2770 7th Street
Boulder, CO 80304
Ph: # 303-447-2530
Fax: # 303-544-0233

ZERO ENERGY. LLC

Fax

To:	Raw Land Solutions / Teresa Kerrigan	**From:**	Davide Picard
Fax:	303-484-5155	**Pages:**	18
Phone:	303-431-4622	**Date:**	11-9-07
Re:	Mountain Beetle Survey	**CC:**	Scott Schorer

☐ **Urgent** ☐ **For Review** ☐ **Please Comment** ☐ **Please Reply** ☐ **Please Recycle**

- **Comments:** Attached please find a copy of the mountain beetle survey report. Please forward your mailing address and I will send you a color copy.

Please call if you have any questions.

Davide Picard

Roosevelt Ridge Mountain Pine Beetle Survey

October 19-24, 2007

Objective: Conduct a Mountain Pine Beetle (MPB) survey for Roosevelt Ridge Subdivision to determine the extent of insect damage. The survey will:

- Locate and map the prominent MPB infestations.
- Determine spread ratios of new insect attacks.
- Obtain total number of trees potentially infested.
- Make recommendations for control of MPB infestations.

Findings: Mountain Pine Beetle is attacking two species of trees at Roosevelt Ridge, Lodgepole Pine (*Pinus contorta*) and Limber Pine (*Pinus flexilis*). The MPB spread ratio seems to be less than 1:1 at this point, but larger pockets of infestations are building. This may be an indication that spread ratios of 1:2 or greater could be obtained if no control treatment takes place. Grand County for example witnessed spread ratios of 1:2 in the mid 1990's and then experienced ratios of more than 1:10 and greater in recent years. This is an appropriate time to take forest management action.

Aggravating issues include the disease dwarf mistletoe (Photo 1) and secondary insects like Ips beetle (Photo 2). These are a result of forest stands in need of proper forest management. Current stands are over crowded and in need of thinning (Photo 3). Competition for available nutrients and water have suppressed the growth and weakened the trees to some extent. This makes the trees easy targets for insect and disease infestations. Additionally, excess slash from road building and logging have not always been cleaned up completely and have become good environments for the secondary insects (Photo 4). These insects build up in population and then can attack live trees successfully.

A walk through the forest stands can find many dead standing trees killed from mistletoe, secondary insects Ips, and primary insect Mountain Pine Beetle (Photo 5). Our survey was to find the locations of the primary insect, (MPB).

The Base Map shows 45 locations of past or current MPB outbreaks. These outbreaks are color coded for high, medium, and low priorities. Table 1 is the number of MPB or dead trees marked at each location for removal. The survey did not find new infestations at each location, but that does not mean live

Fire Safe Homes

Bruce Coulter

Wildland Interface Specialist

303-904-2620
Fax: 303-904-9731
FIRESAFEHOMES@AOL.COM

TO: Davide Picard

SUBJECT: Mountain Pine Beetle Survey for Roosevelt Ridge

DATE: 11/1/2007

Dear Davide:

Thank you for selecting Fire Safe Homes to complete your Mountain Pine Beetle survey for Roosevelt Ridge.

We located 45 areas with some type of infestation, old or new. The plots vary in size from 3 to 53 trees. That does not represent new infestations, but a combination of old and new hits. Plots 1,40, and 44 are low priority areas with large numbers of dead trees scattered out in the forest stand.

As suggested in the report, it would be best to complete a diameter cut on the entire property. This would mean removing all trees under 6" in diameter and chipping all the slash. Big job, but would be a good first step in getting the forest in a more healthy condition. Outside of that, start with the plots that have new attacks listed. Try to remove all the dead trees in those areas so we can more easily locate new hits next year when the trees fade.

It will take 3-5 years to get the infestation under control and reduce tree losses to a manageable level. Successive surveys will help manage insect activity and start zeroing in on the most active locations.

Hope this is useful to you and helps get you started on a successful Mountain Pine Beetle control program. If I can be of further assistance, please give me a call.

Enclosed is an Invoice for $2670.00.

Sincerely,

Bruce Coulter

Bruce Coulter
Consulting Forester

Thank you for your business!

Bruce Coulter

Total # 2,670.00

trees in the area were not attacked. Some trees are so weak they do not have excess pitch to push the invading insects out, so do not show evidence of attack (pitch tubes on the trunk of trees). These are called "blind attacks" and some were found at some locations. The number of trees marked also include "old hits" that may not have current MPB insects in them. It is recommended that all dead trees at these designated locations be cut and removed regardless of MPB presence. This will help identify new MPB infestations more easily as trees fade in late summer and fall of 2008.

The survey concentrated on the more accessible central and eastern areas. The western portion was viewed from vantage points where possible and no major outbreaks were observed. No doubt some activity is present in the western portion however.

Over 900 trees were marked for removal (Table 1). Areas of "red top" tees were located (Photo 6) and marked (Photo 7). Trees marked include 2 or 3 years of activity and does not represent a total of newly infested trees. It is hard to estimate the exact number of newly infested trees, due to "blind attacks" and beetles moving away from last years infested trees. An educated guess would be 300+ trees are currently infested with MPB at Roosevelt Ridge. Left unchecked at a 1:2 ratio, the number of infested trees would grow rapidly.

Recommendations:

Mountain Pine Beetle is difficult to eliminate in one year over a large area such as Roosevelt Ridge. It may take 3 to 5 years of persistent work to get the number of infested trees down to a low level. Besides removing only MPB infested trees, it is strongly recommended to complete a forest management thinning operation over the entire property. This would accomplish the following forest improvements:

- Reduce fuels for wildfires and help keep fires smaller
- Increase health and vigor of leave trees
- Lower the spread of dwarf mistletoe and Western gall rust
- Decrease insect activity to manageable levels
- Improve wildlife habitat and recreational values

Many of these improvements were covered in your Anchor Point report submitted in October of 2005.

If a complete forest management thinning is not feasible at this time, then doing work in stages may be best. The MPB survey Base Map provides you with High, Medium, and Low plot

priorities. The most important plots to complete work in this winter would be the High priority ones shown in red on the maps. A look at the Base Map shows you where the priority areas are located. Number of trees per plot can be found in Table 1. The Base Map also indicates which plots are located on Maps A-F. Map A has plots 1 through 11, Map B has plots 12 through 20 and so on.
If it is more economical to complete work in stages, the following is recommended:

Stage One: Complete the following:

- Remove high priority areas of infestation by May 15, 2008 as determined by ground surveys and mapping.
- Conduct an insect and disease survey each year to keep tabs on spread ratios, tree mortality, priority work areas, and success in limiting problems.

Stage Two: Complete all of stage one plus:

- Remove all medium priority areas of infestation by June 15, 2008 as determined by ground surveys and mapping.
- Eliminate all road side slash and chip all material.

Stage Three: Complete all of stages one and two plus:

- Begin work in low priority areas taking all dead material and past MPB infested trees.
- Remove trees infested with dwarf mistletoe, and all trees 6" and less in diameter, chip all material.

It would be advisable to complete the High priority areas this winter by May 15, 2008. That will assure many of the newly infested trees will be destroyed and no beetles will fly from them.

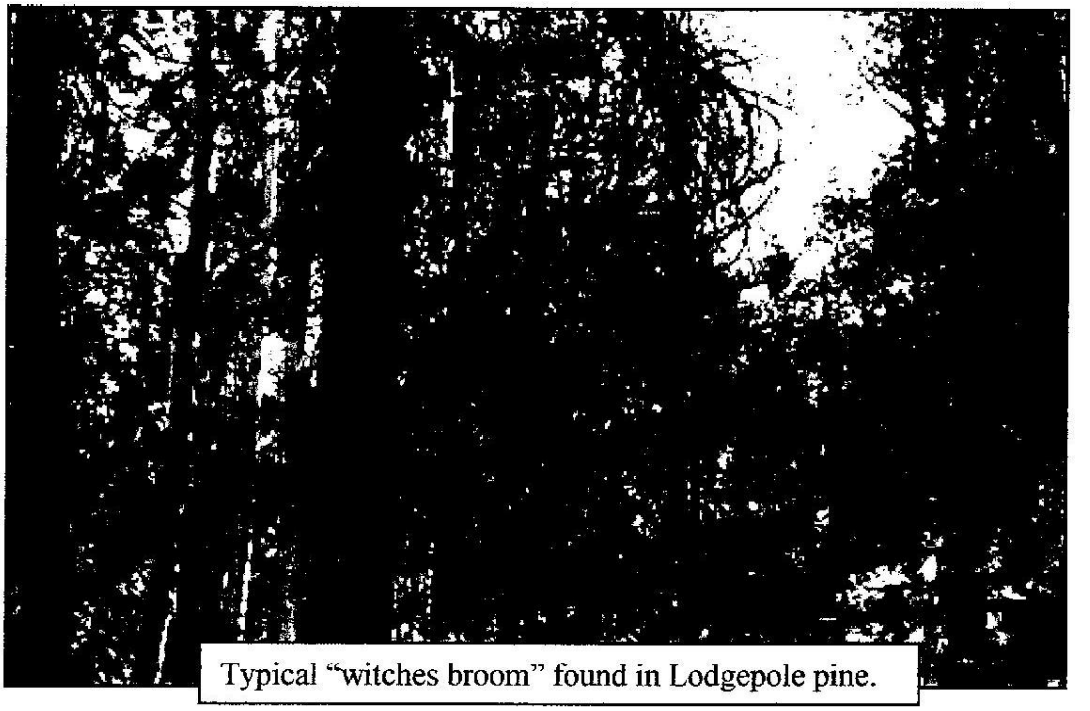
Remember! Just cutting the tree down does **NOT** eliminate the beetle. The insects are in the main stem of the tree and as long as the main stem has bark on it some insects will live. The whole tree should be destroyed (chipped, burned, buried) or peeled to eliminate brood wood for MPB. This needs to be done prior to May 15th ideally and no later than June 15th. Some insects are known to fly by the end of June. The secondary insect Ips will be flying from May through September.

Conclusion: There is an MPB infestation worth being concerned about, particularly in light of the problems we see in Grand and Summit Counties. Some remedial action should be taken this winter to stem the growth of MPB populations and lessen the tree

losses for 2008. The completion of stage one would be essential in my opinion. The more you are able to complete management wise the better off the forest stands will be. Management of the forest stands at Roosevelt Ridge is at a critical juncture (as are most front range forested areas). Insects and disease are having their way with the trees due to overcrowding and lack of management. If that isn't enough, fuels are building to such high levels, that when a fire starts it is difficult to suppress and they become large quickly.

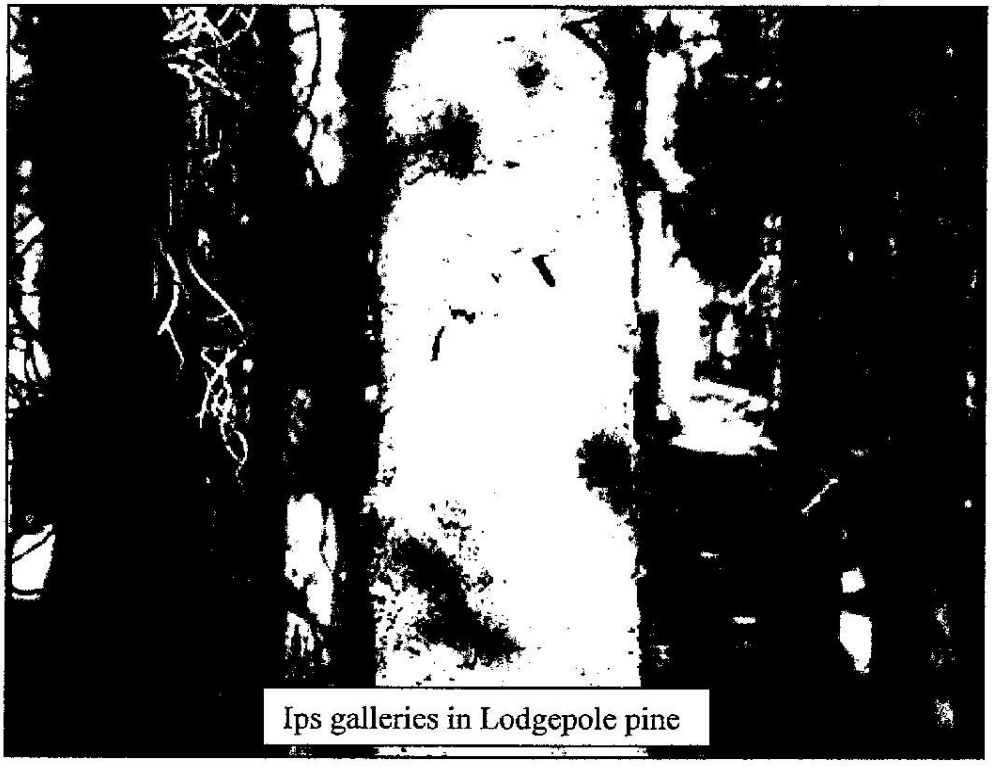
Complete as much as you can to suppress the MPB, and as time and money is available expand your management to include overall tree thinning. It will pay you dividends in the long term. For your information, in the appendix you will find sheets on Mountain Pine Beetle, Dwarf Mistletoe, and Ips Beetles. These represent major insect and disease problems found in forest stands located on the Roosevelt Ridge property.

Roosevelt Ridge Photos



Typical "witches broom" found in Lodgepole pine.

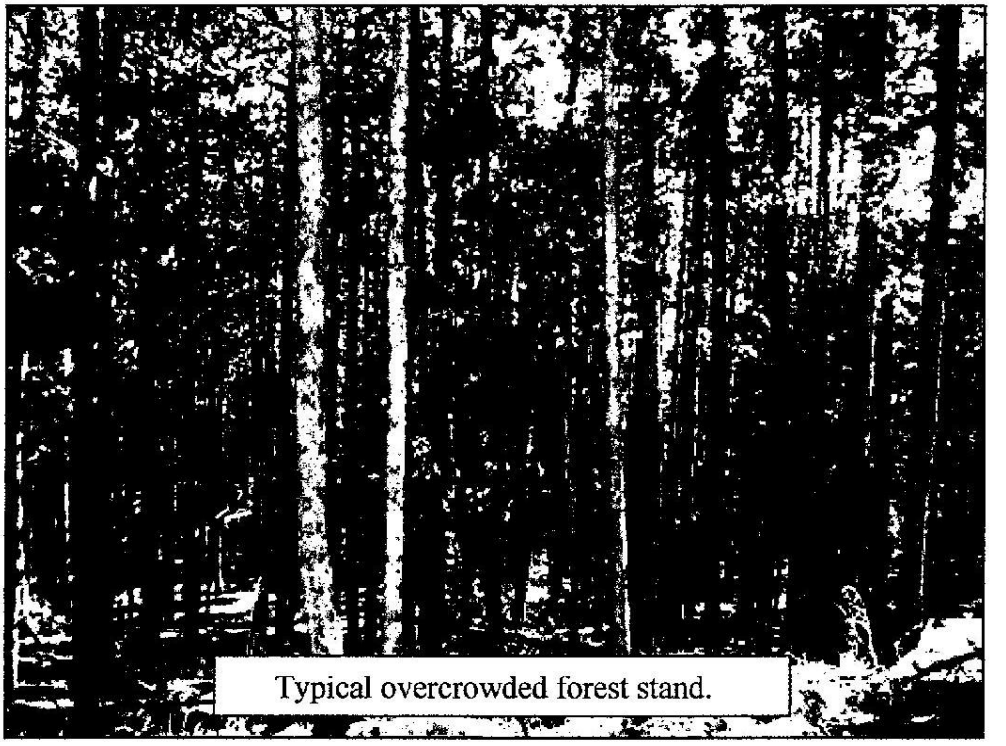
Photo 1



Ips galleries in Lodgepole pine

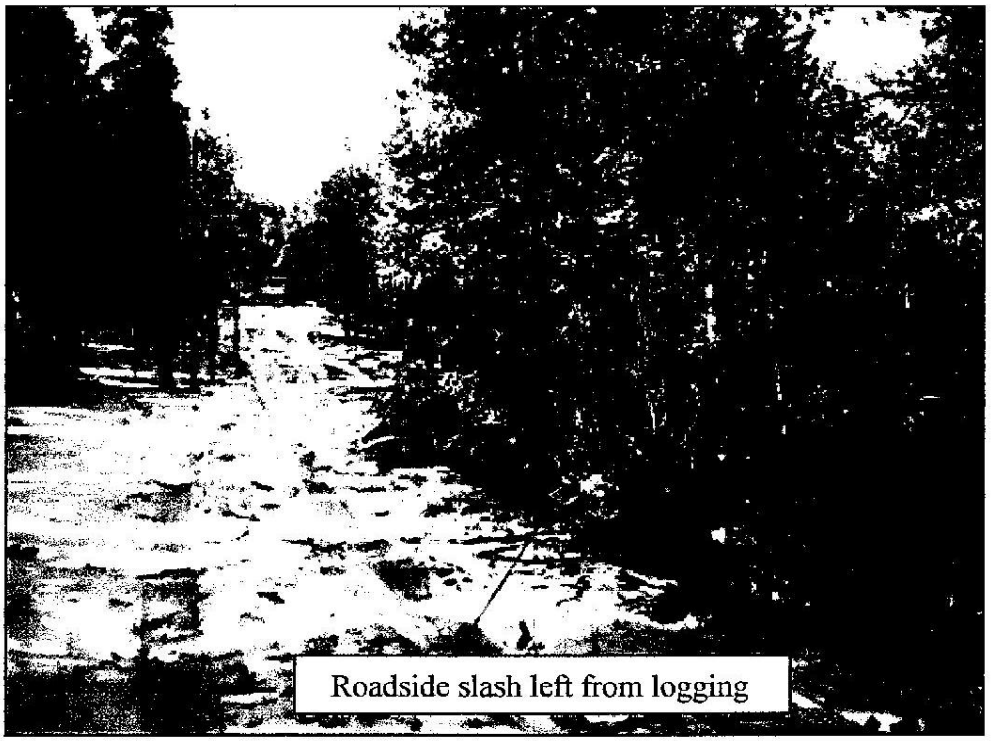
Photo 2

Roosevelt Ridge Photos



Typical overcrowded forest stand.

Photo 3



Roadside slash left from logging

Photo 4

Roosevelt Ridge Photos

Old "witches broom" seen on tree attacked by beetles.

Photo 5

Roosevelt Ridge Photos

Typical "red top" beetle tree

Photo 6

Tree marked for removal

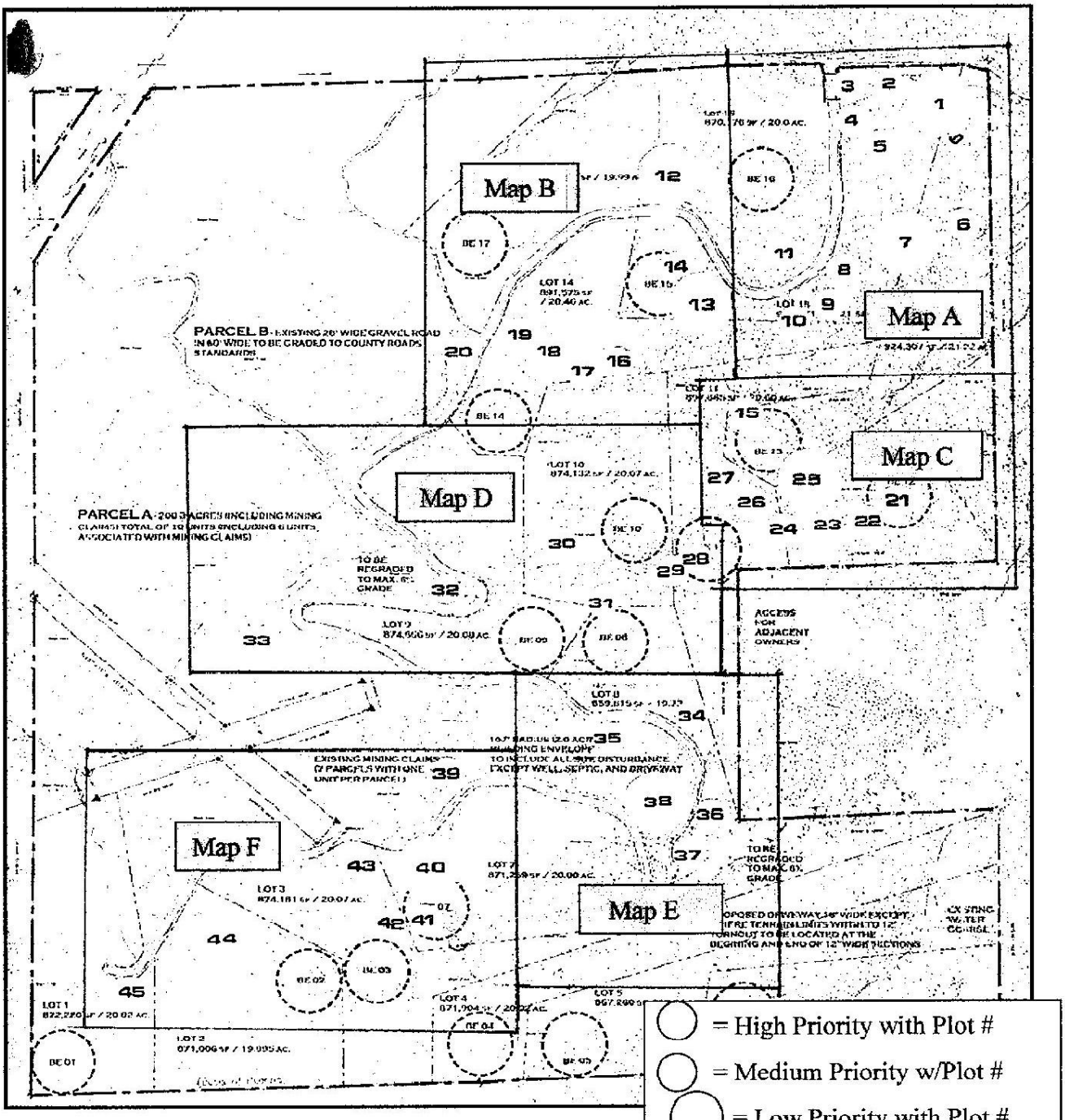
Photo 7

Survey Results

Plot #	# of Trees	Comments:
1	100+	Old dead scattered throughout area
2	14	Old and New attacks
3	9	Old and New attacks
4	7	Old and New attacks
5	53	Old and New attacks
6	19	Old and New attacks
7	49	Old and New attacks, dead scattered
8	8	Old and New attacks
9	11	Old and New attacks
10	12	Old and New attacks
11	11	Old attacks
12	80+	Old and New attacks scattered in area
13	45	Old and New attacks
14	17	Old and New attacks
15	8	Old attacks
16	4	Old and New attacks
17	3	Old attacks
18	10	Old attacks
19	23+	Old and New attacks, dead scattered
20	6	Old attacks
21	5	Old and New attacks, plot 12 not yet cut
22	17	Old attacks
23	6	Old attacks
24	21	Old attacks
25	53	Old and New attacks
26	14	Old attacks
27	4	Old attacks
28	20	Old attacks
29	1	Old attack
30	6	Old attacks
31	5	Old attacks
32	10	Old and New attacks
33	7	Old attacks
34	10	Old attacks
35	21	Old and New attacks
36	20	New attacks, biggest pocket of LLP hits
37	13	Old attacks
38	47	Old and New attacks
39	14	Old and New attacks
40	40+	Old dead Limber Pine scattered
41	20	Old and New attacks on both sides of road
42	11	Old and New attacks
43	9	Old and New attacks
44	50+	Old dead Limber Pine scattered
45	3	Old and New attacks

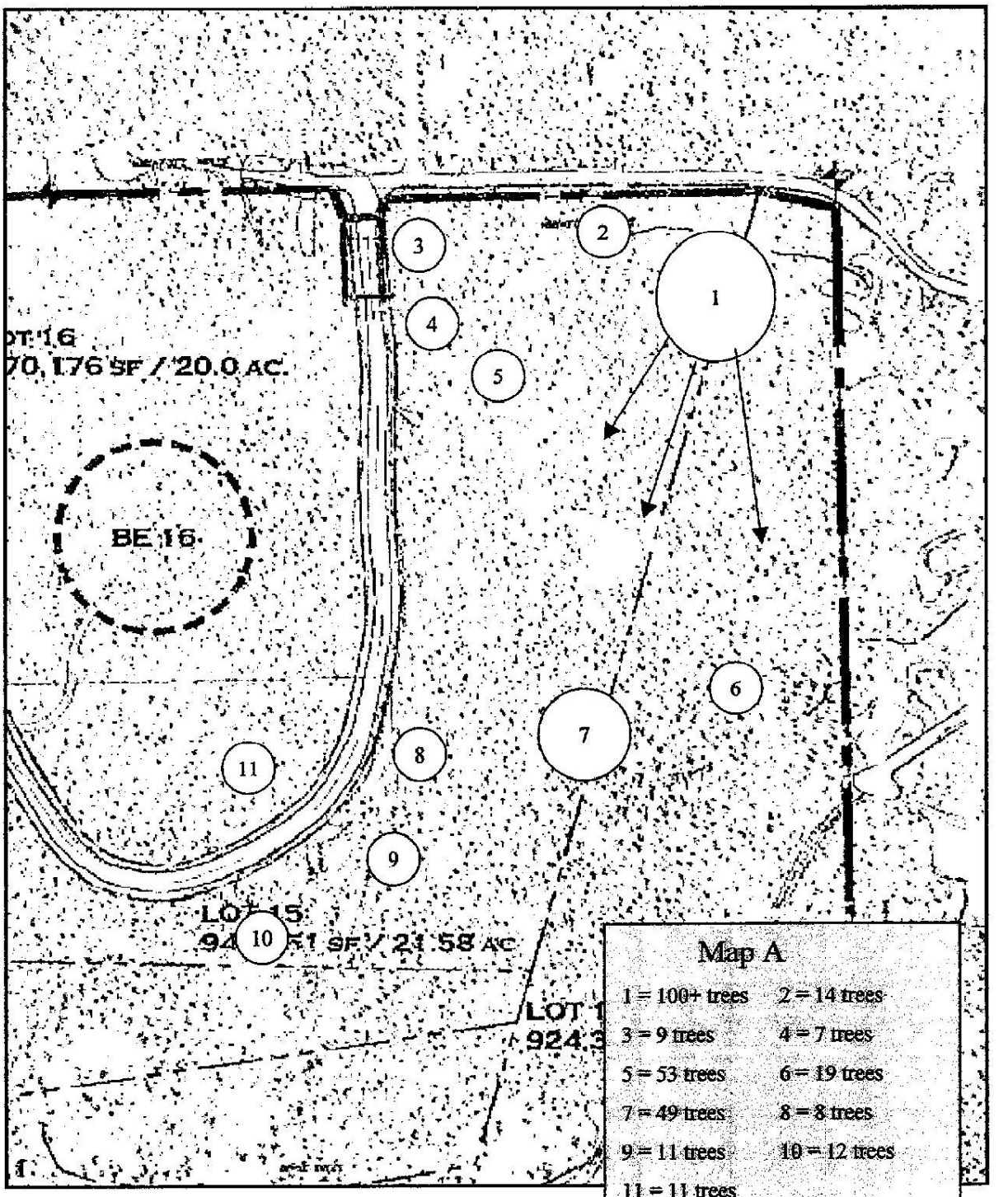
Table 1

Roosevelt Ridge MPB Survey

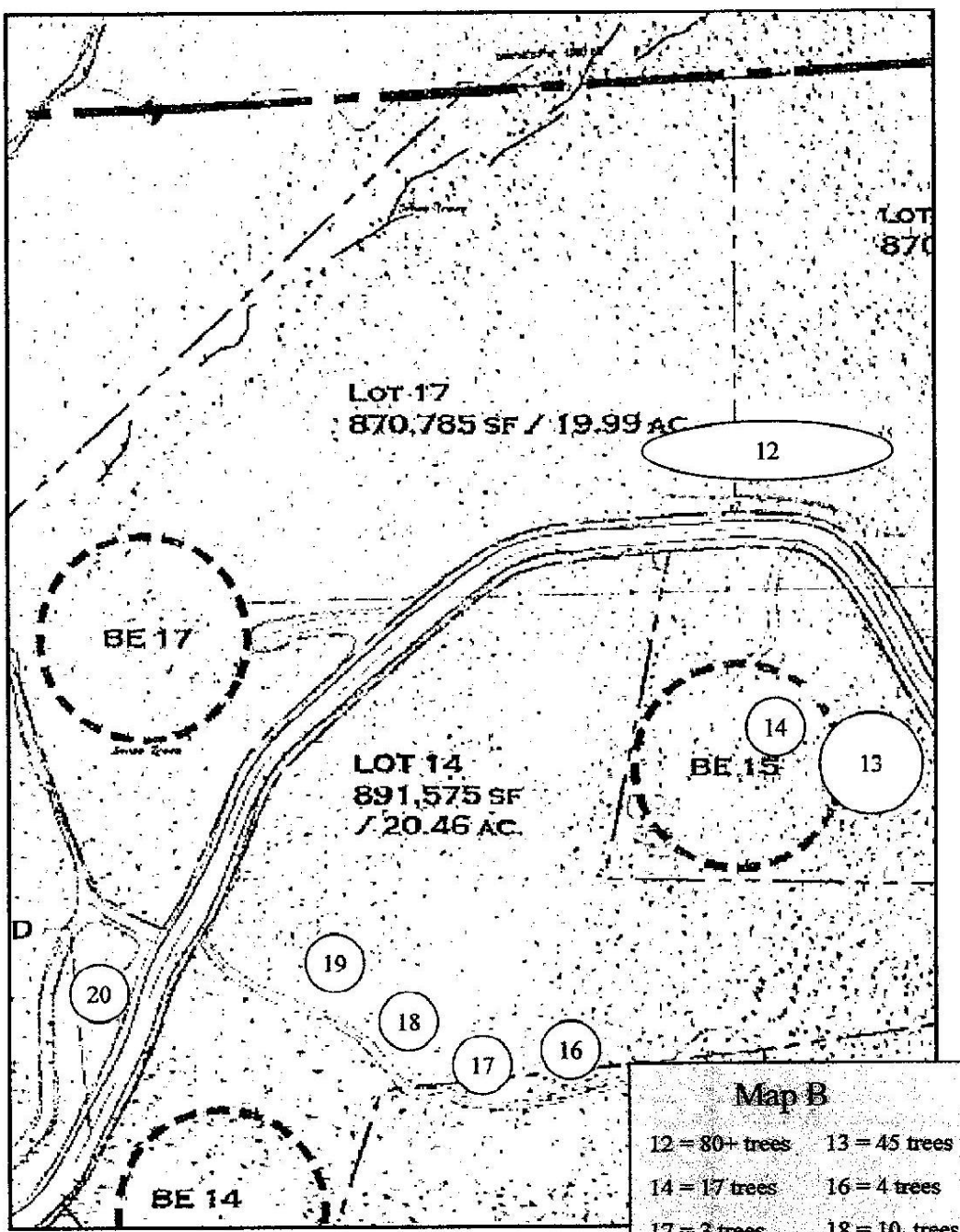


Base Map

Roosevelt Ridge MPB Survey



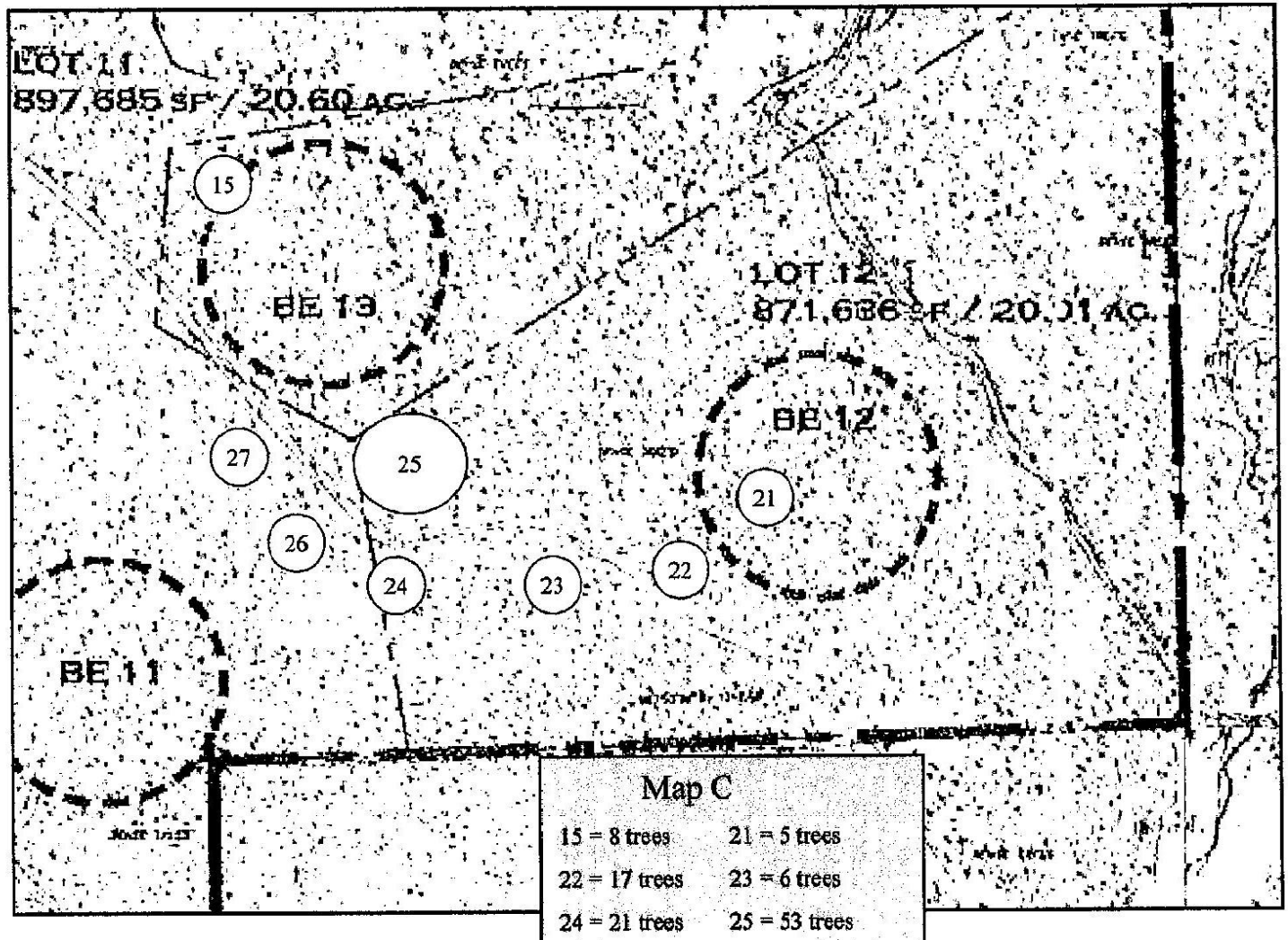
Roosevelt Ridge MPB Survey



Map B

12 = 80+ trees	13 = 45 trees
14 = 17 trees	16 = 4 trees
17 = 3 trees	18 = 10 trees
19 = 23+ trees	20 = 6 trees

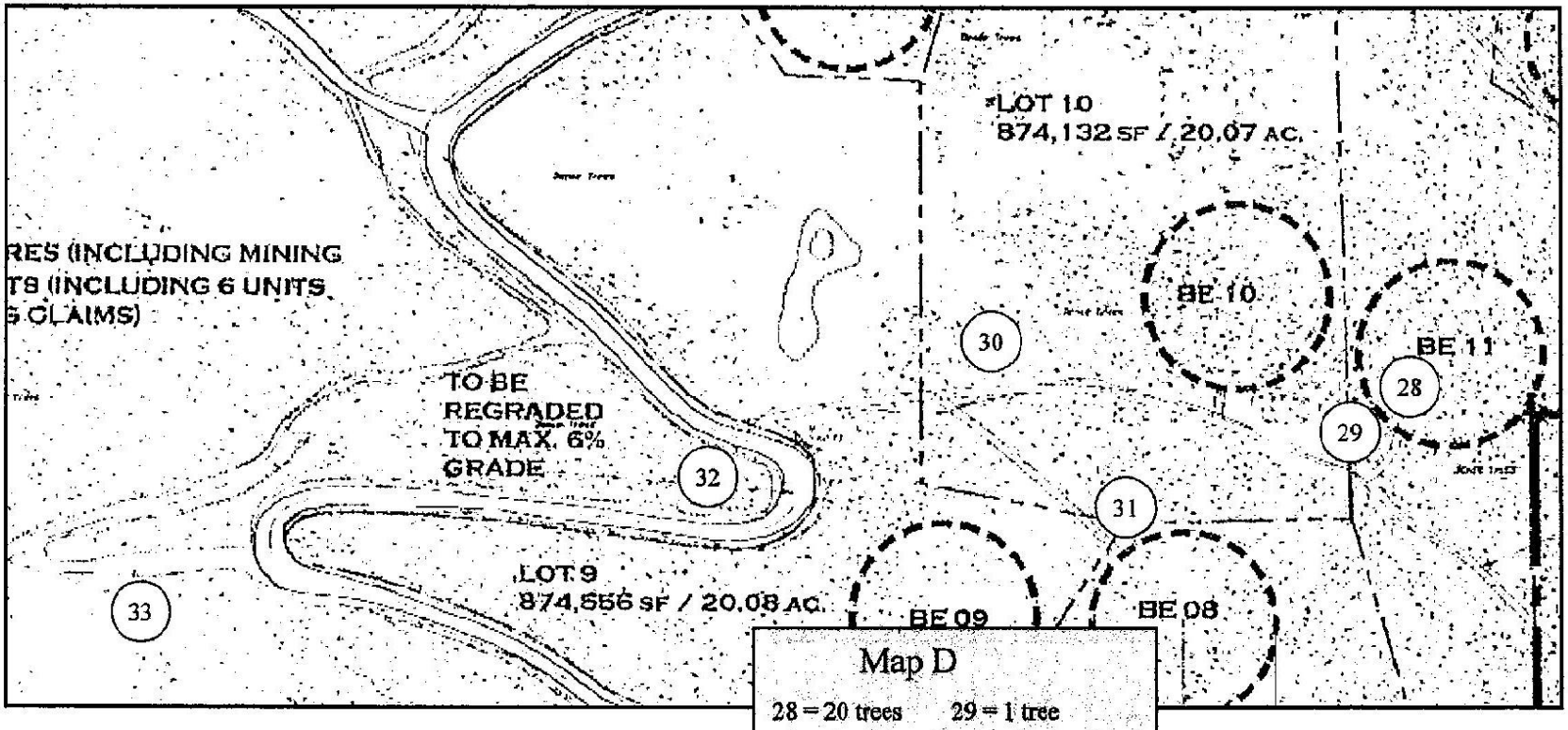
Roosevelt Ridge MPB Survey



Map C

15 = 8 trees	21 = 5 trees
22 = 17 trees	23 = 6 trees
24 = 21 trees	25 = 53 trees
26 = 14 trees	27 = 4 trees

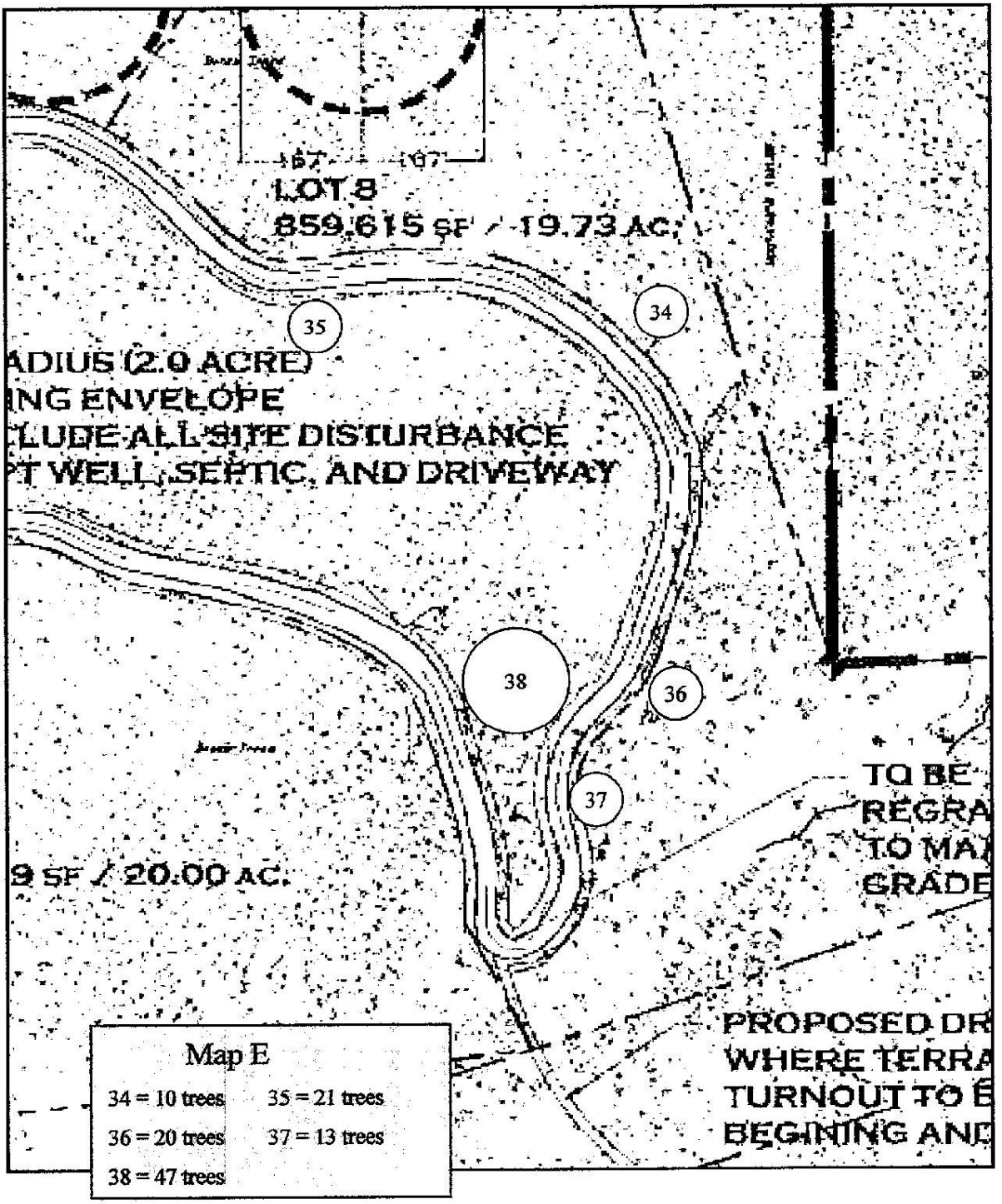
Roosevelt Ridge MPB Survey



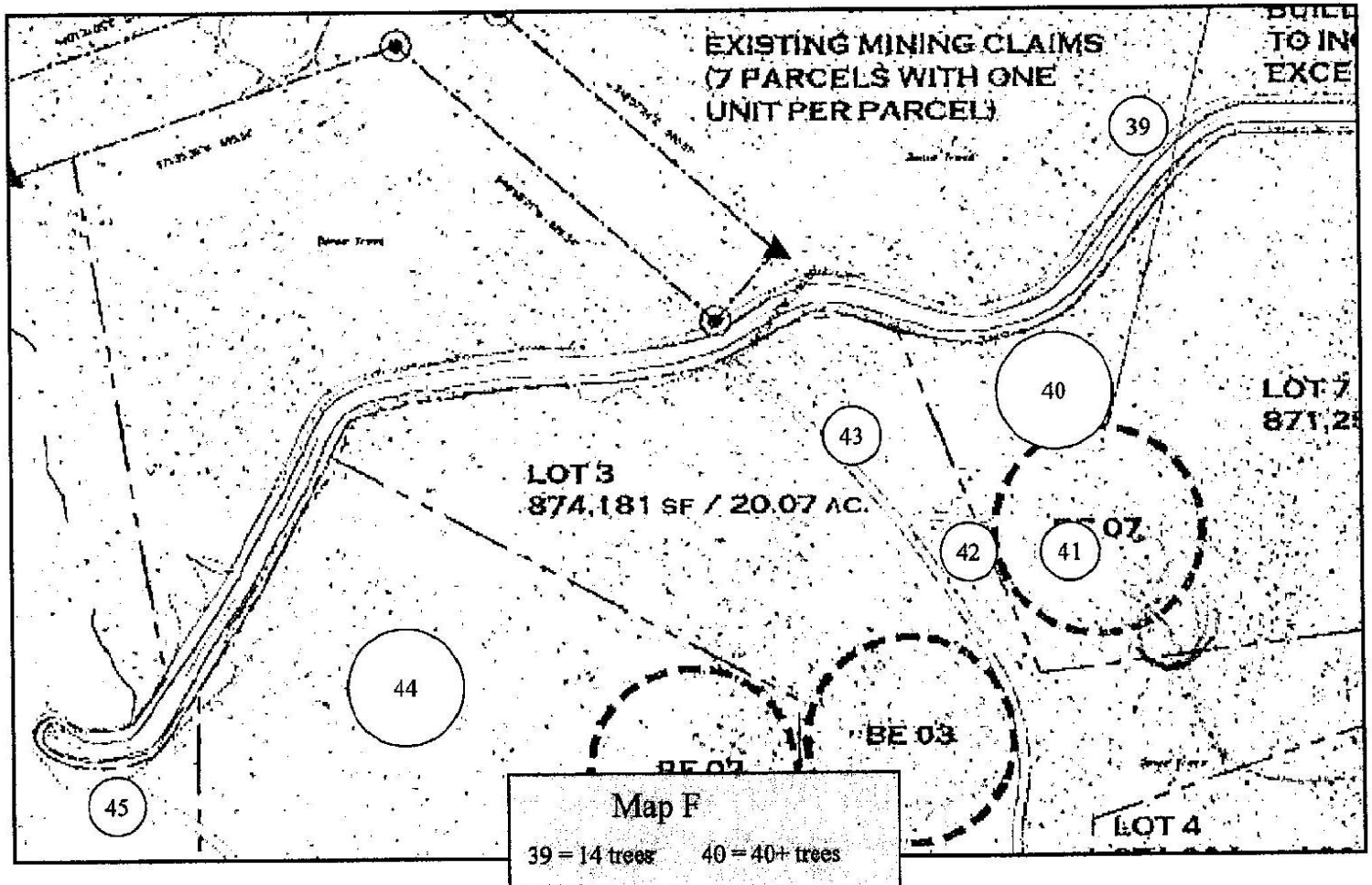
Map D

28 = 20 trees	29 = 1 tree
30 = 6 trees	31 = 5 trees
32 = 10 trees	33 = 7 trees

Roosevelt Ridge MPB Survey



Roosevelt Ridge MPB Survey



Map F

39 = 14 trees	40 = 40+ trees
41 = 20 trees	42 = 11 trees
43 = 9 trees	44 = 50 + trees
45 = 3 trees	

Fire Safe Homes
5150 So Oak St
Littleton, CO 80127
303-904-2620

INVOICE

INVOICE #
7094

DATE
11/1/2007

DUE DATE
11/16/2007

BILL TO
Zero Energy Attn: Davide Picard 2770 7th Street Boulder, CO 80304

SERVICE	DESCRIPTION	AMOUNT
Consulting, Forestry	Roosevelt Ridge Mountain Pine Beetle Survey	0.00
	Field Research and Data collection = 17hrs @ $110/hr	1,870.00
	Report Development = 4 hrs @ $110/hr	440.00
	Mapping = 3 hrs @ $60/hr	180.00
	Office Research = 3 hrs @ $60/hr	180.00

Thank you for your business!

Bruce Coulter

Total # 2,670.00