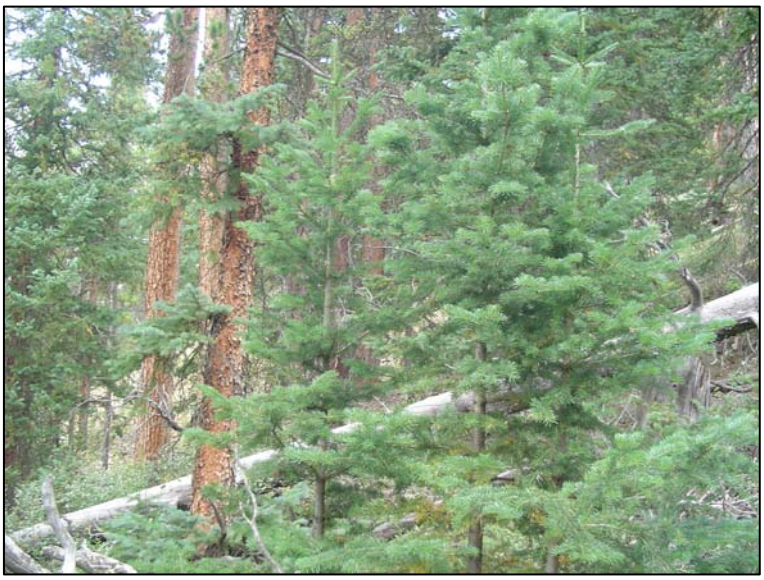
Lodgepole Pine "Doghair"

The term "doghair" refers to the small diameter, densely packed lodgepole pine trees that regenerate after a disturbance event, but never self-thin to allow for larger growth. These trees are generally old (60 to 100 years old), and stunted in height and diameter due to intraspecific competition for resources (light, water and soil nutrients). Thinning or other silvicultural treatments designed to "release" the stand from competition, and allow for more growth do not work. These stands will persist for many more decades, likely until a fire event kills the trees, or the trees die of old age.

These stands are resistant to MPB, due to the small diameter of the tree. Post-MPB infestation in the valley, they will likely be one of the main forested components left in the Breckenridge area (aside from mixed conifer stands). Generally, doghair stands are not desirable as they have very low wildlife use, and only provide marginal habitat conditions. The only way to manage these stands is to clear cut them and "start over", or allow them to persist as they are for many more years.

Given the MPB epidemic, these doghair stands should likely be left in place until after MPB infestations have run their course, and land managers can then accurately assess the full impact of MPB. Clear cutting these stands should involve summertime logging in order to scarify the soil and prepare the seed bed for subsequent lodgepole pine regeneration (lodgepole pine seedlings need bare or disturbed soils for germination). Spruce and fir seedlings are virtually non-existent in these stands, and would therefore not recolonize the site if it was logged in the winter. Recolonization of spruce and fir generally occurs over great periods of time in natural settings, but can be accelerated here with selective planting of seedlings in selected areas. Another option to logging these stands is "chipping". The tree diameters are small enough to allow for tracked chipping machines to clear a path through the trees for such things are roads, fire breaks, and ski trails, or simply to regenerate the stands.

Mixed Conifer Stands



"Mixed conifer" stands refer to the tree composition within the stand, in that these stands have a mixture of Engelmann spruce, subalpine fir, and lodgepole pine. Within a mixed conifer stand, there can be variations on species dominance and size classes. For example, some areas of a stand will have almost total dominance by spruce and fir trees, with only a marginal lodgepole pine component, while other areas may have lodgepole pine as the overstory dominant species with spruce and fir seedlings/saplings forming a strong under-story component.

These stands provide the highest wildlife benefit, due to the physical structure of the trees and the increase in understory plant diversity. Mixed conifer stands usually have higher understory plant species diversity and structure, which also makes these stands more suitable for use by wildlife species such as red-backed vole, pine marten, and other various microtine rodents and various bird species.

MPB activity within these stands is limited to the lodgepole pine component of the stand. Therefore, within mixed conifer stands with a high lodgepole pine component, there will be more of a visible and structural impact from MPB mortality, and in stands with little to no lodgepole component, the impacts of MPB will be negligible.

Mixed conifer stands offer more management options, as these stands often have multiple stories, and can be thinned and treated to remove MPB trees. As many of these stands have spruce and fir seedlings and saplings, summertime logging to remove MPB infested or dead lodgepole pine would result in crushing or damaging understory trees. Winter logging offers more protection for understory spruce and fir, and even lodgepole pine seedlings. This is from deep snows protecting the small trees, as most logging equipment will "float" on snow, and trees being removed with heavy equipment will generally stay on top of snow.

Post-logging, these stands will still offer some forested cover and won't appear to be a "clearcut". As spruce/fir trees will persist on a site for many years, mixed conifer stands that have been thinned will still stay dominated by spruce and fir. Summertime logging in these stands would increase the likelihood that lodgepole pine seedlings would be established in disturbed areas.

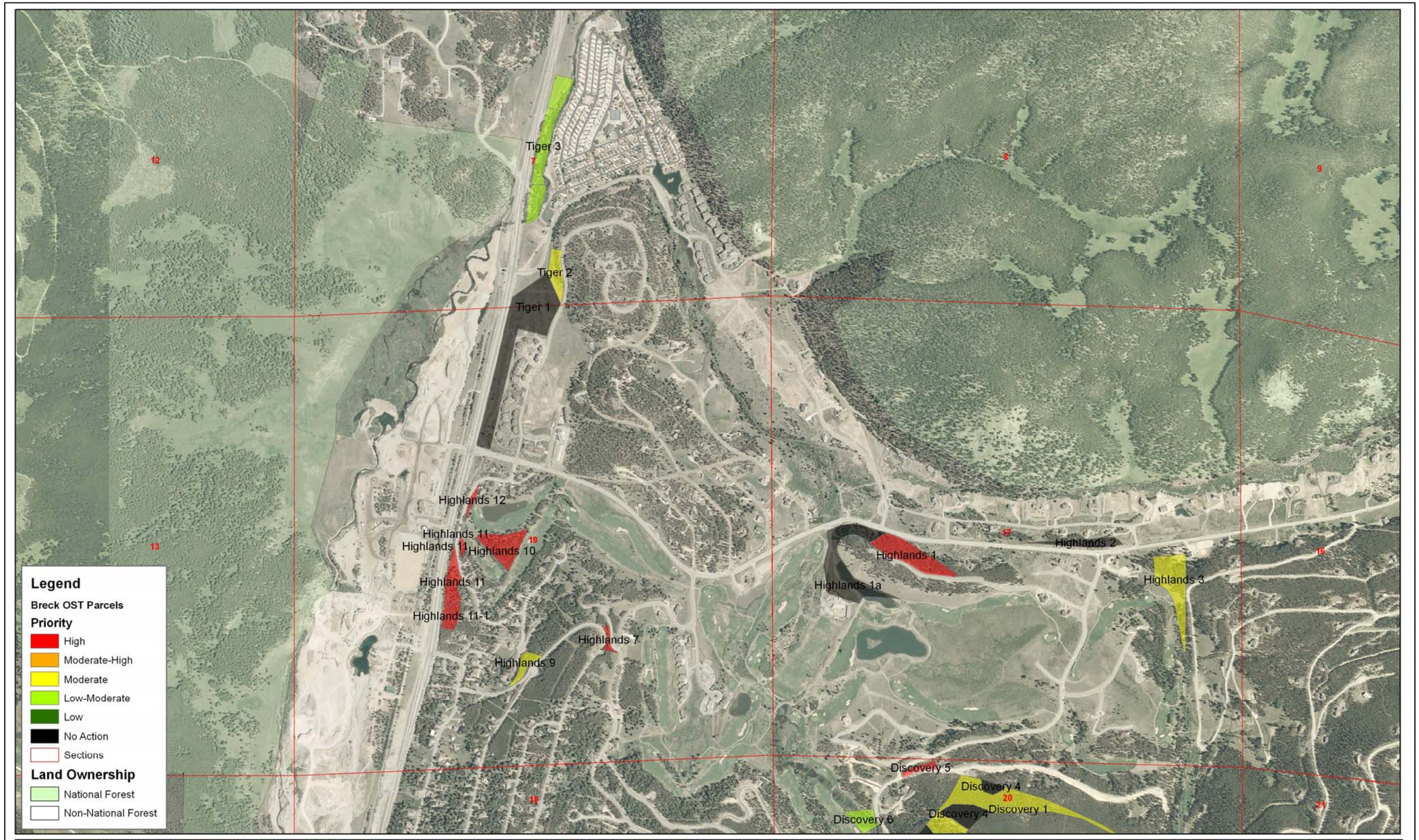
Recommendations

Lodgepole pine- Lodgepole pine stands should not be excessively "thinned" either pre- or post-MPB because the residual trees will likely fall down over time due to shallow root structures. Rather, the trees should be "clear cut" if thinning more that 30% of the overstory is likely to occur. Any trees too small to support MPB should be left on site (i.e. trees smaller than 5" dbh). As many of the lodgepole pine stands have very poor spruce/fir and lodgepole pine seedling stocking, logging should be done during the summer months in order to create a suitable seedbed for lodgepole pine seedling establishment. Due to the large volume of trees which may be removed, the areas to be logged should be cruised (volume estimation) in order to facilitate selling of the wood to help recover some of the removal costs. Some of the harvest boundaries should work around other stands (mixed conifer, etc.). In order to remove the volume of wood likely to be generated, landings and other staging areas will have to be designated in order to facilitate logging equipment and trucks accessing the site. Stumps within a pre-determined area could be chipped (using a stump grinder) to improve aesthetics and minimize risk to users of open space parcels.

Lodgepole Doghair- Trail or roads through these stands should be cleared with a grinder, as traditional logging equipment will be more expensive, inefficient, and logged material would then have to be handled a second time for disposal. Widespread silvicultural treatment of doghair stands is not recommended at this time, as resources should rather be spent on treating MPB hazards and dead material. No buffering around trails is needed, as doghair lodgepole is fairly wind-firm.

Mixed Conifer- Within stands, MPB killed trees can be removed or felled (or simply left in place if there are not too many dead trees) in order to minimize the risk of dead lodgepole adding to hazardous fuel loading. If mechanized equipment is used, this should occur during the winter months in order to avoid damaging spruce and fir seedlings/saplings. If lodgepole pine forms a significant component of the stand, logging may be done during the summer, as enough space between trees will allow for mechanized equipment, and seed-bed preparation for lodgepole pine seedling establishment will be a benefit.

Mapping Criteria- The priorities on the following maps were generated using a qualitative assessment process considering the dominant stand type, accessibility, proximity to homes and infrastructure, and topography. Parcels with High ratings were generally dominated by mature lodgepole pine, had good accessibility, were in close proximity to homes, and occurred on gentle terrain.



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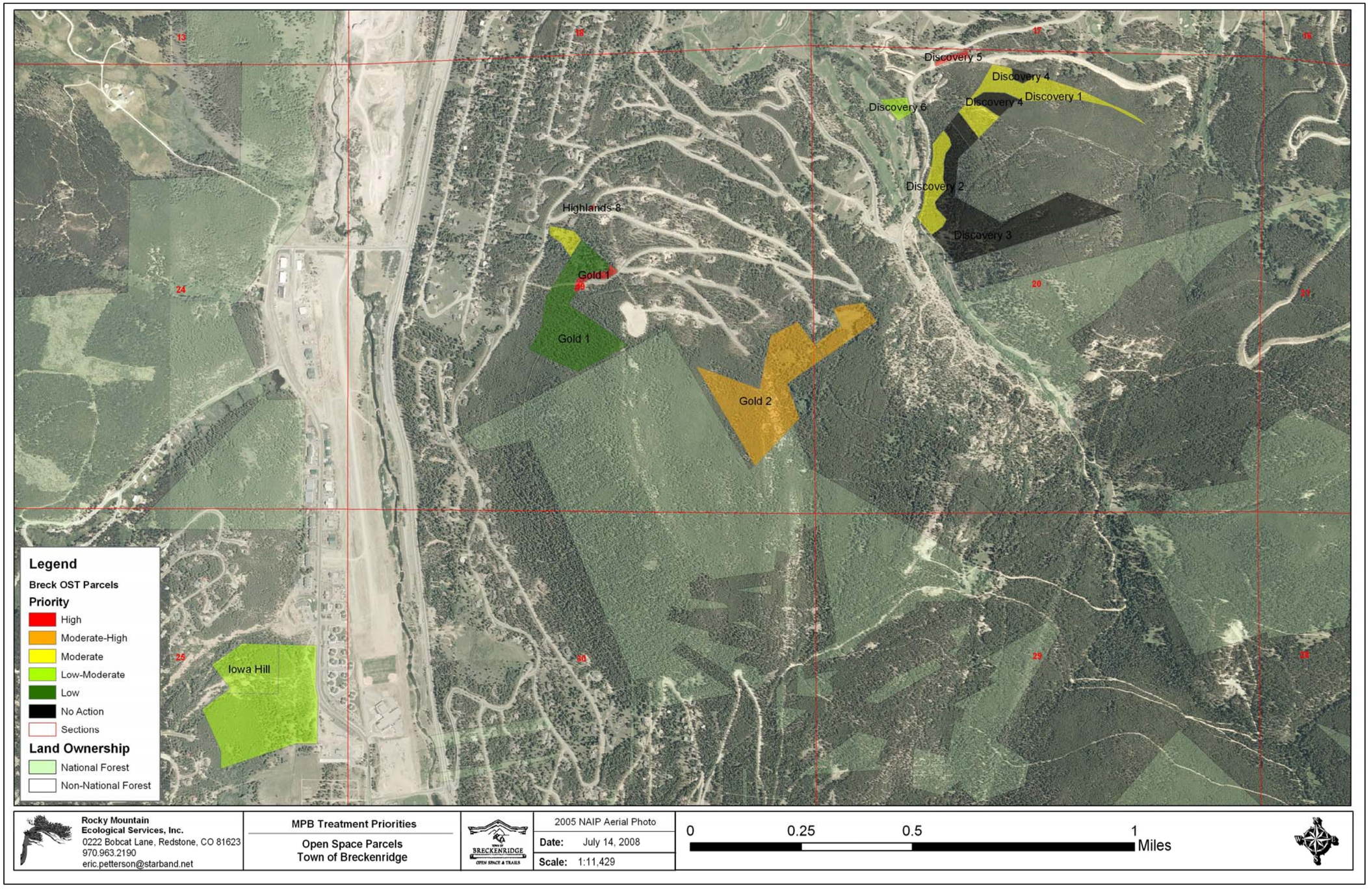
MPB Treatment Priorities

Open Space Parcels
Town of Breckenridge

2005 NAIP Aerial Photo
Date: July 14, 2008
Scale: 1:11,429

0 0.25 0.5 1 Miles


Discovery 5
Discovery 4
Discovery 1
Discovery 4
Discovery 6
Discovery 2
Discovery 3
Highlands 8
Gold 1
Gold 1
Gold 2
Iowa Hill
Legend
Breck OST Parcels
Priority
High
Moderate-High
Moderate
Low-Moderate
Low
No Action
Sections
Land Ownership
National Forest
Non-National Forest
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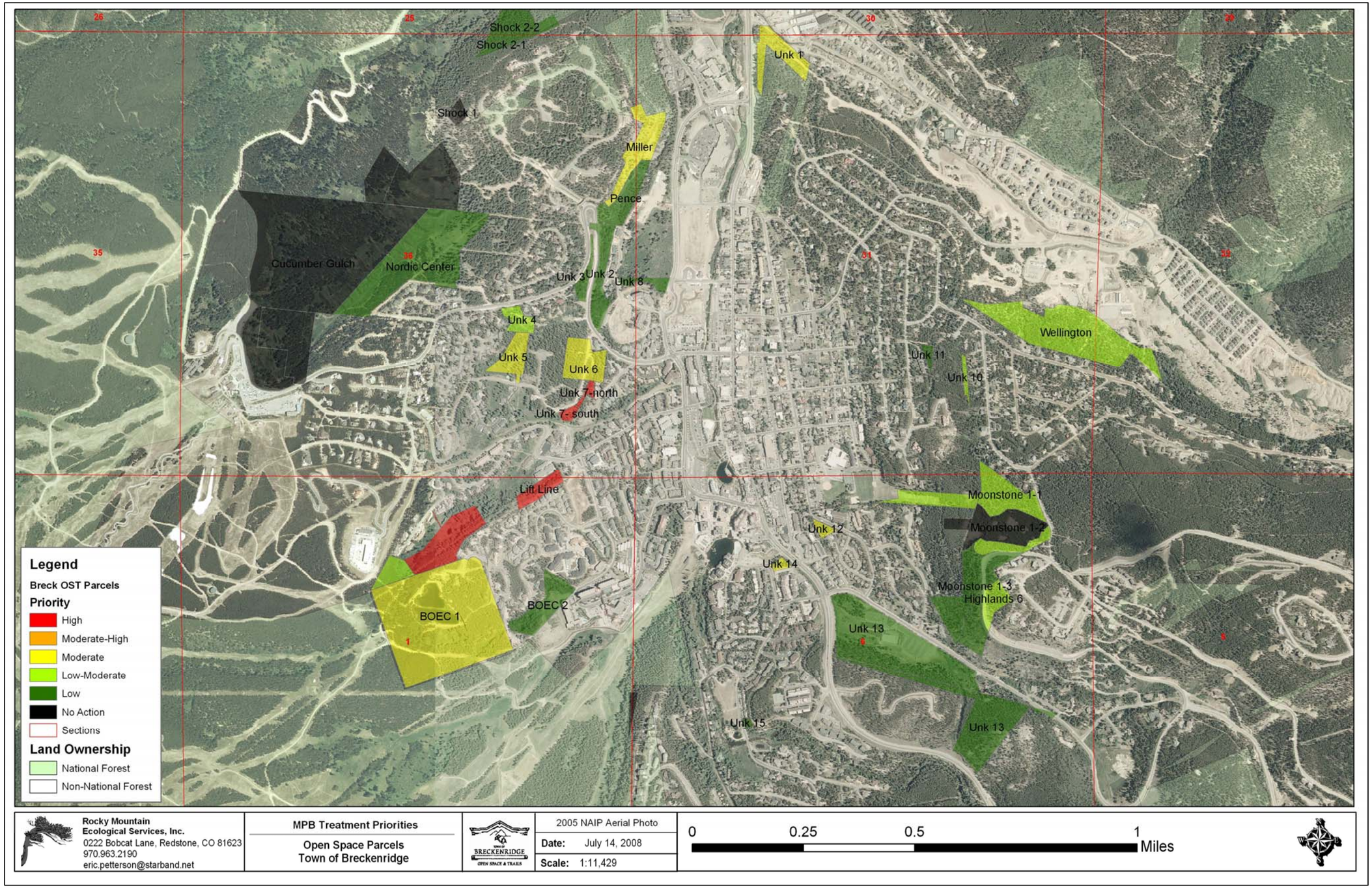

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MPB Treatment Priorities

Open Space Parcels
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2005 NAIP Aerial Photo

Date: July 14, 2008

Scale: 1:11,429

0 0.25 0.5 1 Miles

OPEN SPACE PARCEL ASSESSMENT SHEETS

The following pages are the photographs and data for the 30 assessment and monitoring locations.

Highlands Parcel #1

Photo #1

Photo #2

Stand ID: Highlands 1
Cover Type: Lodgepole Pine
DBH: 4-13", avg. 10"
Slope: 10-50%
Accessibility: Good to Moderate
Visibility: High

Survey Date: April 25, 2008
Structural Stage: Mature
Canopy Closure: 90%
Understory Regen?: Unknown
Proximity to Homes/Infrastructure:
Priority: **High**

Recommendations: Summer log for ground scarification. Structure protection around Utility "cabin" (see photo #2). Western section grades into mixed conifer stand, but gets very steep, No Action is recommended for Highlands 1a.

Highlands Parcel #2
There are only a few mature lodgepole pine, with good lodgepole understory (post and pole) development. Remove dead MPB trees as necessary. *Not shown on map.*

Highlands Parcel #3


Photo #1


Photo #2

Stand ID: Highlands 3
Survey Date: April 25, 2008
Cover Type: Lodgepole Pine
Structural Stage: Mature
DBH: 4-13", avg. 7"
Canopy Closure: 80%
Slope: 20-50%
Understory Regen?: Unknown

Accessibility: Moderate- roads close but steep
Proximity to Homes/Infrastructure: Close to access roads- strategic fire break?
Visibility: Moderate to High
Priority: **Moderate**

Recommendations: Summer log for ground scarification. Very steep, so may only be able to do hazard trees near road, or as part of a fire break. Steepness will dramatically add to cost of treatment.

Highlands Parcel #7

Photo #1

Stand ID: Highlands 7
Survey Date: April 25, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 5-10”
Canopy Closure: 70%
Slope: 20-50%

Understory Regen?: Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Very Close
Visibility: High
Priority: **High**

Recommendations: Steep and very visible- summer sanitize cut, with some stump-grinding due to visibility.

Highlands Parcel #8

No Photo

Stand ID: Highlands 8
Survey Date: April 25, 2008
Cover Type: Mixed conifer
Structural Stage: Mature
DBH: 10-18”
Canopy Closure: 90%
Slope: 5%
Understory Regen?: Very Good
Accessibility: Good
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **High**

Recommendations: Mixed conifer stand dominated by subalpine fir, with significant mortality (likely from armillaria root-rot). Should cut and remove dead fir, anytime of year.

Highlands Parcel #9

Photo #1

Stand ID: Highlands 9
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-11”
Canopy Closure: 90%

Slope: 28%
Understory Regen?: None
Accessibility: Good
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **Moderate**

Recommendations: Lots of MPB, Steep and visible- summer sanitize cut, with some stump-grinding due to visibility. Some post-pole sized material at southern end- could leave trees less than 5” dbh.

Highlands Parcel #10

Photo #1

Photo #2

Stand ID: Highlands 10
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-10", avg. 5"
Canopy Closure: 50%
Slope: 2%

Understory Regen?: Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Moderately close
Visibility: High
Priority: **High**

Recommendations: Has been cut, with some likely spraying as well from golf course staff. Some blowdown, and will likely see more. Summer cut for scarification of soils, coordinate with golf course as to actions.

Highlands Parcel #11

Photo #1

Photo #2

Stand ID: Highlands 11
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-14”
Canopy Closure: 90%

Slope: 2%
Understory Regen?: Moderate-Good
Accessibility: Good
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **High**

Recommendations: Close to homes, and highway, so very visible. Heavy MPB infestation. Blowdown will be a large concern, so sanitization cut likely the best scenario. Summer cut for scarification of soils.

Highlands Parcel #11

Photo #1

Stand ID: Highlands 11-1
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-10”
Canopy Closure: 90%
Slope: 2%

Understory Regen?: Poor to Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Moderately close
Visibility: High
Priority: **High**

Recommendations: Moderately close to homes, and highway, so very visible. Heavy MPB infestation. Blowdown will be a large concern, so sanitization cut likely the best scenario. Summer cut for scarification of soils.

Highlands Parcel #12

Photo #1

Stand ID: Highlands 12
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-10”
Canopy Closure: 10%
Slope: 2%

Understory Regen?: Good
Accessibility: Good
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **High**

Recommendations: Forms a good barrier to Highway. Should spray trees. Trees on east side of road (adjacent to golf course) may be cut.

Discovery Hill

Photo #1

Stand ID: Discovery 5
Survey Date: April 25, 2008
Cover Type: Lodgepole Pine
Structural Stage: Post-pole/Mature
DBH: 4-10", avg. 5"
Canopy Closure: 85%
Slope: 10%

Understory Regen?: Unknown
Accessibility: Excellent
Proximity to Homes/Infrastructure: Close to access roads- has fire hydrant & electrical box
Visibility: High
Priority: **High**

Recommendations: At road junction, and has fire hydrant, and good access. Sanitize cut all potential MPB trees, scarify ground for regen.

Discovery Hill

Photo #1

Stand ID: Discovery 1
Survey Date: April 25, 2008
Cover Type: Lodgepole Pine
Structural Stage: Mature
DBH: 7-13”
Canopy Closure: 90%
Slope: 20-50%
Understory Regen?: Unknown

Accessibility: Moderate- roads close but steep
Proximity to Homes/Infrastructure: Close to access roads- strategic fire break?
Visibility: Moderate to High
Priority: **Moderate**

Recommendations: Summer log for ground scarification. Steep, so may only be able to do hazard trees near road, or as part of a fire break. Steepness will dramatically add to cost of treatment.

Discovery Hill

Photo #1

Stand ID: Discovery 4
Survey Date: April 25, 2008
Cover Type: Lodgepole Pine
Structural Stage: Doghair
DBH: 2-5
Canopy Closure: 90%
Slope: 20-50%
Understory Regen?: None

Accessibility: Moderate- roads close but steep
Proximity to Homes/Infrastructure: Close to access roads- strategic fire break?
Visibility: Moderate to High
Priority: **No Action**

Recommendations: Doghair stands not susceptible to MPB, so leave for aesthetics.

Discovery Hill

Photo #1

Photo #2

Stand ID: Discovery 2
Survey Date: April 25, 2008
Cover Type: Lodgepole Pine
Structural Stage: Mature
DBH: 7-13", avg. 10"
Canopy Closure: 90%
Slope: 10-50%
Understory Regen?: Unknown

Accessibility: Good- roads close but gets steep rapidly
Proximity to Homes/Infrastructure: Close to access roads- fire hydrants & homes
Visibility: High
Priority: **Moderate**

Recommendations: Summer log for ground scarification. Very steep, so may only be able to do hazard trees near road, or as part of a fire break. Steepness will dramatically add to cost of treatment. Maybe only do areas along roadsides as fuels reduction along roadsides project.

Discovery Hill

Photo #1

Stand ID: Discovery 3
Survey Date: April 25, 2008
Cover Type: Mixed conifer
Structural Stage: Mature
DBH: 7-14”
Canopy Closure: 70%
Slope: 20-60%

Understory Regen?: Good
Accessibility: Very Poor
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **No Action**

Recommendations: Very steep, no vehicular access- would have to helicopter log it. Very visible, very high blowdown potential.

Discovery Hill

Stand ID: Discovery 6
Survey Date: April 25, 2008
Cover Type: Lodgepole Pine
Structural Stage: Mature
DBH: 12-15”
Canopy Closure: 10%
Slope: 10-50%
Understory Regen?: Good

Accessibility: Moderate- roads close but trees are downhill on steep slope
Proximity to Homes/Infrastructure: Close to roads, moderately close to homes
Visibility: High
Priority: **Low-Moderate**

Recommendations: Approximately 5 trees that will likely succumb to MPB. Could leave them, or fell them down into creek below (good for stream coarse wood).

Tiger Parcel #1

Photo #1

Stand ID: Tiger-1
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-10”
Canopy Closure: 1%
Slope: 2-5%

Understory Regen?: Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Moderately close
Visibility: High
Priority: **No Action**

Recommendations: infrequent trees, with some smaller stock. No action required.

Tiger Parcel #2

Photo #1

Stand ID: Tiger-2
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-12”
Canopy Closure: 20%
Slope: 55%

Understory Regen?: Poor to Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Moderately close
Visibility: High
Priority: **Moderate**

Recommendations: Moderately close to homes, and very visible. Heavy MPB infestation. Blowdown will be a large concern, so sanitization cut likely the best scenario. Remove dead trees as necessary to reduce fuels, and to prevent trees from blowing down across road.

Tiger Parcel #3

Photo #1

Stand ID: Tiger-3
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-12”
Canopy Closure: 70%
Slope: 0%

Understory Regen?: Good
Accessibility: Good
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **Low- Moderate**

Recommendations: Not a risk, but very visible. Heavy MPB infestation. Blowdown will be a large concern, so sanitization cut likely the best scenario. Remove dead trees as necessary to reduce fuels, and to prevent trees from blowing down across road- if time and funding allow.

Gold Parcel #1

Photo #1

Stand ID: Gold-1
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 4-14", 11" avg.
Canopy Closure: 90%
Slope: 10-30%

Understory Regen?: Poor
Accessibility: Moderate
Proximity to Homes/Infrastructure: Close in areas
Visibility: High
Priority: **Low**

Recommendations: Very high MPB risk, but also a very large parcel. At this time should consider defensible space mitigation around homes and roads, and consider partnering w/ USFS if larger operations may be desired. Log in summer for soil scarification.

Gold #2

Photo #1

Stand ID: Gold 2
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 8-13”
Canopy Closure: 90%
Slope: 10-40%

Understory Regen?: Variable
Accessibility: Poor- Moderate
Proximity to Homes/Infrastructure: Close in a couple of areas.
Visibility: High
Priority: **Moderate**

Recommendations: Large and variable site. Wetland area bisects the parcel, with spruce/fir and lodgepole within the wetlands. Very high MPB risk. At this time should at least consider some defensible space near roads and homesites.

Moonstone Parcel #1

Photo #1

Stand ID: Moonstone1-1
Survey Date: May 30, 2008
Cover Type: Mixed conifer
Structural Stage: Mature
DBH: 8-18”
Canopy Closure: 90%
Slope: 20%
Understory Regen?: Good
Accessibility: Moderate
Proximity to Homes/Infrastructure: Variable
Visibility: Moderate
Priority: **Low- Moderate**

Recommendations: Will have high MPB mortality in lodgepole pine component. Should salvage/sanitize lodgepole at some time. Winter logging would be best given the spruce/fir component.

Moonstone Parcel #1

Photo #1

Stand ID: Moonstone 1-2
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Doghair
DBH: 4-6”
Canopy Closure: 90%
Slope: 10%

Understory Regen?: None
Accessibility: Moderate
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **No Action**

Recommendations: Doghair will be resistant to MPB. Good regen in clearcut areas from 2005 logging.

Moonstone Parcel #1

Photo #1

Stand ID: Moonstone 1-3
Survey Date: May 30, 2008
Cover Type: Mixed conifer
Structural Stage: Mature
DBH: 6-14”
Canopy Closure: 40%
Slope: 60%

Understory Regen?: Moderate
Accessibility: Poor
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **Low**

Recommendations: Quite a bit of Douglas-fir and limber pine. Lodgepole will be susceptible to MPB. Remove dead/dying lodgepole near roadside as necessary to reduce risks of windthrow onto road. Way to steep to do any practical management.

Nordic Center Parcel #1

Photo #1

Stand ID: Nordic Center 1
Survey Date: May 30, 2008
Cover Type: Mixed conifer
Structural Stage: Mature
DBH: 6-14”
Canopy Closure: 90%
Slope: 10%

Understory Regen?: Good
Accessibility: Good
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **Low**

Recommendations: Some lodgepole has already been removed. Remove dead/dying lodgepole as necessary. Winter logging would be best given spruce/fir regen, but lodgepole component is small enough that summertime is fine too.

Lift Line Parcel #1

Photo #1

Stand ID: Lift Line 1
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 6-14”
Canopy Closure: 80%
Slope: 10%

Understory Regen?: Moderate
Accessibility: Moderate- lots of wetlands
Proximity to Homes/Infrastructure: Very Close
Visibility: High
Priority: **High**

Recommendations: Lodgepole trees very close to lift line and condominiums. High MPB mortality is expected. OST staff should coordinate with Skico. Lots of wetlands, so may have to do late fall or early winter tree removal.

BOEC Parcel #1

Photo #1

Photo #2

Photo #3

Photo #4

Stand ID: BOEC 1
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 6-14”
Canopy Closure: 90%
Slope: 0-10%

Understory Regen?: Poor
Accessibility: Moderate
Proximity to Homes/Infrastructure: Moderatley Close
Visibility: High
Priority: **Moderate**

Recommendations: Many trees marked with various paint colors- assuming some MPB mitigation may be happening? Various wetland areas scattered around the property, so should be careful about impacts to wetlands. Some areas are dominated by smaller diameter trees, which will be more resistant. Given size of property, high windthrow potential exists for residual trees. May want to consider spraying trees around structures.

BOEC #2

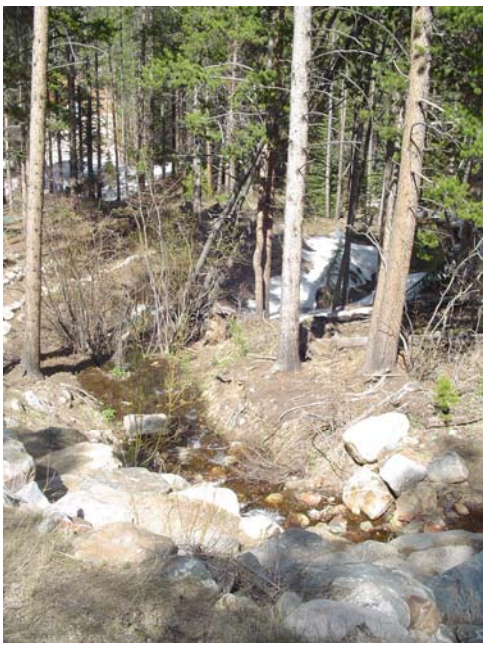

Photo #1

Stand ID: BOEC 2
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 4-13”
Canopy Closure: 90%
Slope: 40%
Understory Regen?: Low

Accessibility: Poor- lots of wetlands, homes and slopes
Proximity to Homes/Infrastructure: Very Close
Visibility: High
Priority: **Low**

Recommendations: Lodgepole stand has very poor access, but is close to homes. Creek runs through property. High MPB activity at this time.

Shock Hill #1

Photo #1

Stand ID: Shock Hill 1
Survey Date: May 30, 2008
Cover Type: 70% PICO, 30% MxCon
Structural Stage: Mature
DBH: 6-16”
Canopy Closure: 60%
Slope: 40%

Understory Regen?: Moderate
Accessibility: Poor
Proximity to Homes/Infrastructure: Not Close
Visibility: Low
Priority: **No Action**

Recommendations: Poor access, very steep- on old mining site. Use resources elsewhere for now.

Shock #2

Photo #1

Stand ID: Shock 2-1
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 3-9", avg. 7"
Canopy Closure: 95%
Slope: 15%

Understory Regen?: Poor
Accessibility: Poor-Moderate
Proximity to Homes/Infrastructure: Not very close
Visibility: Low
Priority: **Low**

Recommendations: MPB risk is high, but has only moderate access, and lots of material. Low reproduction, so summertime logging would be best.

Shock #2

Photo #1

Stand ID: Shock 2-2
Survey Date: May 30, 2008
Cover Type: Lodgepole pine
Structural Stage: Mature
DBH: 6-13”
Canopy Closure: 90%
Slope: 40%

Understory Regen?: Poor
Accessibility: Poor
Proximity to Homes/Infrastructure: Not very close
Visibility: Low
Priority: **Low**

Recommendations: Rocky site. Some individual spruce trees here and there. MPB risk is high. Unless larger coordinated effort is done (w/ adjacent land owners and USFS), should use resources elsewhere for now.

Miller Parcel

Photo #1

Stand ID: Miller
Survey Date: May 30, 2008
Cover Type: 40% Lodgepole, 60% Mxd Con
Structural Stage: Mature
DBH: 6-7”
Canopy Closure: 90%
Slope: 40-50%

Understory Regen?: Poor-Moderate
Accessibility: Moderate
Proximity to Homes/Infrastructure: Not very close
Visibility: High
Priority: **Moderate**

Recommendations: Mixed conifer stand, lodgepole very susceptible to MPB. Very steep too. Could remove MPB after its dead, but would likely need to divert traffic on highway.

Pence Parcel

Photo #1

Stand ID: Pence
Survey Date: May 30, 2008
Cover Type: 75% Lodgepole, 25% MC
Structural Stage: Mature
DBH: 8-9”
Canopy Closure: 60%
Slope: 5-40%

Understory Regen?: Poor, but some aspen
Accessibility: Good
Proximity to Homes/Infrastructure: Not very close
Visibility: High
Priority: **Moderate**

Recommendations: High MPB risk, good access, but not around homes, etc. Summertime log for scarification- aspen would be a good benefit.

Unk #3

Photo #1

Stand ID: Unk 3
Survey Date: May 30, 2008
Cover Type: Mostly lodgepole
Structural Stage: Mature
DBH: 8" avg.
Canopy Closure: 30%
Slope: 40-60%

Understory Regen?: Good- aspen
Accessibility: Moderate
Proximity to Homes/Infrastructure: Not very close
Visibility: High
Priority: **Low**

Recommendations: Some lodgepole, lots of aspen, and some mixed conifer. Very steep. Recommendation is no action for this stand at this time

Unk #4

Photo #1

Stand ID: Unk 4
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 4-10”
Canopy Closure: 60%

Slope: 60%
Understory Regen?: Poor-Moderate
Accessibility: Very Poor
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **Low-Moderate**

Recommendations: Although this stand is close to homes, the access is very bad due to past mining activities (hydromining?). There is a large stockpile of stumps in a gully, which is something of a fuels hazard for nearby homes. This would be a very expensive site to treat, but may be important for fuels mitigation. Could spray the trees….

Unk #5

Photo #1

Stand ID: Unk 5
Survey Date: May 30, 2008
Cover Type: 60% Lodgepole, 40% Mxd Con
Structural Stage: Mature
DBH: 6-7”
Canopy Closure: 90%
Slope: 10-20%

Understory Regen?: Moderate- some aspen
Accessibility: Moderate
Proximity to Homes/Infrastructure: Not very close
Visibility: High
Priority: **Moderate**

Recommendations: Mixed conifer stand, lodgepole very susceptible to MPB. Very steep too. Could remove MPB after its dead, but would likely need to divert traffic on highway.

Unk #6

Photo #1

Photo #2


Photo #3- old sluice

Stand ID: Unk 6
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 6-7”
Canopy Closure: 90%
Slope: 20%

Understory Regen?: Poor- some willow & fir
Accessibility: Poor-Moderate
Proximity to Homes/Infrastructure: Not very close
Visibility: High
Priority: Moderate

Recommendations: Ski trail bisects this parcel. Understory has some willow and fir, indicating more mesic conditions. MPB activity is high, and lots of material to treat. Log in summer for scarification.

Unk #7

Photo #1- North

Photo #2- South

Stand ID: Unk 7
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 8-9”
Canopy Closure: 60%

Slope: 10-20%
Understory Regen?: Poor- Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **High**

Recommendations: Good access, close to homes, and multiple size classes. Should consider a summer treatment.

Unk #8

Photo #1- East

Photo #2- West

Stand ID: Unk 8
Survey Date: May 30, 2008
Cover Type: 80% Lodgepole, 20% MC
Structural Stage: Mature
DBH: 8-9”
Canopy Closure: 70%
Slope: 1-5%

Understory Regen?: Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **Low**

Recommendations: Good access, but not close to at-risk features. Thus lower priority. Very wet.

Wellington Parcel

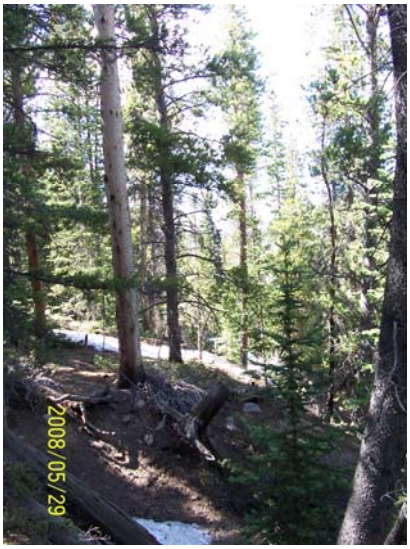

Photo #1-

Photo #2

Photo #3

Photo #4

Stand ID: Wellington
Survey Date: May 30, 2008
Cover Type: 80% Lodgepole, 20% MC
Structural Stage: Mature
DBH: 5-7”
Canopy Closure: 90%
Slope: 40-70%

Understory Regen?: Poor
Accessibility: Poor
Proximity to Homes/Infrastructure: Right behind homes
Visibility: High
Priority: **Low-Moderate**

Recommendations: Very poor access, but should do some fuels reduction right behind homes-would need homeowner cooperation. Very expensive to treat.

Unk #10

Photo #1- East

Stand ID: Unk 10
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 6-7”
Canopy Closure: 90%

Slope: 1-5%
Understory Regen?: Poor
Accessibility: Good
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **Low-Moderate**

Recommendations: Good access, but very narrow strip- not worth taking action in this area unless local land owners cooperate. Thus lower priority.

Unk #11

Photo #1- East

Stand ID: Unk 11
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 5-6”
Canopy Closure: 90%

Slope: 1-5%
Understory Regen?: Poor, but some aspen
Accessibility: Good
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **Low**

Recommendations: Good access, area recently treated- lots of marked and cut trees. Thus lower priority. Good access from street.

Unk #12

Photo #1- East

Stand ID: Unk 12
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 8”
Canopy Closure: 90%
Slope: 10-15%

Understory Regen?: Poor-Moderate
Accessibility: Good
Proximity to Homes/Infrastructure: Close to streets, etc.
Visibility: High
Priority: **Moderate**

Recommendations: Good access, large block, elevated priority due to access and MPB risk. Log in summer for scarification.

Unk #13

Photo #1- East

Stand ID: Unk 13
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 8”
Canopy Closure: 90%
Slope: 15-25%

Understory Regen?: Poor
Accessibility: Moderate
Proximity to Homes/Infrastructure: Not very close
Visibility: High
Priority: **Low**

Recommendations: Access only through private lands, and a narrow strip unless can act in cooperation with other land-owners. Log during summer months for scarification. Spruce/fir near north end (along creek) not susceptible to MPB.

Unk #14

Photo #1

Stand ID: Unk 14
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 6-10”
Canopy Closure: 90%

Slope: 5-10%
Understory Regen?: Poor
Accessibility: Good
Proximity to Homes/Infrastructure: Close
Visibility: High
Priority: **Moderate**

Recommendations: Good access, but very narrow strip- not worth taking action in this area unless local land owners cooperate. Thus lower priority.

Unk #15

Photo #1- East

Stand ID: Unk 15
Survey Date: May 30, 2008
Cover Type: Lodgepole
Structural Stage: Mature
DBH: 9-10”
Canopy Closure: 75%
Slope: 25%

Understory Regen?: some aspen and lodgepole
Accessibility: Good
Proximity to Homes/Infrastructure: Not Close
Visibility: High
Priority: **Low**

Recommendations: Spruce at bottom of parcel (western side), steep and rocky. As there are few homes, etc. in the area, no action is recommended at this time.