ADVANCED
FORESTRY

WILLIAM K. OLSEN
(970) 495-1719

RESOURCE ANALYSIS
AND CONSULTING
FORESTRY SERVICES
FOREST RESEARCH
SEMINARS

247 Falls Creek Drive
Bellvue, Colorado 80512

September 22, 1999

Mr. Bill Smythe
Greenbelt Committee
Crystal Lakes Road and Recreation Association
800 Tami Road
Red Feather Lakes, CO 80545

Dear Mr. Smythe,

Enclosed you will find the completed report titled "Analysis and Recommendations for a Forest Management Demonstration Program - Crystal Lakes Road and Recreation Association - Filing 15/12" .

The following topics are included in the report for the proposed Demonstration Area:

1. An analysis of forest conditions

2. A proposed decision-making structure incorporated in a management plan framework

3. Specific stand-by-stand treatment recommendations

4. Estimates of standing timber volumes, timber removals based on recommended silvicultural treatments, and estimates of stumpage value for several pricing scenarios

5. Supporting data

I recommend that the Greenbelt Committee first review the report in its entirety. Before decisions are made regarding on-the-ground treatments, the Committee may wish to consider creation of a decision-making body, for which I have recommended a subcommittee or panel consisting of Greenbelt Committee members and participating landowners. That subcommittee would approve management objectives for the project that are incorporated into the management plan. Activities to be included in the management plan can then be resolved based in part on the stand-by-stand recommendations made in the report.

Thank you for the opportunity to conduct this assessment. If the report is satisfactory and meets your expectations, I will submit an invoice to the Association for the balance due to Advanced Forestry. I admire the willingness of the Greenbelt Committee, area landowners, and of the Association to evaluate forest conditions in the proposed Demonstration Area.

On the following page is an estimate of fees required for forestry services provided by Advanced Forestry if the Association decided to implement the recommended treatments. The estimate is based on several assumptions. First, all landowners are included as participants. Second, all areas in the 72 acres are treated as recommended. Third, timber harvesting is assumed to be completed over a 2-month period. Costs after the timber sale is closed, such as prescribed burning and precommercial thinning, are not included.

Treatment preparations	$12,000
Stand boundary marking	
Prepare final prescriptions and marking guides	
Timber marking	
Timber cruise	
Volume removal calculations	
Sale contract preparation	
"Show-me" trip	
Bid solicitation	
Contract finalization	
Sale administration	$7,600
Road and skid-trail layout	
Logging inspection and reviews	
Supervise and inspect sale-closing activities	
Closing report	
Expenses:	
Tree-marking paint	$550
Flagging	$20
Cutting unit signs	$230
Total Estimate	$20,400

This is approximately $284 per acre. For timber removed, the middle estimate of stumpage (standing) value for mixed products is about $25,000, or about $11,300 if valued only as fuelwood at a medium price. Stumpage estimates vary widely depending on price and product assumptions. (See Table 4 in the report.)

There are estimated to be 11,640 standing live trees on the Unit (diameter at breast height >= 5.0 inches). Of these, about 6620 trees would be removed if preferred current treatments were implemented. This includes about 60,080 merchantable cubic feet, or roughly 751 cords. About 68,900 merchantable cubic feet, or approximately 861 cords, would remain standing after this round of treatments.

Please feel free to call if you have any questions.

Special thanks go to Committee members and other volunteers that helped locate and flag Unit boundaries.

Yours Truly,

William K. Olsen

cc: Dick Rosecrans/CLRRA

Analysis and Recommendations for a Forest Management Demonstration Program

Crystal Lakes Road and Recreation Association

Filing 15/12

September 22, 1999

William K. Olsen
Forest Management Consultant

Advanced Forestry
247 Falls Creek Drive
Bellvue, CO 80512
wolsen@advancedforestry.com
www.advancedforestry.com

wkolsen@wkolsen.com
495-1719

ADVANCED
FORESTRY

CONTENTS

	Page
Executive Summary	4
I. Introduction	5
Data Collection	6
Data Analysis	7
Forest Stand Reviews	7
Site Geography	7
Forest Types	8
Site Overview: The Historical Perspective	9
II. Overview Of Current Conditions	10
III. (Proposed) Forest Management Plan	15
A. Organization And Decision-Making	15
Greenbelt Subcommittee Guidelines:	
1. Subcommittee Membership	15
2. Voting On Membership Participation	16
3. Voting	16
4. Budgeting	16
5. Data Tracking And Recordkeeping	15
6. Meetings	17
7. Professional Consultations	17
8. Selection Of Objectives	17
9. Revisions	17
B. Problem Identification	17
C. Demonstration Area Management Objectives	18
D. Action Plan	18
IV. Stand-Level Characteristics, Diagnoses And Alternatives	
1. General Comments And Considerations:	
What Should Future Area Forests Look Like?	20
Even-Aged Vs. Uneven-Aged Management	20
Diameter Distributions: Big Trees	20
How Often Should Stands Be Thinned?	21

Page

2. Analysis, Diagnosis And Recommended Silvicultural Prescriptions

Stand 1 Filing 15 22
Stand 2 Filing 15 24
Stand 3 Filing 15 26
Stand 4 Filing 15 28
Stand 5 Filing 15 30
Stand 6 Filing 15/12 32
Stand 7 Filing 15/12 34
Stand 8 Filing 15 36
Stand 9 Filing 15 37
Stand 10 Filing 15 39

V. Estimates Of Stumpage Value For Preferred Alternatives 40

VI. Site Mitigation And Treatment Options Accompanying Timber Harvesting 43

Slash And Fuels Treatment 43
Timber Harvesting 46
Snag Retention 47

VII. Additional Treatments 48

VIII. References And Suggested Reading 49

Figures And Tables

Fig. 1. Proposed Forest Managment Demonstration Area 4b
Fig. 2. Aerial photo and delineated forest stands 6b
Fig. 3. Composite map for proposed Demonstration Area 6c

Table 1. Basal area statistics for each stand 50
Table 2. Descriptive forest stand data 51
Table 3. Snag, slope and aspect data 51
Table 4. Assessment of stumpage value 52

Appendix A. Bar Charts: Diameter Distributions 53

Appendix B. Growth And Yield Simulations: Gengym Output 64

Appendix C. Field Data 75

Appendix D. Forest Insect And Disease Leaflet 18: Lodgepole Pine Dwarf Mistletoe 98

EXECUTIVE SUMMARY

In cooperation with the Greenbelt Committee of the Crystal Lakes Road and Recreation Association, this project was implemented to evaluate forest conditions along a greenbelt tract in Filings 15 and 12, an area bounded by Mosquito Drive on the southeast, Shasta Way and Arapahoe Way to the west, and Shoshoni Road to the north (Fig. 1). The primary objective has been to evaluate forest conditions and make recommendations leading to creation of a Forest Management Demonstration Area in a cooperative effort between the Association and interested private landowners. Through the development of a Management Plan, issues are identified that serve to guide the planning, decision-making and implementation process.

This paper presents and reviews data describing forest conditions in the selected area. After important aspects of the analysis are presented and discussed, key issues are highlighted that require the attention of decision-makers in the Association and of participating landowners. Problems, objectives and action alternatives are reviewed and recommendations made that will shape the quality and health of area forests, and affect residents' and landowners' enjoyment of their surroundings at Crystal Lakes.

It is recommended that a subcommittee of the Greenbelt Committee be created for planning and decision-making in the Demonstration Area. Inclusion of private landowners, and their participation and guidance in shaping a management direction, is crucial to its success.

A general outline for a Forest Management Plan has been developed and specific objectives for the conditions on the Demonstration Area are recommended in Section III. On a broader scale for the Association, possible primary objectives have been identified that may serve as a good starting point for management plans throughout Crystal Lakes:

1. Reduce the risk of catastrophic forest fire, thereby improving the quality of life and level of safety for area residents.
2. Improve and maintain quality, healthy forests that are a positive attribute for current and future residents.

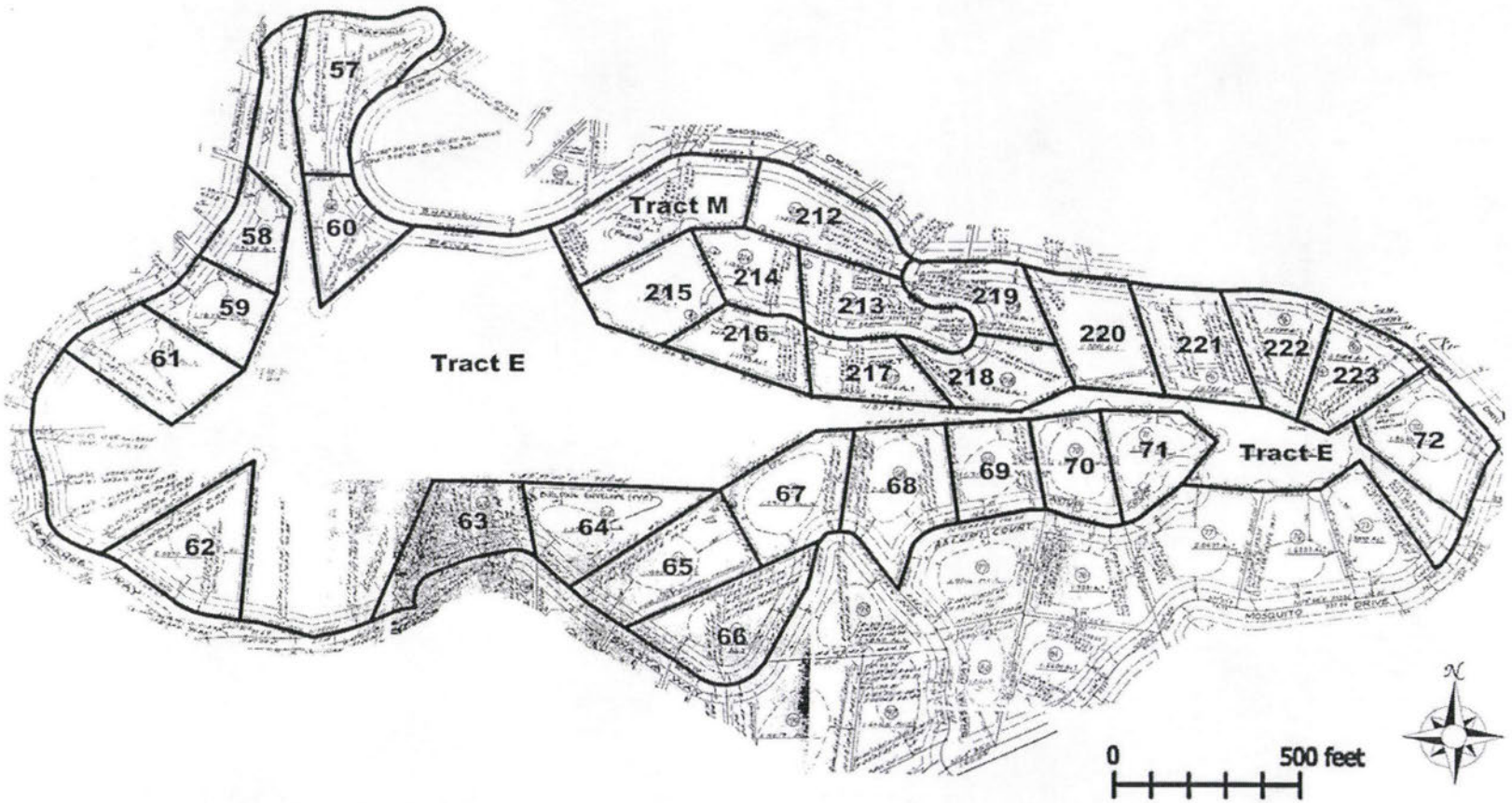


Fig. 1. Proposed Forest Management Demonstration Area for Crystal Lakes, Filings 15 and 12. Tracts E and M are Homeowners' Association parcels.

3. Strive to manage the broad forest systems and greenbelts in an efficient and cost-effective manner.
4. Encourage communication, cooperation and accommodation among forest landowners as they strive to achieve mutually beneficial forest resource goals.

On the Demonstration Area, the total merchantable volume of standing live trees is estimated to be 128,984 cubic feet (about 1612 cords). Of this amount, there are 230,509 board feet of timber in trees with DBH>=9.0 inches.

Stand densities in most areas are high, as are fire hazard ratings. Heavy dwarf mistletoe infestations exist throughout the area that will complicate forest management efforts. Regeneration cuts and thinnings have been recommended for improving forest quality and reducing fire hazard. If all recommended treatments are implemented and all landowners participated, estimated merchantable timber volume to be harvested in the first stage of treatments would include:

Poles	186,731 linear feet	(+/- 24.3% at 80% confidence)
Sawtimber	35,443 board feet	(+/- 23.4% at 80% confidence)
Residual cordwood	310 cords	(+/- 22.0% at 80% confidence)

Estimates of stumpage value have been made for several marketing and pricing scenarios. Combining timber harvesting and slash disposal for all stands into one contract is the best option for ensuring all objectives are achieved. Mechanical piling and burning of slash is the preferred method for reduction of fuel loads. Burning immediately after an early fall snowfall would satisfactorily consume fuels while minimizing the risk of fire spread.

I. INTRODUCTION

The highlighted area in Fig. 1 was identified by Dick Rosecrans as having dense forest conditions that might benefit from active forest management activities. The Association, in cooperation with Bill Smythe, Chairman of the Greenbelt Committee, and with other

Committee members, asked through formal letters if landowners in the area would be interested in participating in this forest assessment. No commitment was required other than to return a written authorization allowing this author access to their lots for the evaluation. Permission was granted unanimously, except for one or two landowners that did not respond.

The first step of this project was to identify survey markers and flag property boundaries. This was done mostly by members of the Greenbelt Committee, with initial assistance by the author. Aerial photos providing stereoscopic coverage of the Demonstration Area in Filings 15 and 12 were secured from the U.S. Forest Service. (At times the Demonstration Area will be referred to as the Unit, for convenience.) A walk-through of the Unit was combined with interpretation of the aerial photos in delineating areas of similar forest cover. These relatively "uniform" sites, called stands, are units having common attributes that make them suitable for generalized evaluations and possible activities or actions. For the proposed forest management demonstration Unit, 10 stands were identified (Fig. 2).

DATA COLLECTION

To obtain data from each stand, temporary sample plots or points were pseudo-randomly located on the ground. The sample data collected included parameters such as tree diameter at breast height (4.5 feet above the ground, commonly called DBH), total tree height, increment cores to determine tree ages and growth rates, and various measures of tree population density. Key measures of the degree of site or stand occupancy by trees are trees per acre (TPA) and basal area (BA). BA is the sum of the area of all live trees on an acre, measured as cross sections at breast height in units of "square feet per acre". Other attributes recorded on sample points include live crown length, and the frequency of damaging insects and diseases.

First, a thorough review was made of property boundaries, followed by a broad sample (reconnaissance cruise) of about 50 inventory points to determine the degree of variability (sample variance) for each stand. This data was used in the development of a sample design, a formal procedure to determine how intensively stands should and could be sampled. A total of 101 formal sample points were then measured across the 10 stands.

Fig. 2. Aerial photo and delineated forest stands, Crystal Lakes Filings 15 and 12.

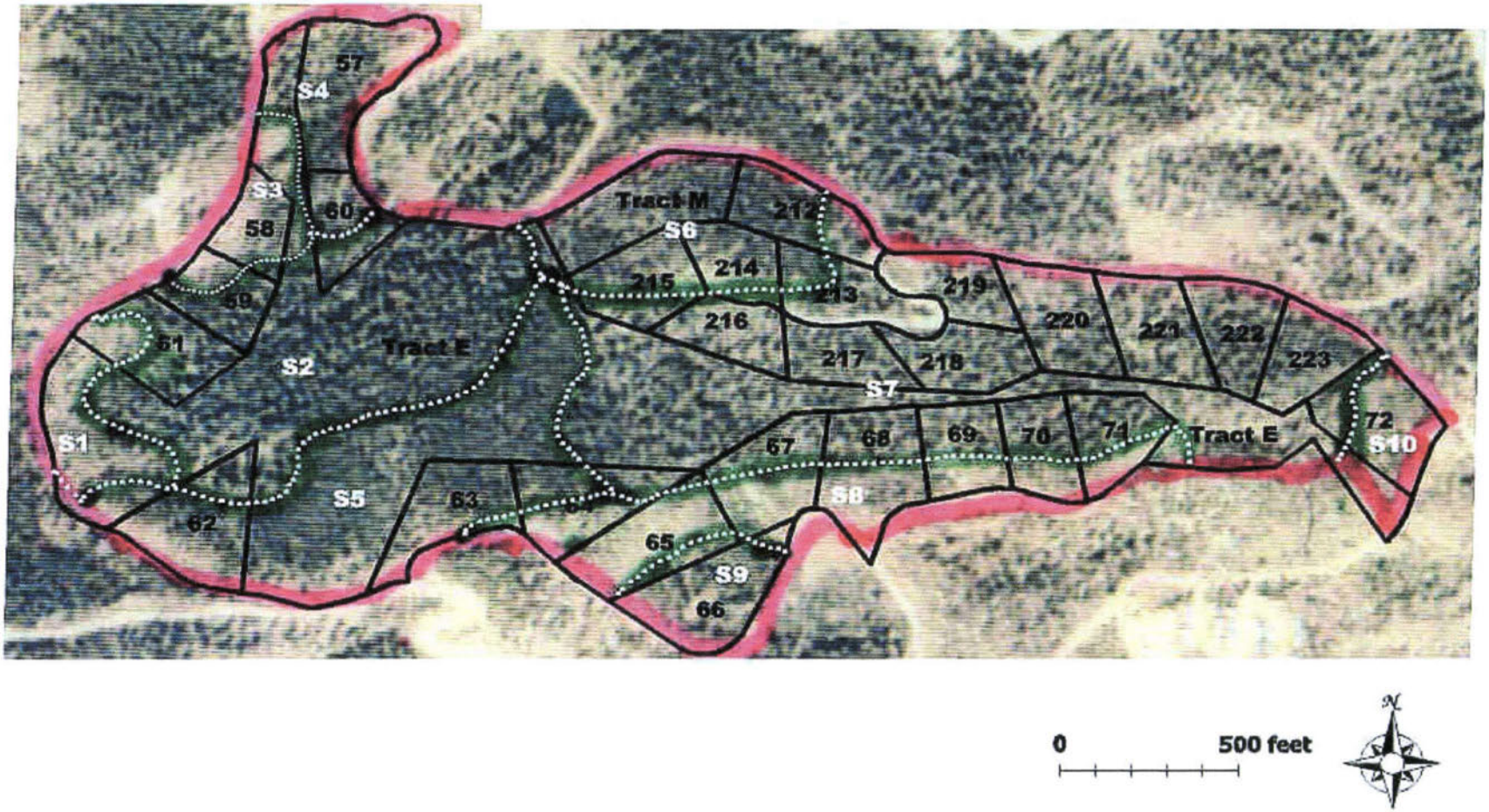


Fig. 3. Composite map for proposed Forest Management Demonstration Area, Crystal Lakes Filings 15 and 12. An areial photo is overlaid with property boundaries and delineated forest stands.

After the collection of data in each stand, general observations were recorded. An initial assessment was made of stand conditions, including a diagnosis and development of possible treatment prescriptions.

Global Positioning System (GPS) Receivers were used to precisely measure specific ground attributes and to aid in mapping and land surveying for area determination.

DATA ANALYSIS

The data was reviewed for correctness and completeness, and data analysis and computer programming techniques were applied to ensure the data was as accurate as possible. The sample data was then processed and transformed to calculate average conditions for each stand. The stand-level data was submitted to customized summary and modeling software, called "forest growth and yield" programs, to determine stocking levels, volumes and other characteristics of each stand. For the stands, the program Generalized Growth and Yield Model, or GENGYM (U.S. Forest Service, 1991), containing statistical and modeling relationships specific to the forest types of the Central Rocky Mountains, was used to produce many of the stand-specific tables used for this paper.

FOREST STAND REVIEWS

Each stand was reviewed to develop an understanding of the characteristics and issues unique to each site. This comprehensive picture was used to identify important issues to be considered for the Management Plan.

SITE GEOGRAPHY

The east half of the Unit, coinciding with Stands 7-10, is gently sloped except for the narrow ridge that runs along the Stand 8 / Stand 7 border. Stands 1-6 are generally steep and together

form a good portion of the upper reaches and source of Beaver Creek. Stands 1-7 have a significant northerly component to their aspect, whereas Stands 8-10 face gently to the south and east. The highest elevations are near the junction of Stands 5, 7 and 9 (9120 feet), dropping to 8921 feet in the NW at the Beaver Creek crossing, and 8865 feet in the northeast corner of the Unit.

FOREST TYPES

Lodgepole pine forests dominate in the Unit, and numerous lodgepole pine habitat types and phases populate the varied slopes. Stand 2 lies in the cool Beaver Creek drainage and has a significant mix of other tree species, including subalpine fir, Colorado blue spruce, and aspen. A small but somewhat similar site is tucked into the southwest corner of Stand 7 and along the east-west ridge on the border with Stand 7. Limber pine is found on isolated rock croppings throughout the Unit, and several notably large limber pine can be seen in the extreme northwest corner of Stand 7. A rare ponderosa pine and Douglas-fir, overstory remnants of forest conditions long gone, are easy to spot in Stands 5 and 7.

SITE OVERVIEW: THE HISTORICAL PERSPECTIVE

The Demonstration Area consists of discrete, clearly discernible stands created by a combination of environmental parameters (Fig. 2). Perhaps most influential is soil quality, rockiness and depth: the sites most conducive to vigorous tree growth are located in Stands 1-4 and along the northwest boundary of Stand 5.

One of the best measures of the confluence of factors that determine site quality is Site Index. Higher quality sites produce trees that grow faster in height, whereas on poor sites height growth is reduced. In general , stand density does not strongly influence height growth, so a measurement of tree height versus tree age in carefully selected trees is a good indicator of site potential. Here in the Rockies, a scale has been developed based on how tall trees can grow from breast height in 100 years. This "base age 100" Site Index was measured extensively in the 10 stands. In Table 2, column three, the estimated or average Site Index is

given. For Stand 2, SI=63, meaning the site has the potential to grow 63-foot-tall trees at a breast height age of 100 years. Stands 1-5 have considerably higher Site Index values than Stands 6-10. In fact, the poor sites coincide with the rocky ridge that forms the south backbone of the Unit, and from Site Index alone one can easily determine which part of the Unit contains each stand. These site differences have played a crucial role in forest stand dynamics over thousands of years.

Stands 1-6 have a noticeable absence, nearly absolute, of old trees. In fact, much of the Unit is dominated by trees that are 123 to 127 years old, but on the west side one feature is striking, particularly in Stand 2: a large number of respectably-sized, decayed logs are on the ground, often under a deep layer of duff, and more often than not toppled by a southwest wind. The evidence of past forest fires is impossible to miss, as is a complete lack of fire scars on live trees. To some extent these features are common throughout Stands 1-6.

Several remaining burned but short stumps and downed logs were about 20 to 22 inches in diameter at breast height, coincidentally the same size as the largest live blue spruce and subalpine fir trees now in the stand. Though once can't be sure, the odds are good the burned large trees died at about the same age as that of the largest trees now in the stand - about 130 years old. Dig through the 3 to 4-inch-deep duff, and charred wood and coals are common.

Stand 7 offers a sharp change along the Stand 5 border. Densely-packed lodgepole pine, 120 to 127 years old, suddenly gives way to a muti-storied mixed species stand with a noticeable distribution of old trees, including ponderosa pine, many snags and a heavy DM (DM) infestation. Many of the old trees are hollow from rot, and age cannot be determined. One DM-infected lodgepole pine, perhaps 14 inches in diameter, was found to be about 330 years old. It is likely that many of these older overstory trees are 250 to 350 years old. Some of these trees have old fire scars.

In casual searching, only one tree was found to have multiple fire scars. It was a small snag, perhaps 8 inches in diameter and located along the Stand 7-5 boundary, that burned twice, and it was many years between the two fires.

The historical picture is clear. A catastrophic stand-replacing fire burned through the Unit around 1869, and Stands 1-6, 9 and probably the west end of Stand 8 were completely denuded of vegetation. That fire marks the birth of the stands we see today.

The line that now denotes the boundary between Stands 5 and 7 is likely a long-term border in fire dynamics influenced by the poor soils and DM to the east, abutting the Beaver Creek drainage to the west that is clearly prone to strong southwest winds and fire. The DM-infected Stand 7 has likely had a long pattern of multi-storied conditions perpetuated by openings created as high rates of mistletoe-induced mortality cause patches of varied age classes. It seems likely that a fire from the west and southwest would quickly burn the understory, but a few older surviving lodgepole pine and ponderosa pine were able to avoid being burned as a result of low stand densities, high crowns and lower odds of a crown fire. New regeneration populates the burned openings, the heavy mistletoe in the overstory drops into the new regeneration, preventing the development of a uniform stand, and the next catastrophic fire from the west/southwest drops down again into the Stand 7 understory.

Some of these specific conclusions may be debated, but there is a critical point to bear in mind as we proceed: wind, fire and DM are the dominant and persistent components of the Filing 15/12 forest ecosystem. The trees themselves, including their status and condition, are in an ever-changing state of flux. These forests are dynamic, and the forest qualities have changed significantly from just 20 years ago, and are unbelievably, almost impossibly, different from the treeless forest of 1869. In stark contrast, the lack of fire scars suggests that the site has not burned again since that earlier fire of 130 years ago.

II. OVERVIEW OF CURRENT CONDITIONS

This section discusses current characteristics of the forest landscape on the Unit, serving as the background for development of the Forest Management Plan in the next section. Detailed discussion of each stand will then follow in Section IV.

Lodgepole pine dwarf mistletoe is a parasitic plant that causes severe growth reduction and tree mortality. Levels of DM infection in the Unit are very high, and discussion of its role in stand development is important when considering objectives and options for the Unit. The presence of DM severely limits options available for improving stand growth and health. If you are not familiar with DM, please read the included publication, Lodgepole Pine Dwarf Mistletoe (Hawksworth and Dooling 1985) in Appendix D, before proceeding.

It is desirable to maintain basal areas of 80 to 110 sq ft/acre in lodgepole pine stands. As stand densities approach 120 sq ft/acre and average diameter nears 9 inches, the stands become susceptible to mountain pine beetle attack. Densities over 120 to 140 sq ft/acre, particularly on poorer sites, can result in low growth rates and an overabundance of small-diameter trees. Stands with basal areas below 70 square feet per acre are more susceptible to windthrow as well as improved conditions for the establishment of new regeneration - the unintended creation of multi-storied uneven-aged stands. This is a recipe for disaster where DM is present and fire danger is a critical concern.

Four forest conditions exist in the Unit.

1. Dense overstocked stands of poles and small sawtimber are the primary characteristic of Stands 2, 4, 5 and 6. Each stand is approaching maturity, the point at which stand growth decreases and mortality increases. Suppressed diameter growth rates of 0.2 inches per decade are common. The ability of trees to increase growth in response to thinning is reduced at this stage, particularly where high densities have caused stagnation, or low growth due to overcrowding, such as on the poorer sites of Stands 5 and 6. Heavy DM infestations exist in Stands 5 and 6, and growth and yield simulations show that

with or without thinning, mistletoe will continue to overtake the stands, and net growth will become negative as mortality exceeds growth rates sometime over the next 20 to 40 years. In short, these stands are about to unravel.

Stand 2 is a multi-storied stand, with a substantial cohort of 40 to 65-year-old shade-tolerant subalpine fir in the understory. The stand is attractive and aesthetically valuable - several Association trails run through the site. More wildlife was seen in this stand than elsewhere, including an owl, a red tail hawk, gray jays, various songbirds and an abundance of squirrels and chipmunks. The stand, particularly along the drainage bottom, is capable of growing impressively large trees. Several trees over 20 inches in diameter and about 95 feet in height are present in the stand, including several large blue or Engelmann spruce. Overall stand density is at 70 percent of average maximum density, far above any reasonable management zone, and some areas within the stand are approaching densities of 400 square feet per acre. The multi-storied stand conditions are ideal for a ground fire to jump swiftly into the dense canopy.

Stands 2 and 4 can be expected to respond to thinning, though care must be taken to manage existing and neighboring DM infestations. With thinning, these stands will continue to grow and build respectably larger trees over the next 60 years or longer.

2. The second stand condition is the multi-storied multi-aged DM-infested unraveling lodgepole pine Stand 7. The multi-storied conditions will perpetuate the mistletoe infestation until the next stand-replacing event. In most areas the overstory canopy is too fragmented to carry an intense crown fire, but a true unevenaged diameter distribution is dominated by trees with heavy witches brooms. The situation is confounded by a high DM-driven mortality rate (27 standing dead trees per acre with diameters greater than 5 inches, 8 snags per acre with diameters greater than 9 inches) and numerous patches of large, dead windthrown trees. The entire length of the stand is bisected by an Association hiking trail.

3. Multi-storied stands have been created as a result of heavy thinning in Stands 1, 3 and 9 and a portion of Stand 8. The sites are somewhat attractive in that the change in forest cover is a nice distraction from nearby overstocked stands. Increased competition between overstory and understory trees, the threat of increased fire hazard as ladder fuels grow taller, and the developing DM infestation of the regeneration from infested overstories (Stands 1 and 9) have increased the need for treatments.

4. Successfully regenerated clearcuts include Stands 8 and 10, numerous road right-of-ways and several smaller patches of regeneration, such as at the junction of Nanticoke and Shoshoni, and along the west side of Stand 1. These sites serve as good examples of how quickly and thoroughly lodgepole pine can regenerate after an overstory removal. Many of these sites were probably treated to be part of a fuelbreak system in conjunction with the road system, and/or to alter and improve aesthetics of the private lots. These sites have been transformed from firefighting aids to fire hazards. Sanitation cuts and thinnings are needed to control DM infestations from adjoining stands, reduce fire hazards and to maintain healthy and vigorous stands.

No mountain pine beetle problems were seen in the Demonstration Area. In part, this is because stand conditions are not ideal for attacks.

Snags were inventoried, but dead and down material was not measured. In Stand 7, the quantity of snags, and of dead and down wood, is alarming. Much of this material is not compacted and will burn readily, a matter exacerbated by the multi-storied condition of the stand. Here, dead material should be removed and/or piled and burned.

Evaluation of fire hazard and fire probabilities are important considerations. The most intense fire conditions are conflagrations that consume entire forest stands by entering tree crowns. Using the crowning potential rating system by Dennis (1983), stands may be rated for crowning hazard on a scale of 0 to 9, where 0 is the lowest danger and 9 the highest. Crowning potential ratings for Stands 2, 4, 5, 6, 7 and 9 are on the highest end of the scale, from 7 to 9.

The probability of a forest fire entering the Demonstration Area is more difficult to assess. Fire history is a good indicator of fire probability. Consider first that lodgepole pine forests are known forest ecosystems dependent on fire for stand replacement and regeneration. Second, all stands in the Demonstration Area were formed in whole or in part from the catastrophic stand-replacing fire circa 1869. Third, stand-replacing fires are a known and irrefutable aspect of recent history in the area. Finally, younger stands are less prone to catastrophic fire, but as stands mature, dead and down material and ladder fuels increase. The larger, uncut stands in the Demonstration Area have reached this maturation stage, when the fire hazard is increased.

Indications in Stand 2 from old downed trees - remnants of the 1869 fire - are that the largest trees in the stand at the time of the fire were about the size of the largest trees now growing on the site. Evidence suggests the stand may have been somewhat older, so assume the stand was 150 years old and was created by an earlier stand replacing fire around 1720. In addition, we can make a weak assumption that a lone snag with a double fire scar probably burned about 120 to 160 years prior to the 1869 fire.

Suppose now that stand-replacing fires are capable of occurring every 150 years in the demonstration area. The fire risk is fairly low in the first 75 years or so, when ground fuel loadings are low. The greatest probability of fire occurs in stands 75 to 150 years old, or older.

Since most of the stands are now about 130 years old, it could be argued that the probability of a crown fire in the Demonstration Area in the next 20 years is nearly 100 percent. This could be debated, and there are factors that alter the probability, such as the existence of the road system, fire suppression capabilities (both reducing probabilities), and the increased likelihood of ignition due to the presence of people in the area (increased probabilities).

In sum, the fire hazard in the Demonstration Area is very high, as is the probability that a crown fire will occur in a coming decade.

III. (PROPOSED) FOREST MANAGEMENT PLAN

This is a living document, organized to provide a formal guide to management of the proposed Forest Management Demonstration Area in Filings 15 and 12. It should be revisited and revised as frequently as necessary to address changing conditions, objectives and needs.

A. ORGANIZATION AND DECISION-MAKING

The Filing 15/12 Forest Management Demonstration Area Subcommittee of the Greenbelt Committee, Crystal Lakes Road and Recreation Association, will be the primary decision-making body regarding this Management Plan and policies for the Demonstration Area, subject to the rules and requirements of the Greenbelt Committee and of the Association.

SUBCOMMITTEE GUIDELINES:

1. SUBCOMMITTEE MEMBERSHIP

Membership of the Subcommittee shall consist of 2 members of the Greenbelt Committee and each participating private landowner or their duly selected representative. A private landowner is eligible for membership on the Subcommittee if:

(a) the landowner owns one or more lots within the boundaries of the Demonstration Area (Fig. 3).

(b) the landowner agrees to participate and cooperate in forest management activities under one of the following categories:

i. the landowner agrees to contribute to, and to accept, joint management decisions for forest management activities on their parcel

ii. the landowner agrees to accept joint decisions, with special provisions for their parcels

iii. minimal participation to accommodate localized objectives

(c) for item (b) above, "participation" is defined as a demonstrated willingness by the landowner to apply active forest management practices on their land, in conjunction with Subcommittee objectives for the Demonstration Area.

2. VOTING ON MEMBERSHIP PARTICIPATION

By a two-thirds vote, Subcommittee members can expel a member for failing to "participate", as described above.

3. VOTING

Motions and resolutions may be passed by a simple majority vote when a quorum of 40 percent of eligible members are present. A landowner is qualified to vote once for each parcel owned within the Demonstration Area boundary.

4. BUDGETING

Subject to requirements and necessary approvals of the Greenbelt Committee and of the Association, the Subcommittee shall decide by majority vote how distributions of profits and costs will be distributed.

5. DATA TRACKING AND RECORDKEEPING

The Subcommittee shall appoint, by mutual agreement, a Resource Records Manager to consolidate and maintain resource records related to management activities, scheduling and accomplishments.

6. MEETINGS

The Subcommittee shall decide, by majority vote, on the location, frequency and time of meetings.

7. PROFESSIONAL CONSULTATIONS

The Subcommittee shall decide, by majority vote subject to limitations and requirements of the Greenbelt Committee and the Association, on which natural resource professionals are recruited as consultants on Demonstration Area matters, and on when they are recruited for consulting services. This provision does not limit in any way limit the ability of a landowner to contract for any services whatsoever on their private parcel.

8. SELECTION OF OBJECTIVES

The selection of Demonstration Area management objectives and actions shall be made, and revised, by a simple majority vote.

9. REVISIONS

Approval of and revisions to the above Subcommittee guidelines, including this clause, requires a two-thirds vote in agreement.

B. PROBLEM IDENTIFICATION

1. The risk of catastrophic fire damage to private property has risen as forest stand densities and unfavorable forest stand conditions have increased.

2. The aesthetic value of Unit forests has decreased as forest conditions have deteriorated.

3. The spread of DM reduces property values and actions should be taken to reduce its impact.

4. Current forest stand conditions are not static, and ongoing changes should be managed to improve the quality and enjoyment of our forest environment for our use and for future landowners.

5. Cooperative efforts are required to address forest resource issues that cross private property boundaries.

C. DEMONSTRATION AREA MANAGEMENT OBJECTIVES

1. Reduce the risk of catastrophic forest fires to life and property through the active application of forest management principles.

2. Improve forest growth and aesthetics, and promote sustainable forest conditions through active control and reduction of DM infestations, in a cost-effective manner.

3. Anticipate, plan for and actively guide changes in forest conditions that will benefit future landowners.

4. Develop a dialogue among landowners and resource professionals that will aid in the identification and addressing of issues affecting mixed forest land ownerships for the Demonstration Area.

D. ACTION PLAN

[A list of priorities must be developed based on a thorough analysis of forest stand conditions on the Demonstration Area. Recommendations are made below in Section IV. for activities that would meet the above objectives. Approval of those recommendations or other

alternatives would be consolidated here under the ACTION PLAN. Several additional items to be considered for incorporation into the Action Plan and its development are listed below.]

Item 1. A prescribed burn policy, or perhaps evaluation guidelines, must be explored for compatibility with Demonstration Area Management Objectives and Association goals.

Item 2. Temporary access roads may be required if timber harvesting is to be implemented. Such roads could be designed to reduce impacts on some private parcels. Identify the road and transportation issues for the Demonstration Area.

Item 3. Monitoring. What monitoring efforts should be initiated to measure achievements and guide future efforts?

IV. STAND-LEVEL CHARACTERISTICS, DIAGNOSES AND ALTERNATIVES

1. GENERAL COMMENTS AND CONSIDERATIONS:

WHAT SHOULD FUTURE DEMONSTRATION AREA FORESTS LOOK LIKE?

For aesthetics, logistics and a balance of distribution of treatments, stand ages and treatments should be rotated across the landscape. This assures an assortment of forest stand conditions are maintained for wildlife, and that a balance of time and resources is attained. Even though issues such as DM demand attention, a wide range of stand ages and conditions exist in the Unit, helping ensure a range of forest conditions are maintained.

EVEN-AGED VS. UNEVEN-AGED MANAGEMENT: WHICH IS BEST?

An emphasis on uneven-aged forest management has been fashionable in recent years. Declarations that individual-tree and group selection methods are superior to even-aged management is not only unsupported, it is ignorant of basic concepts of silvics, silviculture and applied ecology. Different tree species exhibit strong differences in the ability to regenerate in various conditions of soil exposure, and dramatic differences in shade tolerance (the ability to grow in shaded conditions) among species affect the volume, value and growth rates of future stands. The fact is, different opening sizes grow different tree species.

Locally, great contrasts are seen between lodgepole pine (a shade intolerant species) and subalpine fir (a notoriously shade tolerant species). Whereas lodgepole pine seems to require at least 30-foot canopy openings simply for seedlings to become established, subalpine fir can grow quite well in some of the densest forest shade in the area.

Stand 2 is one such example. Subalpine fir has been wildly successful in the dense understory, while lodgepole pine seedlings are unable to even germinate in most places. Subalpine fir, a shorter-lived tree species that is prone to stem and butt decay when mature, will displace shade intolerant forest types. If a decision was made to move the 2-storied Stand 2 toward an uneven-aged system, individual-tree and group selection would favor subalpine fir, and economically valuable lodgepole pine would become a less significant component in future decades.

Worse yet, uneven-aged management is fully compatible with the rapid spread of DM.

Given the importance of lodgepole pine in the Demonstration Area and the unwanted DM infestations, it would be centuries under the best of circumstances before uneven-aged management could even be attempted locally.

DIAMETER DISTRIBUTIONS: BIG TREES

Thinnings concentrate site growth potential on fewer trees that grow faster than in unthinned stands. Under some circumstances, big trees can and should be retained to improve aesthetics and wildlife habitat, as an alternative to a complete overstory removal. On the Unit, several large spruce in Stand 2 can and should be retained, and may live up to 200 or maybe even 300 additional years - provided wind, lightning, fire or bark beetles do not kill the trees first.

Retaining lodgepole pine in the overstory, however, could spell disaster for new regeneration if it is infested with DM.

HOW OFTEN SHOULD STANDS BE THINNED?

Local growth model simulations on Unit data have shown that a properly thinned lodgepole pine stand of saplings will not need thinning again for up to 60 years

after the first treatment. As the stand matures, however, thinning is necessary at 20 to 30 year intervals to maintain basal area stocking within the 80 to 120 sq ft/acre management zone. Of course, other objectives could shorten or lengthen time between treatments.

2. ANALYSIS, DIAGNOSIS AND RECOMMENDED SILVICULTURAL PRESCRIPTIONS

Filing 15 Stand 1

OBSERVATIONS

This two-aged lodgepole pine stand, consisting of a 125-yr-old overstory over 15-yr-old regeneration, was thinned around 1984. The strong differentiation in age classes is apparent in Figs. 1a and 1b (Appendix A). The west side along the road has no overstory. It is generally a better-quality site because of its location in a drainage. The point sample grid ran along the edge of the open area to the west; volume estimates will be 25-50 percent too high. Stimulation brooms made DM ratings difficult, but DM in the new understory verifies infestation from the overstory has been initiated. The lower stand density to the west, in addition to light penetrating from the road, has allowed for dense regeneration that would not be expected in a larger stand of this stocking.

DIAGNOSIS

The new regeneration is dense and overstocked. The overstory is suppressing understory growth, and DM infection in the regeneration will accelerate unless the overstory is removed. Stands 2 and 4, to the east and south, will continue to infest this stand with DM unless they are treated also.

OPTIONS

Alternative 1 (preferred): overstory removal, followed by sanitation/thinning in the understory.

Alternative 2: No action. DM infestation will accelerate in the understory. The understory will continue to grow and is more likely to be damaged from overstory removal at a later date. The two-storied stand will become more susceptible to serious fire damage.

Alternative 3: Overstory removal only, delay understory thinning. A fire would pass easily through the understory, a detriment to the use of the road as a firebreak. The DM threat to the understory would be diminished for the time being.

Filing 15 Stand 2

OBSERVATIONS

Primarily even-aged 125-yr-old lodgepole pine/subalpine fir stand with an invading 40 to 65-yr-old subalpine fir understory and pockets of subalpine fir seedlings and saplings. The subalpine fir invasion and dominance in the understory is easily viewed in Figs. 2a and 2b, Appendix A. Occasional blue spruce is present in the overstory and understory, generally along the drainage bottom. About 1 acre of the site, along the drainage, is particularly moist during periods of higher precipitation. Stocking is very high, suppressing growth rates. The site is a cool, north/northeast drainage. Noticeable mortality in overstory fir may be due to fir engraver. DM infestation in lodgepole pine is light, but is most noticeable on the stand edges due to infestation from adjacent stands. Hiking trails and wildlife utilization are important components of the site.

DIAGNOSIS

Very susceptible to fire due to multi-storied and dense stand conditions. The mountain pine beetle threat is increasing as average stand diameter has reached susceptible size classes (7 inches and greater, see Fig. 2b in Appendix A and Table 2). Subalpine fir is over-represented in the understory and threatens to dominate the stand without an external change or influence on stand conditions. Growth is fair in dominant trees, and overall growth will remain suppressed without thinning. The duff layer is noticeably thick, usually 3 to 4 inches in depth.

OPTIONS

Alternative 1 (preferred): thinning from below to 80 square feet per acre; complete removal of the understory to reduce ladder fuels. Target a somewhat higher stocking, near 100 square feet per acre, within 70 feet of the drainage bottom, and in a 1-acre (approx.) area near the south corner of Lot 61. Timber harvesting should be scheduled for the winter months or dry summer periods to

minimize impacts on soils along the drainage bottom. Large spruce and white fir are a focus for retention. All snags within 'striking distance' of the hiking trails will be removed.

Alternative 2: no action. Stand vigor will decrease, fire hazard will increase. The prospects for long-term sustainability of stand conditions is poor. The likelihood of long-term conversion of the stand to subalpine fir, and/or complete loss to catastrophic fire, is high.

Alternative 3: patch cuts to convert to uneven-aged stand. Not recommended due to the threat of DM infestation and likely conversion to subalpine fir.

Filing 15 Stand 3

OBSERVATIONS

Previously this was an even-aged lodgepole pine stand. Two patchcuts from approximately 15 years ago have successfully regenerated. The remainder of the site, mostly on the east side of the stand, was thinned at the same time. The current stand structure is readily discernible in Figs. 3a and 3b in Appendix A. Heavy slash, mostly pole-sized boles, remain on the ground in a jackstraw pattern below the overstory. Codominant and dominant trees responded to the earlier thinning with growth increases.

In the south opening, scattered overstory trees have small witches brooms and excessively compacted foliage. The presence of DM could not be confirmed, though stimulation brooms likely also have DM present.

DIAGNOSIS

In patches of regeneration, scattered overstory trees will increasingly compete with the understory. There is a chance of understory DM infestation from the overstory trees and adjacent stands. The closed but previously thinned stand is approaching maturity.

Overstory trees should be removed from the openings to reduce competition with regeneration. After overstory removal, the regeneration should be thinned. The remainder of the stand should be thinned lightly, concentrating on reducing stocking to levels conducive to good growth and targeting for removal trees that were damaged at the last entry. If adjacent Stands 4 and 2 are thinned, the overstory of Stand 3 would become most similar to those sites and should be managed separately from the new understory on the west side.

OPTIONS

Alternative 1 (preferred): overstory removal in patches of regeneration; thinning from below in remainder of overstory. Thin understory after overstory removal.

Alternative 2: No action. As the regeneration in the understory grows, the likelihood of later damage from overstory removal will increase. There may be a 10-year window available before understory competition becomes excessive and thinning would then be critical.

Alternative 3: Clearcut. Complete removal of the overstory would push the site toward an even-aged condition and hence a younger and more vigorous stand. However, a regeneration-style treatment in this stand, particularly for the east side, might be more appropriate if coordinated with later treatments in Stands 2 and 4 - in perhaps 60 years.

Filing 15 Stand 4

OBSERVATIONS

This even-aged lodgepole pine stand was established around 1875. At 40 to 45 years of age, the trees fully occupied the site and growth became quickly suppressed.

It has two components: one is the dense lodgepole pine overstory (124 square feet per acre, maximum point basal area of 240 square feet per acre; see Table 1) occupying most of the area. Second are several areas that have begun to regenerate due to overstory stocking reductions (south-central, on the north half along the road right-of-way, and northwest in a new opening resulting from overstory mortality). The south and north ends were thinned around 1985.

The northwest corner has more moisture available, allowing for aspen in the overstory and understory. Several subalpine fir seedlings and saplings have become established in areas of lower overstory density. A light DM infestation is present, particularly along the north and northwest edges of the stand. Better site quality has allowed lodgepole pine to grow relatively unaffected by DM, contrary to the condition of much of the Demonstration Area.

Slow diameter growth is evident across most of the stand and there is no evidence of significant timber harvests or thinning prior to 1985. Recent mortality and sparse narrow crowns have resulted from overcrowding. The stand is nearing maturity, but a positive growth response is likely after thinning as seen in increment cores taken from area trees thinned circa 1985.

The road right-of-way was mostly cleared of overstory trees years earlier and has now regenerated in dense lodgepole pine.

DIAGNOSIS

As the stand reaches maturity, mortality will increase and growth will decrease. The stand is still capable of a positive growth response to thinning. The low level of DM infestation can be tolerated, but it will be an important consideration when a decision is made to regenerate the site. With a mean diameter of 7 inches (Table 2) and a significant proportion of trees at 9 inches and greater (Figs. 4a and 4b, Appendix A), the stand is a prime target for mountain pine beetle attacks.

OPTIONS

Alternative 1 (preferred): thinning from below, favoring dominant/codominant trees with lower DM ratings. Target a residual basal area of 80 square feet per acre. Thin regeneration along the road right-of-ways. The faster-growing residual stand will allow for larger-diameter trees while decreasing the likelihood of serious damage from crown fires and mountain pine beetle.

Alternative 2: no action. Trees will continue the downward trend in growth rates. The stand is now susceptible to mountain pine beetle attack, and the likelihood of MPB attacks will increase without treatment.

Alternative 3: thinning from below combined with patchcuts. While an interesting multi-storied stand could be created that would favor aspen in the northwest corner of the stand, the opportunity for DM spreading into a new understory would increase. One option would be to intentionally favor aspen through precommercial thinning about 10 years after opening patches.

Filing 15 Stand 5

OBSERVATIONS

This is a dense, even-aged stand of lodgepole pine, heavily infested with DM. Site index is low, apparently due to shallow and rocky soils. Growth is nearly stagnated in most areas. The stand is highly susceptible to a stand-replacing catastrophic crown fire. Mountain pine beetle susceptibility is low due to the small and unfavorable average tree diameter (Fig. 5b, Appendix A). A small area of steep slopes (about 40%) in the center of the stand may be difficult to access with timber harvesting equipment. Most invading subalpine fir regeneration (Table 5a, Appendix A) is located toward the northwest boundary with Stand 2.

DIAGNOSIS

The stand is in poor condition. High stocking, poor site quality and a dramatic DM infestation have combined to produce a stagnated stand that will begin to unravel as increasing mortality takes its toll. Without intervention, this stand faces one of two outcomes: complete loss to catastrophic fire, or a conversion to a multi-stored stand of poor growth and extreme DM infestation as seen in Stand 7. The stand will not respond well to thinning, which would only result in additional DM growth. Options for improving site conditions are limited.

OPTIONS

Alternative 1: (preferred) Heavy seedcut/shelterwood treatment, leaving about 20 square feet per acre of trees 10 inches and larger - approximately a 34-foot mean spacing with an average of 37 trees retained per acre. A seedcut is not silviculturally necessary because adequate lodgepole pine regeneration is achieved with a clearcut. The lodgepole pine overstory in this case would serve principally to maintain forest cover for aesthetic purposes. Vigilance would be required, however, in removing the seed tree overstory after 10 years to prevent

DM from infecting new regeneration. There will be windthrow losses if a seedcut is applied. Few trees over 10 inches would be removed at this time.

Regeneration will become quickly established, and the overstory must be removed after 10 years to ensure DM does not infest the regeneration. Over 2000 board feet per acre would be removed at that time, making a commercial harvest of the overstory feasible.

Alternative 2: Clearcut. The stand must be regenerated from scratch to eliminate DM.

Alternative 3: No action. The stand condition will continue to deteriorate, and fire hazards will increase.

A relatively vigorous stand would be created from Alternatives 1 and 2, but a successive precommercial sanitation/thinning will be required to maintain acceptable levels of growth and to control DM likely to be introduced from nearby stands.

Filing 15/12 Stand 6

OBSERVATIONS

This small-diameter overstocked even-aged lodgepole pine stand is about 125 years old, averages 132 square feet per acre in basal area (Table 2), and is located on steep, rocky and poor soils. The classic mature-stand tree distribution is evident in Fig. 6a, Appendix A. The DM infestation is moderate to heavy, with an average DM rating of 4.3 (Table 2). Tree growth is suppressed and stagnated as seen in 10-year diameter growth rates commonly at 0.1 inches and less. Some thinning was applied on the north stand boundary along the road about 15 years ago and diameter growth increased. Susceptibility to catastrophic crown fire is high, but the small trees are not a favorable size for large-scale mountain pine beetle attacks. The organic duff layer is about 3 inches in depth.

DIAGNOSIS

Though the DM infestation has negatively impacted the stand, most trees have continued to grow without producing heavy witches brooms; branch fanning and swelling from DM is common. As for Stand 6, mortality from DM will increase and the stand will start to unravel as seen in Stand 7 - unless the stand burns beforehand. The stand is fairly isolated and poses a significant external threat of DM spread only on the west boundary with Stand 2.

OPTIONS

Alternative 1 (preferred): Thin from below to a basal area of 70 square feet per acre. Though the DM infestation in dominant and codominant trees is substantial, an attempt can be made to carry the stand for one to three decades before a regeneration cut is absolutely required. The isolation of the stand reduces its mistletoe threat for neighboring stands. This option would decrease the fire threat while allowing for a better balance in Unit stand age classes in the future by delaying the establishment of a new stand for 20 to 30 years. The stand would

have to be closely monitored after treatment, because the mistletoe is likely to spread further among residual trees after thinning.

Alternative 2: Clearcut. The stand has reached maturity, and stagnated growth makes a thinning response of low likelihood and little importance. A regeneration cut will eliminate DM and allow for establishment of a young and vigorous stand. The threat of future DM infestation from Stand 7, uphill and to the south, is high and thus treatments for Stands 7 and 6 should be closely coordinated and future interaction monitored. This is the best option from a silvicultural perspective.

Alternative 3: No action. The fire threat will increase as mortality increases and muti-storied conditions will be created as heavy DM infestations spread into new regeneration.

Filing 15/12 Stand 7

OBSERVATIONS

This multi-storied and heavily-fragmented lodgepole pine stand is heavily infested with DM in all size classes. The stand-level DM rating is 4.2, but the infestation is extreme in trees larger than 6 inches as DM ratings approach the maximum rating of 6.0. Average DM ratings in the understory (0 to 5 inches DBH) are 3.0 to 3.5, and 1.0 for seedlings, an indication of complete the DM infestation has become. A minor component of subalpine fir, along with rare ponderosa pine, limber pine, blue spruce and Douglas-fir, is found on the west end and along the south ridge. Heavy mistletoe brooms, stagnated growth and high mortality rates are defining characteristics throughout the stand. Stand aesthetics have been negatively impacted. The high mortality combined with blowdown and ladder fuels have created areas of extreme fire hazard.

The long-term combination of fire and DM have created a classic uneven-aged stand structure, as seen in Figs. 7a and 7b in Appendix A. For reference, stand structure here contrasts sharply with the two-storied to even-aged characteristics of Stand 2 (Figs. 2a and 2b, Appendix A) and Stand 3 (Figs. 3a and 3b, Appendix A).

DIAGNOSIS

Without intervention, poor stand conditions will be self-perpetuating. As individual trees and groups of trees die, regeneration quickly becomes established. DM is rapidly transferred to the regeneration from surrounding overstory trees, growth is negatively impacted, mortality sets in and the cycle will repeat unless interrupted by fire or silvicultural treatments.

OPTIONS

Alternative 1: Clearcut. Every tree must be removed, and all advanced regeneration eliminated to ensure DM is removed from the site.

Alternative 2: No action. This option is considered unsatisfactory due to the high fire danger.

Alternative 3: Clear a 50-foot buffer along the stand boundaries. Apply prescribed burns to reduce fuel loads. The buffer would serve to reduce DM spread to neighboring stands, and to reduce the impact of potentially catastrophic fires. This option does not address aesthetics. The poor stand quality is accepted as a perpetual condition. The 50-foot buffer would be maintained by periodically removing new regeneration, or alternatively planting preferred species not likely to be affected by lodgepole pine dwarf mistletoe, such as Douglas-fir.

Alternative 4: (preferred) Incremental patchcuts leading to complete overstory removal and new stand establishment. Small clearcuts (patchcuts) would be created across the stand to begin the process of regenerating the stand. The cuts would be applied in 10-year increments across 1/3 of the area at each entry, and remaining areas would be lightly thinned to reduce fire hazards. Overstory removal would be completed at the 20-year entry. Because of the serious threat of DM spreading into newly-regenerated openings, incremental patchcuts would occur in the overstory immediately adjacent to openings created at the previous entry. The effect would be to create openings at year 0 (the initial entry); expand the openings at year 10, which by this time have regenerated in lodgepole pine averaging 3 to 5 feet in height; and finally, remove the last third of the remaining patchy overstory at year 20. The resulting stand would be a three-aged stand, but over time and through regular thinnings the size differences would become less discernible. Where landowners desire to leave overstory trees, such as around and near structures, some thinning (individual tree selection) and piling/burning of slash should be implemented to reduce ladder fuels. This conflicts with outside recommendations that structures in fire-prone forests have a 50 to 100-foot buffer cleared of trees and fuels to provide defensible space, and only the structure owners can decide on the importance of fuel buffers on their land.

Filing 15 Stand 8

OBSERVATIONS

The odd shape of this young and vigorous lodgepole pine stand is the result of an overstory removal about 20 years ago (see Tables 8a and 8b, Appendix A). Regeneration is heavy across most of the site, averaging about 4300 trees per acre. An exception occurs near the midpoint of the stand, where a remaining DM-infested overstory has prevented adequate regeneration from becoming established. Here, regeneration that does exist is being infested by mistletoe. Elsewhere, mistletoe is making headway in the regeneration along the north boundary, the general ridgeline that forms the boundary with heavily mistletoe-infested Stand 7.

This stand serves as a good example of the rapid regeneration establishment and growth that can be expected in Stands 5, 6 and 7 if regeneration cuts are applied. It also shows how DM begins to spread through the young trees unless neighboring stands are also treated.

DIAGNOSIS

Stand growth will quickly stagnate in the next 10 to 20 years without thinning. DM will continue to spread throughout the regeneration without treatments.

OPTIONS

Alternative 1 (preferred): Sanitation/thinning and final removal of remaining overstory. This will create a few openings, particularly at the center of the stand, but regeneration will quickly become established.

Alternative 2: No action. Not recommended. A window of opportunity exists to maintain a quality lodgepole pine stand with very low DM infestation levels.

Filing 15 Stand 9

OBSERVATIONS

Past timber harvesting has created a lodgepole pine site of varied characteristics. The average basal area of 102 square feet per acre (Table 2) is misleading. To the west, an even-aged patch of dense lodgepole (200 to 240 square feet per acre) is similar only to the stands to the southwest across the road. On the northeast section, a patch of regeneration of mixed size classes, generally older than in the adjacent Stand 8, sits as a target for spreading DM from the older patch to the west. On the southeast section, an older lodgepole overstory is mixed with regeneration varying widely in age. DM has infested most of the stand (average DM rating 3.1), with the least damage being in the regeneration in the northeast.

DIAGNOSIS

The site is a mix of sizes and age classes that is highly susceptible to continued DM spread. Without intervention, the site is at risk of becoming heavily impacted by DM in a manner similar to Stand 7. This stand is an infestation threat for the regeneration in Stand 8 to the north and west.

OPTIONS

Alternative 1 (preferred): Sanitation/thinning in regeneration; heavy seedcut leading to overstory removal in the overstory on the west side of the stand. The sanitation will lead to the creation of openings on the east half of the stand - an outcome preferred over the rapid spread of DM that is now occurring.

Alternative 2: No action. Not recommended. The stand will deteriorate as DM spreads throughout this stand, and into Stand 8 and east across the road outside of the project area.

Alternative 3: Clearcut. In the long run, the DM infestation is high enough that intermediate measures of Alternative 1 may not be successful. The choice of Alternative 1 or Alternative 3 is strictly a matter of landowner preference for aesthetics and risk aversion.

Filing 15 Stand 10

OBSERVATIONS

The lodgepole pine overstory was removed around 1979-82, and the site has since regenerated nicely. The stand is now overstocked (about 2160 trees per acre) and must be thinned; Figs. 10a and 10b of Appendix A show the classic even-aged structure common to regenerated lodgepole pine stands. DM is moving into the stand from the overstory trees to the west in adjacent Stand 10. The amount and size of the regeneration is a good indication of new stand conditions that would be created elsewhere in the project area after regeneration cuts.

DIAGNOSIS

Smaller regeneration is suppressed due to overcrowding. The condition will worsen as the stand continues to grow. The entire site is threatened by the developing DM infestation.

OPTIONS

Alternative 1 (preferred): Sanitation/thinning. Adjacent overstory in Stand 7 to the west should be removed to prevent continued DM infestation.

Alternative 2: No action. DM will continue to spread through the stand and tree growth will become suppressed.

V. ESTIMATES OF STUMPAGE VALUE FOR PREFERRED ALTERNATIVES

Computer simulations using GENGYM were conducted for the 9 stands where silvicultural treatments are recommended for the overstory. Estimates of timber volume removals were made under the assumption treatments are done before the start of the next growing season in 2000. Volumes removed during follow-up treatments, such as continued overstory removals in Stand 7 and final removals in Stands 5 and 6, were not considered for this analysis.

Two product or commodity classes were used in estimating the volume and value of removals. The first, cordwood, is a likely commodity class when market prices are poor and if intensive activities are required of the logging contractor. The second class accommodates different sizes and quality of harvested logs that result in separation of timber into different products, i.e. sawtimber, poles and posts, and cordwood (or fuelwood).

Three market price classes (low, medium and high) were developed to provide a range of possible stumpage values. Prices for cordwood, poles and posts, and sawtimber are based on the results of market surveys of primary processors in the central Rockies conducted by Advanced Forestry.

Only lodgepole pine was considered eligible for sawtimber use; the minimum diameter (DBH) used for board foot calculations is 9 inches, with a minimum top diameter inside bark of 4 inches. Estimates of pole and post volumes were based on tree lengths from a 6-inch stump to a 3-inch top outside bark, for trees with diameters between 4 and 8.9 inches at breast height. Field estimates of tree defect were included in the calculation of net merchantable volumes. Estimates of merchantable cordwood volume assume 80 cubic feet of solid wood per standard cord. All trees with DBH less than 4 inches are assumed to be unmerchantable.

Estimates of stand-level basal area for all trees with DBH>=5.0 inches were made for each stand. Sampling intensity was designed to produce tighter confidence limits (statistical bounds on estimates of stand means) for the larger stands with more timber and higher value. Smaller stands, variable conditions and practical limitations on sample point spacing combine with properties of statistical theory and cost constraints to limit sampling intensity.

Confidence limits of 50% to 66%, and sometimes much lower, are usually used for initial stand inventories due to the high cost of intensive sampling relative to low timber volumes and values that may be attained from treatments. For this project, meaningful 80% confidence limits were attained. In Table 1, 80% confidence limits on mean stand basal area are provided, as are relative percent bounds at the 80% confidence level.

For example and referring to Table 1, the mean basal area of Stand 2 (DBH>=5 inches) is 180 square feet per acre, and we can be 80 percent confident that the actual mean basal area is within +/- 16 percent of 180 square feet per acre. In comparison, the smaller but quite variable Stand 3 has a mean basal area of 52.5 square feet per acre, with 80% confidence bounds of 59% of mean basal area.

The 80% bounds on basal area were used as proxy confidence limits on estimates of pole, cordwood and sawtimber volumes to be removed under the recommended treatments. These upper and lower volume estimates were carried through by product classes for each of the low, medium and high market price scenarios, and for each of the two commodity classes.

The total merchantable volume of standing live trees is 128,984 cubic feet (about 1612 cords). Of this amount, there are 230,509 board feet of timber in trees with DBH>=9.0 inches.

Under the preferred treatments, total merchantable volume removed in the first round of treatments (circa 2000) is estimated to be 744 cords (+/- 24% at 80% confidence), about 46% of total standing merchantable volume. The following list shows expected harvest volumes when broken down by product:

Poles	186,731 linear feet	(+/- 24.3% at 80% confidence)
Sawtimber	35,443 board feet	(+/- 23.4% at 80% confidence)
Residual cordwood	310 cords	(+/- 22.0% at 80% confidence)

The above volumes were applied to price data to arrive at the stumpage value estimates in Table 4. Estimates of the 80% confidence limits on value are also given in Table 4. Estimates of defect may be underestimated for high-quality post and pole products.

Reading Table 4, a pessimistic evaluator of stumpage value from the recommended treatments would accept an estimate of $3756, with 80% confidence limits of $2858 (low) and $4655 (high) for cordwood only. In contrast, high market prices for diversified products result in an optimistic stumpage estimate of $45,244, with 80% confidence bounds of $34,521 to $55,966 based on statistical variability in sampling.

These are stumpage valuations only, for standing trees, that do not account for costs of sale preparation and contract preparation; additional planning and meetings; unusual treatment activities and road building required of the logging contractor that increase costs of operations; and, costs of sale administration activities. An estimate from Advanced Forestry for professional forestry services needed to implement the proposed management plan and preferred activities is made in a separate document.

Benefits of active forest management, such as reduced risk of losses due to catastrophic fire, and improved wildlife habitat and stand aesthetics, are not included but must be considered. The current discounted value of future Christmas tree sales (see below) is not included. Finally, the value of future timber products is enhanced in managed stands since larger and more-valuable trees are grown more quickly. Depending on chosen landowner objectives and applied treatments, this improvement in forest land value can be significant.

VI. SITE MITIGATION AND TREATMENT OPTIONS ACCOMPANYING TIMBER HARVESTING

In addition to harvesting timber, certain treatments may be desired to achieve management objectives as well as to ensure the quality of the forest sites remains intact or is even enhanced. The ability to implement these treatments is tied directly to available funds. The higher the quality of timber and the greater the available harvested volumes, the wider the options; poor sites and poor timber may require financial investments as opposed to achieving positive cash flow. In the long run, maintenance of managed stands achieves higher quality products of significantly greater value, broadening site mitigation options.

The Demonstration Area is dominated by dense stands of unmanaged, slow-growing small trees. The Northern Front Range does have an active market for lodgepole pine poles and posts, increasing financial and silvicultural options for area forest landowners. There is significant value in lodgepole pine larger than 12 inches in diameter, for sawtimber and house logs, but this is a minor component of current stands that would be available for harvest under the preferred prescriptions.

SLASH AND FUELS TREATMENT

Timber harvesting will add to the existing fuel loads on the ground. The issues of slash disposal and fuels treatment are important components of forest management activities. Elements of forest ecology, fire risk and cost must be considered in the decision-making process when selecting methods for managing slash. Implications include effects on the seed source and new regeneration, inherent risks of losing control of prescribed fire, nutrient cycling, effects on water quality, and possible damage to overstory trees.

Options for managing slash and other fuels include:

1. Do nothing.

Advantages: Low cost and full retention of nutrients.

Disadvantages: the stand is aesthetically unattractive and fire danger is unacceptably high.

2. Lop and scatter slash.

Advantages: Relatively low cost for a practice that is accepted as a standard timber harvest activity by loggers. Nutrients in slash are fully retained on site and there is no scorching of residual trees. Small birds and small mammals quickly utilize the site.

Disadvantages: Aesthetics are only marginally improved. Not acceptable where fire danger is significant and the volume of slash is high. Large mammal use will decline significantly for many years.

3. Lop, scatter and broadcast burn.

Advantages: Relatively low-cost methods retain good distribution of nutrients after burning. Fire hazard is greatly reduced. Utilization by small birds and small mammals is high.

Disadvantages: Any prescribed burn may escape, causing unintended losses. Carefully conducted and planned burns are safe, but broadcast burns carry higher risks of escaping, particularly in lodgepole pine where ideal conditions for burning are uncommon. Significant losses to residual trees may occur. Aesthetics will be poor where a "park-like" tidy appearance is desired. Follow-up treatments may be difficult due to unburned slash. Poor timing could inadvertently eliminate newly established regeneration, making costly tree planting necessary. A poor burn due to moist conditions or reduced winds may result in continued high levels of slash.

4. (Preferred) Pile all slash, burn piles immediately after an early fall or late spring snowfall.

Advantages: Burning of slash is more complete than for a broadcast burn. Better control of prescribed fire will be achieved. Aesthetics will be more acceptable, and retention of unburned or partially burned piles results in quick utilization by small birds and small mammals. Damage to residual trees through scorching is minimized compared to broadcast burns. This treatment has the least impact on new regeneration.

Disadvantages: Piled slash, when burned, may do some damage to residual trees. Slash piling is costly and perhaps unattainable if done manually, so mechanical piling is preferred. Mechanical piling will disturb soils, but studies have shown such disturbance to have few if any negative consequences beyond 1 to 5 years after treatment.

5. Remove all slash and burn off-site.

Advantages: A "park-like" tidy appearance is quickly achieved. The threat of a prescribed fire escaping from the site is eliminated, as is residual tree damage from scorching.

Disadvantages: Costs are high. Likely implementation would rely on whole-tree harvesting to log decks, loading and hauling of slash to official slash "pits" for burning. Threat of accidental burns being initiated by burning in pits is increased. The sheer volume of slash would likely overwhelm pit capacity. Whole-tree harvesting is highly undesirable because of damage done to residual trees where partial cuts are implemented. Nutrients are removed from the site, and small mammal and small bird utilization is poor in clearcuts following complete slash removal.

6. Chip all slash on site.

Advantages: A "park-like" tidy appearance is quickly achieved. Nutrients are retained and available slowly as a new organic layer decomposes. Fire hazard is reduced.

Disadvantages: High costs and steep slopes make chipping undesirable on sales with low value. Fire hazard is reduced but fuels are transformed rather than reduced. Chips have been shown to be highly detrimental for many years to new regeneration and establishment of ground vegetation (grasses and forbs) due to the release of phenols. For the first 2 years after chipping and spreading, high phonel concentrations could greatly exceed health standards and potentially contaminate groundwater and streams.

Alternative 4 above (pile and burn) is recommended for treating slash and reducing fire hazards. Though the resulting aesthetic value is not as high as other options, Alternative 4 readily achieves the primary objectives of the management plan for the Demonstration Area identified in section C above. Importantly, this option can only be accepted by the Association if there is a general willingness by the Association and area landowners to accept prescribed burns as a socially viable and ecologically functional option for treating fuel loads. An unwillingness to accept prescribed burns may limit overall forest management plans and place strict bounds on management within just two options:

1. Do nothing and accept the risk of catastrophic stand-replacing fire and poor forest conditions.

2. Implement forest management activities and budget for complete slash removal and burning off-site.

TIMBER HARVESTING

Mechanized equipment for felling, delimbing and forwarding may be used, particularly for small-diameter timber sales, depending on contractor availability and other factors. Most important is outcome: residual damage to retained trees should be minimized through directional felling, designated skid trails and careful skidding/forwarding. The forester must

work with the logging contractor to ensure harvesting minimizes negative impacts while providing for efficient and cost-effective harvesting.

A temporary haul road may be needed from east to west along the Greenbelt, from the Axtupi Ct. cul-de-sac, and ending at the west end of Stand 7 or in the northeast finger of Stand 5. An old skid trail in the previously logged area of Stand 1 and southern Stand 2 may be useful as a temporary haul road, with a landing located in Stand 2. A number of landings for collecting and loading logs will be needed, depending on equipment used. The objective of the temporary haul roads would be to minimize the impact of landings on private lots while optimizing skidding/forwarding distances.

The logging contract should include provisions for slash treatment, construction of waterbars in skid trails and on any temporary roads, and methods for closing roads and trails to vehicles. A performance bond should be required to ensure treatments in addition to timber harvesting are implemented.

SNAG RETENTION

Snags are used by an assortment of wildlife. Where snags do not pose a hazard to hikers on Association trails or for private structures, 2 to 3 per acre should be left standing.

VII. ADDITIONAL TREATMENTS

To further reduce fire risk where partial cuts are implemented, some areas should have all small trees cut and piled, i.e. Stand 2. Subalpine fir seedlings and saplings in particular are a serious threat as ladder fuels.

A number of sites have advanced regeneration that should be thinned after timber harvest operations, if recommended treatments are implemented. These precommercial thinnings will cost from $280 to $400 per acre, without piling. Slash treatment after precommercial thinnings is an important issue. Usually it is not piled or burned, due to the expense and high scorching losses to residual trees. Fuelbreaks along roads and near structures are an exception, where spacing should be somewhat wider and slash is either burned and scorching losses accepted, or the slash is removed and burned off-site.

To offset costs of precommercial thinnings, initial residual stocking can be left at a higher stocking than normally desired for future stand conditions, and a second commercial thinning for Christmas trees implemented after 5 to 10 years, depending on tree size and quality. Depending on initial conditions, about 200 Christmas trees per acre could be harvested while leaving a residual stocking of about 300 trees per acre (about a 12-foot spacing). Growth and yield simulations were done using these regeneration treatments, but practical implications are of little consequence for initial treatments (year 2000) that are regeneration cuts. Offsetting revenue, however, could be significant for the project if Christmas trees are targeted as a project objective. Note that on some sites, such as Stands 8 and 9, some regeneration may has grown beyond the stage where desirable Christmas trees can be achieved.

VIII. REFERENCES AND SUGGESTED READING

Benson, Robert E. Management consequences of alternative harvesting and residue treatment practices - lodgepole pine. 1982. Gen. Tech. Rep. INT-132. Ogden, UT: U.S. Department of Agriculture, Forest Service, Intermountain Forest and Range Experiment Station. 58 p.

Chandler, Craig; Cheney, Phillip; Thomas, Phillip; Trabaud, Louis; Williams, Dave. 1983. Fire in Forestry: Volume I, Forest fire behavior and effects. Wiley and Sons, New York. 450 p.

Chandler, Craig; Cheney, Phillip; Thomas, Phillip; Trabaud, Louis; Williams, Dave. 1983. Fire in Forestry: Volume II, Forest fire management and organization. Wiley and Sons, New York. 298 p.

Crouch, Glenn L. 1986. Effects of thinning pole-sized lodgepole pine on understory vegetation and large herbivore activity in central Colorado. USDA Forest Service Research Paper RM-268, 10 p. Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 10 p.

Dennis, Frank C. 1983. Fuelbreak guidelines for forested subdivisions. Colorado State Forest Service, Colorado State University. #102-1083. 16 p.

Edminster, Carleton B.; Mowrer, H. Todd; Mathiasen, Robert L.; Schuler, Thomas M.; Olsen, Wiliam K.; Hawksworth, Frank G. 1990. GENGYM: a variable density stand table projection system calibrated for mixed conifer and ponderosa pine stands in the Southwest. Res. Pap. RM-297,. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station. 32 p.

Hawksworth, Frank G.; Hinds, Thomas E.; Johnson, David W.; Landis, Thomas D. 1977. Silvicultural control of dwarf mistletoe in young lodgepole pine stands. Technical Report R2-10. Lakewood, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Region, State and Private Forestry, Forest Insect and Disease Management. 13 p.

Hawksworth, Frank G.; Dooling, Oscar J. 1984. Lodgepole pine dwarf mistletoe. Forest Insect and Disease Leaflet 18: USDA Forest Service. 11 p.

Oliver, Chadwick D.; Larson, Bruce C. 1996. Forest stand dynamics: update edition. Wiley and Sons, New York. 520 p.

Shepperd, Wayne D.; Alexander, Robert R. 1983. Silviculture of lodgepole pine in the central Rocky Mountains. USDA Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, CO. 36 p.

Smith, David M.; Larson, Bruce C.; Kelty, Matthew J.; Ashton, P. Mark S. 1997. The practice of silviculture. 9th edition. Wiley and Sons, New York. 537 p.

Stand	No. of Sample Points	80% LCL	Mean BA (sq ft/ac)	80% UCL	80% confidence limits expressed as percent of mean BA	Coefficient of Variation	Standard Error	Standard Deviation	Minimum BA	Maximum BA
1	5	36.4	68.0	99.6	46%	0.68	20.6	46.0	20	120
2	21	151.5	180.0	208.5	16%	0.55	21.5	98.6	0	390
3	4	21.6	52.5	83.4	59%	0.72	18.9	37.7	0	80
4	5	54.5	124.0	193.5	56%	0.82	45.3	101.4	20	240
5	12	86.3	112.5	138.7	23%	0.59	19.2	66.6	0	210
6	15	87.4	102.0	116.6	14%	0.41	10.9	42.1	30	180
7	21	48.0	59.0	70.1	19%	0.65	8.3	38.2	0	120
8	7	1.1	7.1	13.2	85%	1.56	4.2	11.1	0	30
9	6	46.8	100.0	153.2	53%	0.88	36.1	88.3	0	240
10	5	---------- N/A ----- NO TREES WITH DBH>=5 ----------							0	0

Table 1. Basal area statistics for each stand, for all live trees with DBH>=5 inches.

Stand	Acres	Site Index (Base Age 100)	Quadratic Mean Diameter DBH>=1"	Mean Height (feet) DBH>=1"	Basal Area (sq ft/ac) DBH>=1"	80 Percent Conf. Bounds on BA (sq ft/ac)	---Trees per Acre --- Seedlings	DBH>=1"	------- Merchantable Volume ------- cubic feet per acre	stand	Scribner board feet per acre	stand	Dwarf Mistletoe Rating (0-6) DBH>=1"
1	2.6	48	3.4	15	79	36.3	5640	1258	1462	3739	1620	4143	0.5
2	11.3	63	6.7	37	192	30.7	1238	788	4546	51188	12185	137203	0.4
3	2.2	49	7.1	37	53	31.3	1925	194	1186	2630	2021	4482	0.0
4	3.3	57	7.0	50	125	70.0	1680	385	3271	10707	5048	16523	0.1
5	11.5	45	4.9	28	164	37.7	650	1224	2106	24248	1614	18583	4.3
6	5.5	34	5.1	28	132	18.5	220	924	1748	9596	203	1114	4.3
7	25.9	39	6.0	21	67	12.7	629	339	858	22251	1828	47406	4.0
8	5.7	40	2.1	10	18	15.3	3600	754	72	409	50	284	0.2
9	2.4	40	6.0	28	102	54.1	1300	527	1742	4215	318	769	3.1
10	1.5	42	2.0	11	54	19.4	2160	2520	0	0	0	0	0.0
Totals	71.9									128,984		230,509	

Table 2. Descriptive forest stand data..

Stand	No. of Sample Points	--------- Snag Basal Area (DBH>=5") --------- trees per acre	sq ft/ac	as pct of live BA	---------- Slope ---------- n	minimum	mean	maximum	standard error	Aspect
1	5	0	0.0	0.0	6	5	8	12	1.4	east
2	21	21.2	2.9	1.6	18	7	24	67	3.8	north
3	4	19.1	5	9.5	4	17	26	37	4.5	east
4	5	71.8	20	16.1	5	12	22	34	4.1	southeast
5	12	8.8	2.5	2.2	10	17	27	40	2.4	northwest
6	15	14.1	4	3.9	11	12	26	40	2.9	north
7	21	27.2	9.5	16.1	17	8	15	28	1.1	east/northeast
8	7	0.0	0	0.0	5	5	6	8	0.6	southeast
9	6	47.9	10	10.0	5	3	6	11	1.3	southeast
10	5	0	0	0	3	5	8	10	1.5	east

Table 3. Snag, slope and aspect data.

		----- Stumpage Value for Recommended Current Treatments -------		
Product classes	Market prices	~ Lower 80% CL	Estimated	~ Upper 80% CL
Cordwood only	Low market prices	$2,858	$3,756	$4,655
	Medium market prices	$8,573	$11,268	$13,964
	High market prices	$20,003	$26,292	$32,582
Poles, sawtimber and cordwood	Low market prices	$10,368	$13,639	$16,910
	Medium market prices	$19,116	$25,092	$31,067
	High market prices	$34,521	$45,244	$55,966

Low market prices: poles = $0.06 per linear foot, 1 cord = $5, 1000 board feet = $25
Medium market prices: poles = $0.10 per linear foot, 1 cord = $15, 1000 board feet = $50
High market prices: poles = $0.17 per linear foot, 1 cord = $35, 1000 board feet = $75

Table 4. Assessment of stumpage value for the proposed Crystal Lakes Forest Management Demonstration Area, Filings 15 and 12.

Values are assigned to estimated timber volumes harvested under the assumption that recommended silvicultural treatments are applied to all 10 stands. See stand treatment recommendations for details. Management and implementation costs, and follow-up treatmen such as prescribed burns, are not included.

Here, three stumpage price scenarios are applied to two different product combinations: cordwood, and a mixed product combination of poles, sawtimber and cordwood. The bounds on estimated value are derived from the 80 percent confidence limits calculated for each statistical sample of stand basal area (see Table 1) and serve only as approximations of valuation confidence.

APPENDIX A

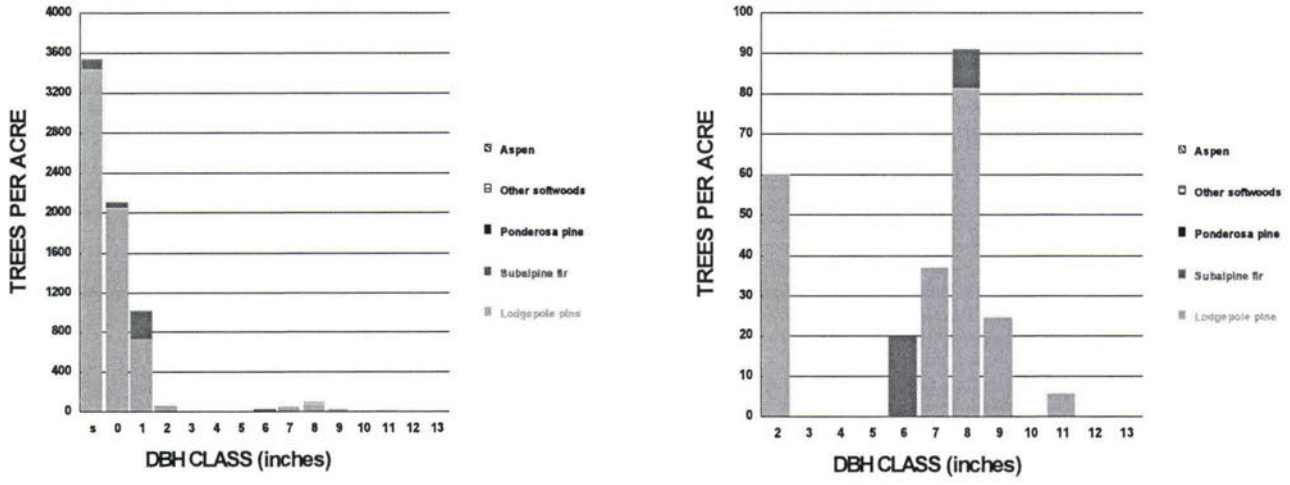


Fig. 1a. Stand 1: Trees per acre, by diameter class, for all trees (left) and for trees with DBH>=2 (right).

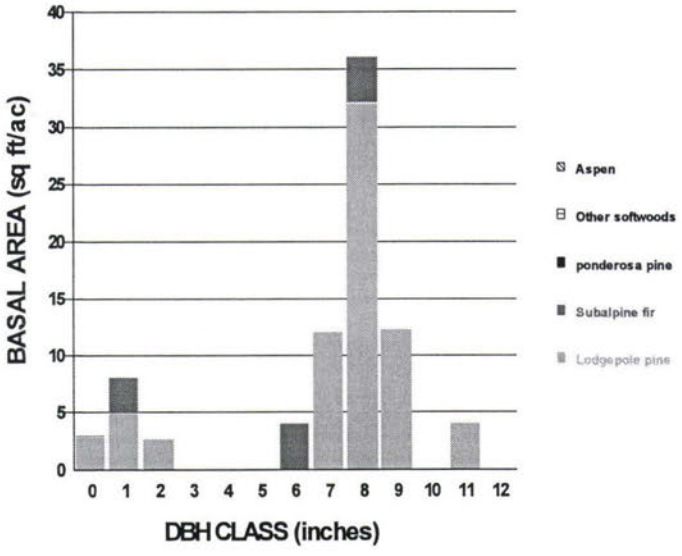


Fig. 1b. Stand 1: Basal area, by diameter class.

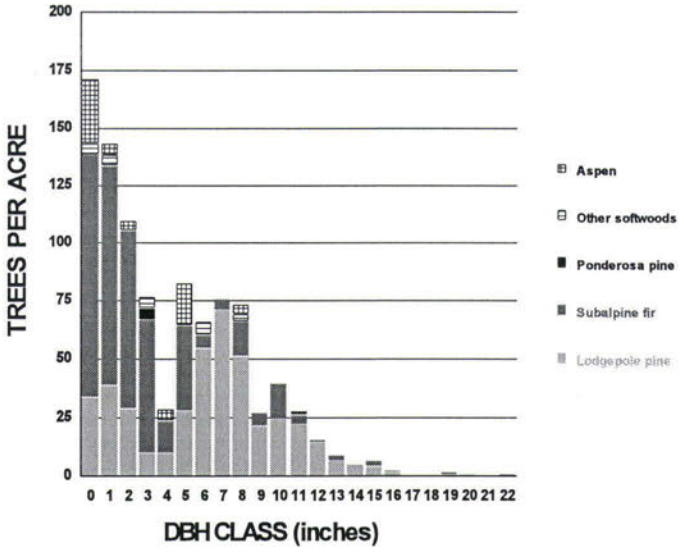


Fig. 2a. Stand 2: Trees per acre, by diameter class.

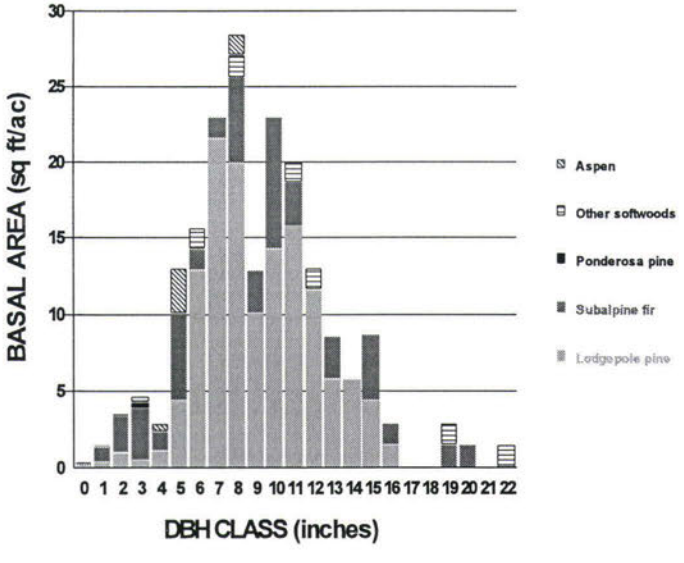


Fig. 2b. Stand 2: Basal area, by diameter class.

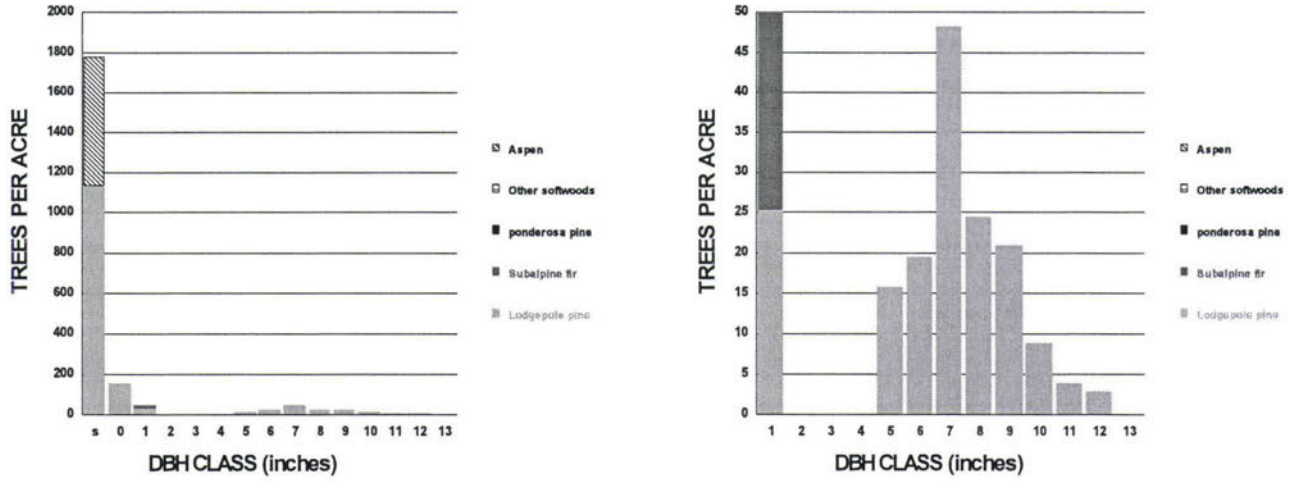


Fig. 3a. Stand 3: Trees per acre, by diameter class, for all trees (left) and for trees with DBH>=1 (right).

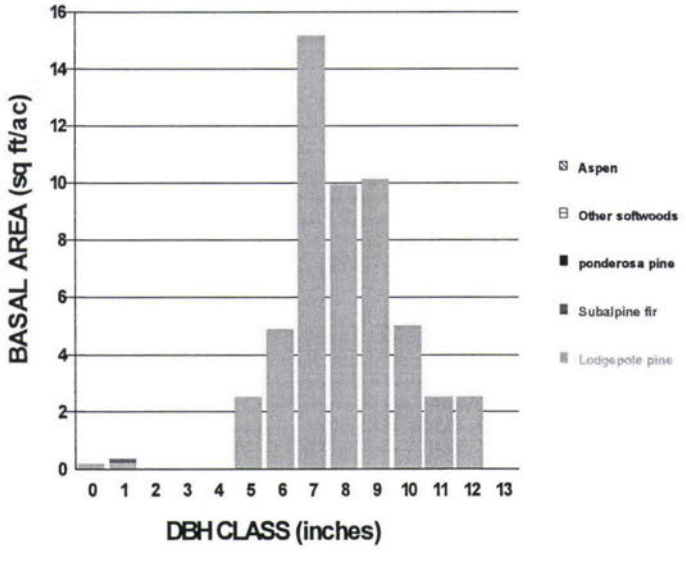


Fig. 3b. Stand 3: Basal area, by diameter class.

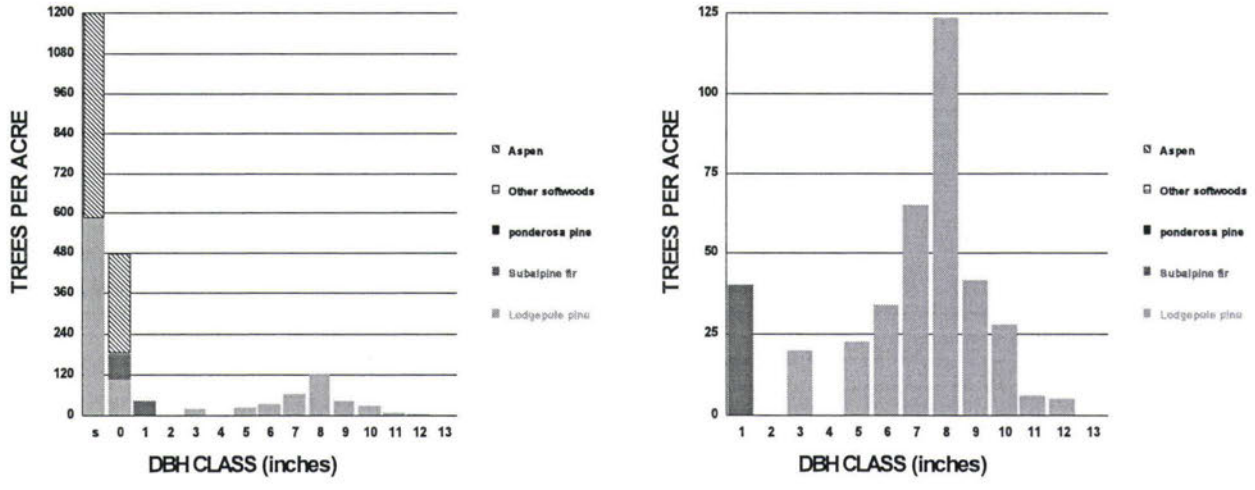


Fig. 4a. Stand 4: Trees per acre, by diameter class, for all trees (left) and for trees with DBH>=1 (right)..

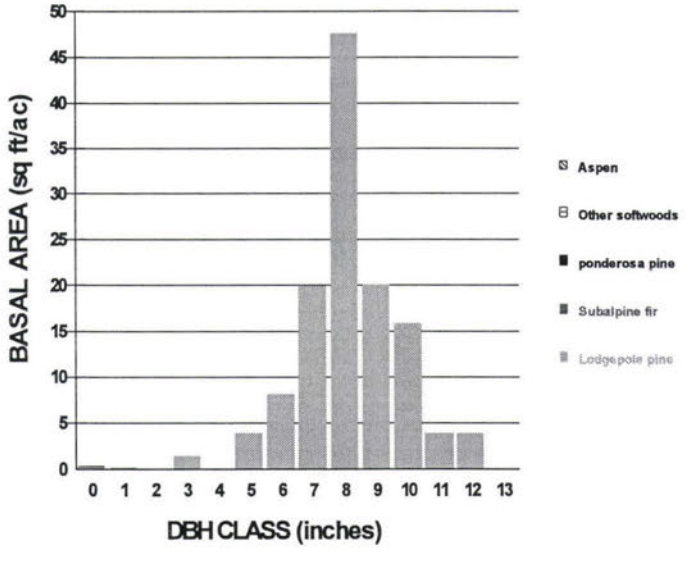


Fig. 4b. Stand 4: Basal area, by diameter class.

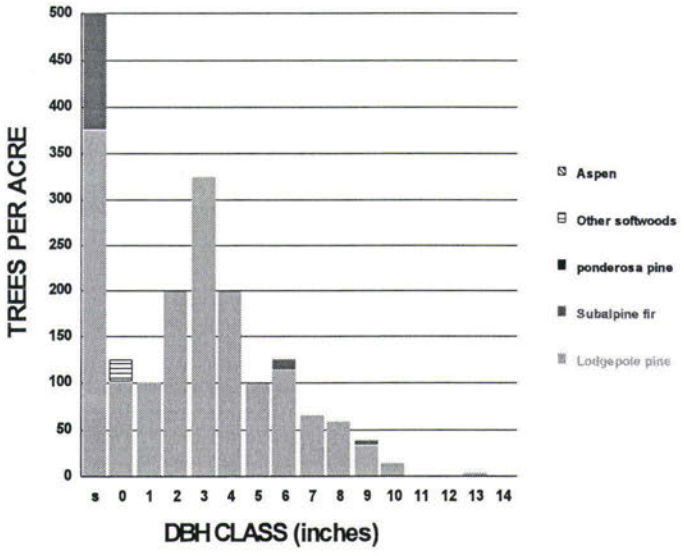


Fig. 5a. Stand 5: Trees per acre, by diameter class.

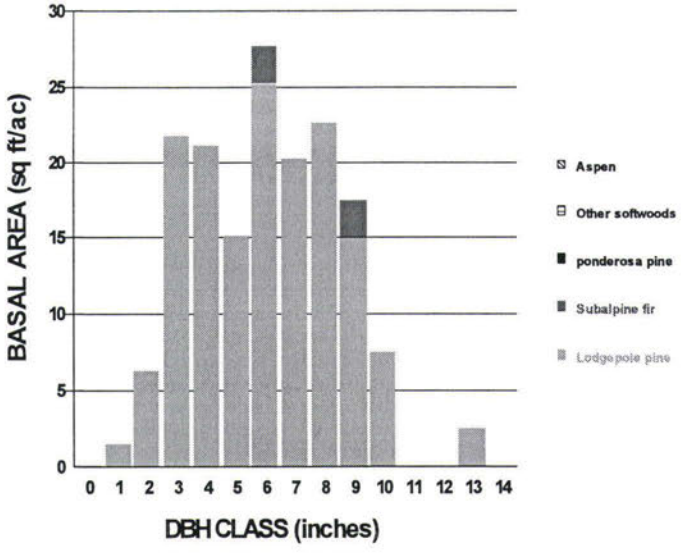


Fig. 5b. Stand 5: Basal area, by diameter class.

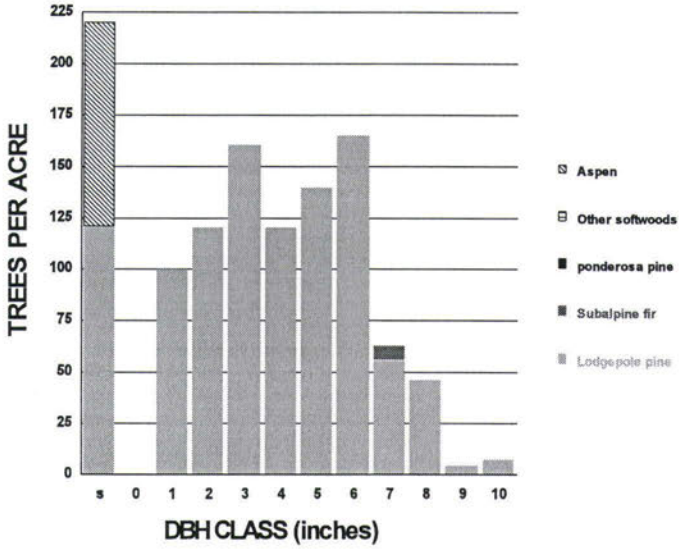


Fig. 6a. Stand 6: Trees per acre, by diameter class.

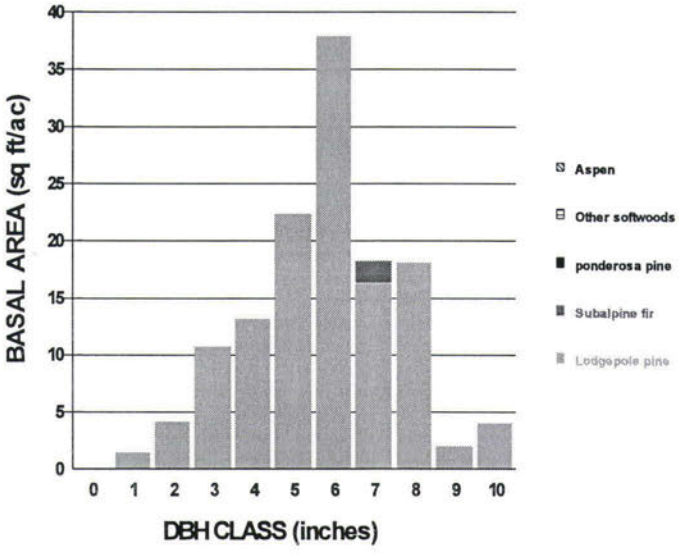


Fig. 6b. Stand 6: Basal area, by diameter class.

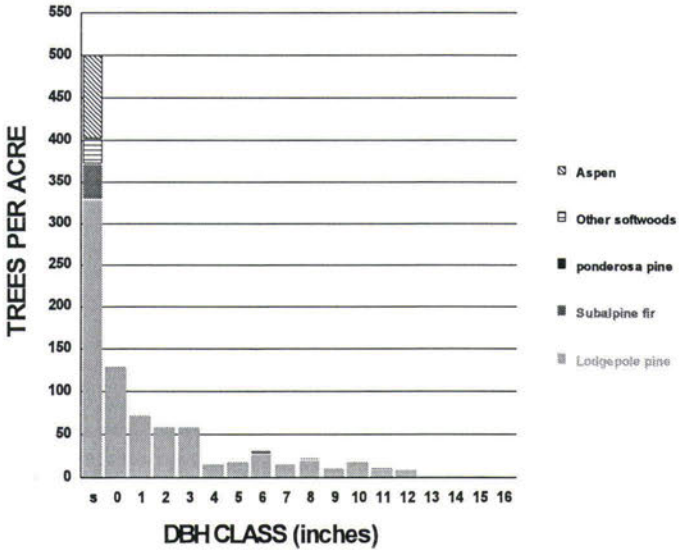


Fig. 7a. Stand 7: Trees per acre, by diameter class.

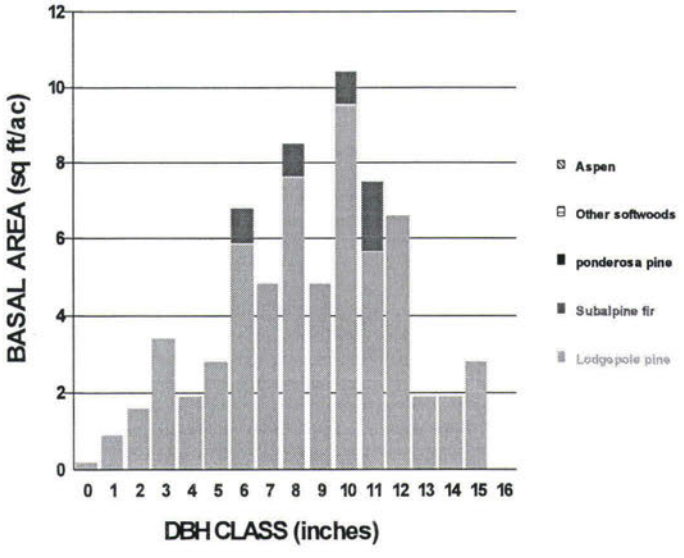


Fig. 7b. Stand 7: Basal area, by diameter class.

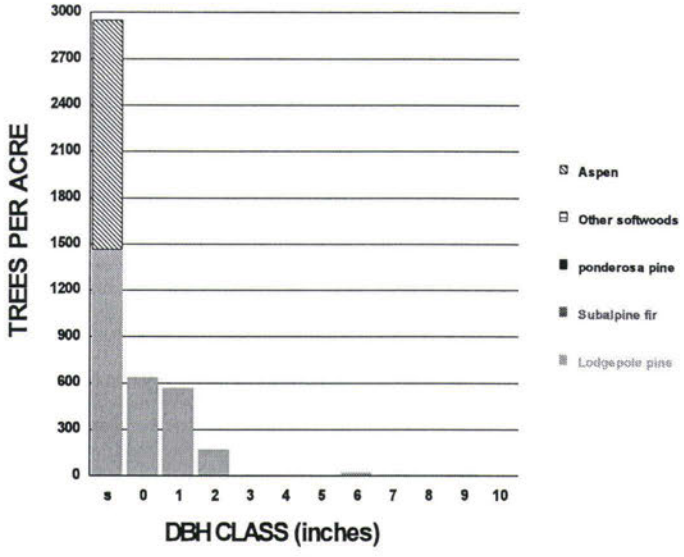


Fig. 8a. Stand 8: Trees per acre, by diameter class.

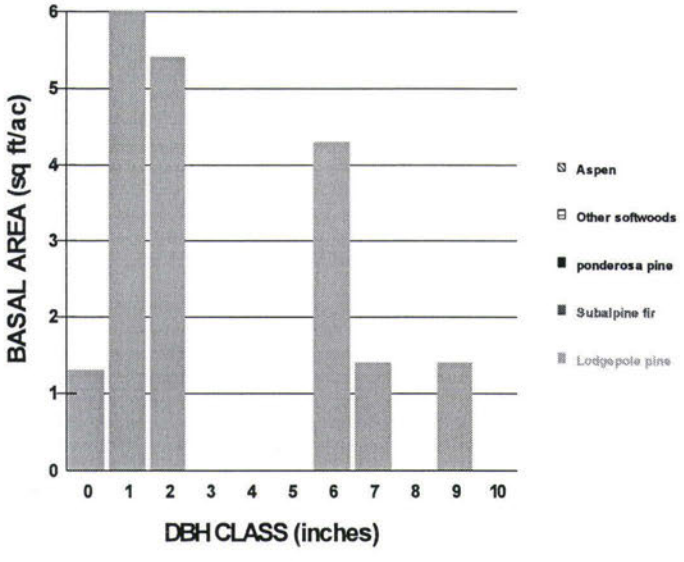


Fig. 8b. Stand 8: Basal area, by diameter class.

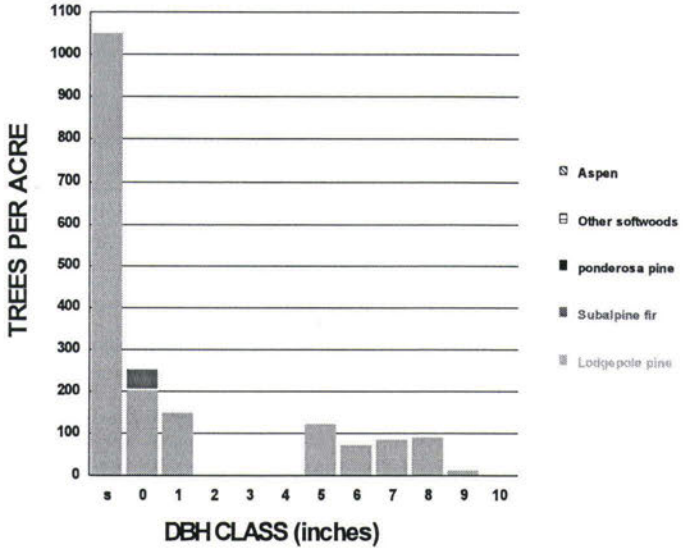


Fig. 9a. Stand 9: Trees per acre, by diameter class.

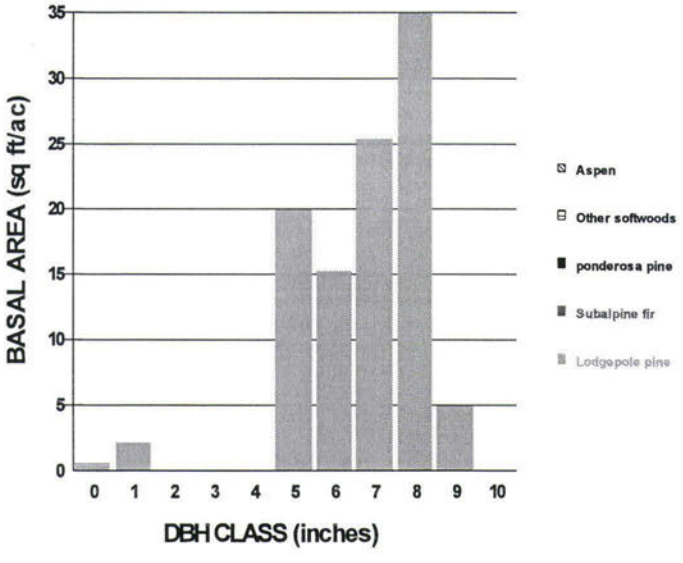


Fig. 9b. Stand 9: Basal area, by diameter class.

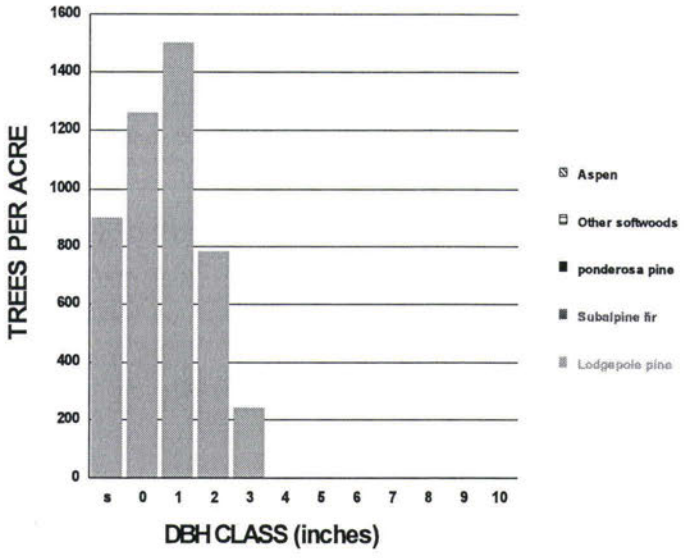


Fig. 10a. Stand 10: Trees per acre, by diameter class.

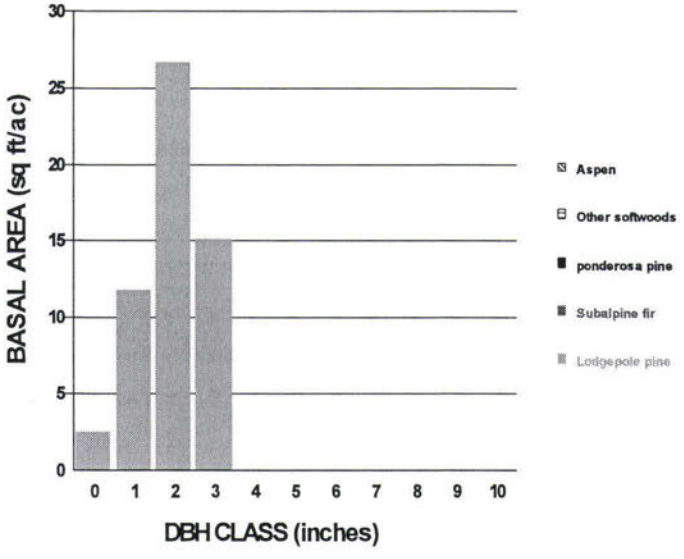


Fig. 10b. Stand 10: Basal area, by diameter class.

APPENDIX B

STAND 1: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 48. SPECIES 108
S1021501: C LAKES FOR MNG DEMO FIL15 S1021501

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	3.0	5640.0	.3	4.	65.	5.	.0	10.	0.	0.
TOTL 1"+	78.7	1257.8	3.4	15.	83.	30.	.3	1874.	1523.	1670.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	3.2	4596.0	.4	4.	47.	6.	.2	16.	0.	0.
TOTL 1"+	96.5	2120.2	2.9	14.	42.	32.	.4	2050.	1599.	3506.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	1.4	3797.1	.3	3.	48.	4.	.4	8.	0.	0.
TOTL 1"+	118.5	2650.0	2.9	15.	36.	40.	.6	2257.	1633.	4712.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.4	3391.5	.1	2.	49.	1.	.7	3.	0.	0.
TOTL 1"+	137.9	2675.0	3.1	16.	32.	49.	.8	2453.	1623.	5367.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	3145.1	.0	2.	50.	0.	1.0	0.	0.	0.
TOTL 1"+	154.8	2491.3	3.4	18.	30.	59.	1.1	2640.	1607.	5623.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	2779.7	.0	2.	50.	0.	1.6	0.	0.	0.
TOTL 1"+	162.6	2164.4	3.7	19.	28.	68.	1.7	2730.	1603.	5558.
STAND CONDITIONS AT YEAR 2059										
TOTL S+0	.0	2399.7	.0	2.	50.	0.	2.3	0.	0.	0.
TOTL 1"+	165.3	1799.5	4.1	21.	29.	78.	2.2	2771.	1582.	5115.

STAND 1: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 48. SPECIES 108
S1021501: C LAKES FOR MNG DEMO FIL15 S1021501

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	3.0	5640.0	.3	4.	65.	5.	.0	10.	0.	0.
TOTL 1"+	78.7	1257.8	3.4	15.	83.	28.	.3	1874.	1523.	1670.
REMOVALS TYPE = CUT FROM ABOVE									OvRm	
TOTL 1"+	68.1	177.8	8.4	47.	43.	103.	1.6	1818.	1523.	1670.
RESIDUAL - AFTER CUT										
TOTL S+0	3.0	5640.0	.3	4.	65.	5.	.0	10.	0.	0.
TOTL 1"+	10.5	1080.0	1.3	9.	90.	16.	.1	56.	0.	0.
REMOVALS TYPE = CUT FROM BELOW									thin	
TOTL S+0	3.0	5640.0	.3	4.	65.	5.	.0	10.	0.	0.
TOTL 1"+	4.8	542.0	1.3	10.	90.	10.	.3	23.	0.	0.
RESIDUAL - AFTER CUT										
TOTL 1"+	5.7	538.0	1.4	9.	90.	22.	.0	33.	0.	0.
STAND CONDITIONS AT YEAR 2006										
TOTL 1"+	13.1	538.0	2.1	13.	59.	29.	.0	105.	0.	0.
REMOVALS TYPE = CUT FROM BELOW									xmas	
TOTL 1"+	3.6	235.0	1.7	12.	59.	28.	.0	27.	0.	0.
RESIDUAL - AFTER CUT										
TOTL 1"+	9.6	303.0	2.4	13.	59.	29.	.0	79.	0.	0.
STAND CONDITIONS AT YEAR 2009										
TOTL 1"+	12.1	302.1	2.7	14.	56.	32.	.0	112.	17.	0.
STAND CONDITIONS AT YEAR 2019										
TOTL 1"+	22.9	298.8	3.7	19.	49.	42.	.0	275.	74.	0.
STAND CONDITIONS AT YEAR 2029										
TOTL 1"+	35.8	296.2	4.7	23.	44.	52.	.0	518.	318.	0.
STAND CONDITIONS AT YEAR 2039										
TOTL 1"+	49.5	292.3	5.6	27.	40.	62.	.0	825.	566.	0.
STAND CONDITIONS AT YEAR 2049										
TOTL 1"+	64.2	289.5	6.4	31.	38.	72.	.0	1189.	931.	0.

STAND 2: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 63. SPECIES 108
S1021502: C LAKES FOR MNG DEMO FIL15 S1021502

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.3	1238.2	.2	3.	51.	2.	.0	1.	0.	0.
TOTL 1"+	192.3	787.8	6.7	37.	49.	66.	.4	5476.	4639.	12435.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.2	1054.3	.2	2.	51.	2.	.0	1.	0.	0.
TOTL 1"+	212.5	789.3	7.0	38.	46.	74.	.4	6115.	5184.	15013.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.1	1015.8	.1	2.	50.	1.	.0	0.	0.	0.
TOTL 1"+	228.5	815.2	7.2	38.	45.	82.	.6	6575.	5581.	17269.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.1	999.5	.1	2.	50.	1.	.0	0.	0.	0.
TOTL 1"+	239.8	816.0	7.3	38.	45.	91.	.9	6896.	5837.	18722.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	992.5	.1	2.	50.	1.	.0	0.	0.	0.
TOTL 1"+	247.3	810.5	7.5	38.	44.	101.	1.1	7103.	6053.	19921.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	8.2	.6	10.	60.	72.	.0	0.	0.	0.
TOTL 1"+	249.0	796.8	7.6	38.	44.	111.	1.4	7140.	6064.	20296.

STAND 2: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 63. SPECIES 108
S1021502: C LAKES FOR MNG DEMO FIL15 S1021502

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.3	1238.2	.2	3.	51.	2.	.0	1.	0.	0.
TOTL 1"+	192.3	787.8	6.7	37.	49.	66.	.4	5476.	4639.	12435.
REMOVALS TYPE = CUT FROM BELOW									thin	
TOTL S+0	.3	171.5	.6	7.	57.	18.	.0	1.	0.	0.
TOTL 1"+	112.3	692.0	5.5	33.	49.	63.	.4	2868.	2270.	1937.
RESIDUAL - AFTER CUT										
TOTL S+0	.0	1066.7	.0	2.	50.	0.	.0	0.	0.	0.
TOTL 1"+	80.0	95.8	12.4	66.	47.	88.	.4	2608.	2368.	10498.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.0	1066.7	.0	2.	50.	0.	.0	0.	0.	0.
TOTL 1"+	88.5	95.8	13.0	67.	43.	98.	.6	2931.	2626.	11959.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.0	1066.7	.0	2.	50.	0.	.0	0.	0.	0.
TOTL 1"+	97.0	95.7	13.6	68.	40.	108.	.9	3253.	2905.	13529.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	1057.3	.0	2.	50.	0.	.1	0.	0.	0.
TOTL 1"+	105.4	95.7	14.2	69.	38.	118.	1.4	3569.	3236.	15556.
REMOVALS TYPE = CUT FROM BELOW									thin	
TOTL 1"+	25.4	31.7	12.1	65.	29.	118.	2.5	875.	777.	3477.
RESIDUAL - AFTER CUT										
TOTL S+0	.0	1057.3	.0	2.	50.	0.	.1	0.	0.	0.
TOTL 1"+	80.0	64.0	15.1	72.	42.	118.	.8	2693.	2459.	12079.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	1057.3	.0	2.	50.	0.	.1	0.	0.	0.
TOTL 1"+	86.7	63.9	15.8	72.	40.	128.	1.2	2944.	2699.	13342.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	1057.3	.0	2.	50.	0.	.1	0.	0.	0.
TOTL 1"+	93.1	63.6	16.4	73.	40.	138.	1.7	3176.	2874.	14444.
TOTAL VOLUMES REMOVED BY CUTTING								3743.	3047.	5414.

STAND 3: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 49. SPECIES 108
S1021503: C LAKES FOR MNG DEMO FIL15 S1021503

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.2	1925.0	.1	3.	53.	1.	.0	1.	0.	0.
TOTL 1"+	53.0	194.3	7.1	37.	47.	74.	.0	1451.	1210.	2062.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.2	1860.2	.2	3.	50.	1.	.0	1.	0.	0.
TOTL 1"+	60.7	259.1	6.6	31.	41.	69.	.0	1665.	1387.	3131.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.1	1824.5	.1	3.	50.	1.	.0	1.	0.	0.
TOTL 1"+	64.9	272.1	6.6	31.	39.	76.	.0	1775.	1488.	3316.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.1	1816.8	.1	3.	50.	1.	.0	1.	0.	0.
TOTL 1"+	65.3	243.2	7.0	34.	38.	92.	.0	1780.	1489.	3551.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.1	1782.5	.1	2.	50.	0.	.0	0.	0.	0.
TOTL 1"+	75.0	243.1	7.5	36.	36.	102.	.0	2062.	1778.	4970.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	1749.0	.0	2.	50.	0.	.0	0.	0.	0.
TOTL 1"+	83.9	202.7	8.7	42.	34.	121.	.0	2343.	2050.	6753.
STAND CONDITIONS AT YEAR 2059										
TOTL S+0	.0	1710.5	.0	2.	50.	0.	.0	0.	0.	0.
TOTL 1"+	93.4	182.6	9.7	46.	34.	138.	.0	2633.	2322.	8350.

STAND 3: RECOMMENDED TREATMENT

N/A

STAND 4: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 57. SPECIES 108
S1021504: C LAKES FOR MNG DEMO FIL15 S1021504

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.4	1680.0	.2	4.	54.	1.	.0	1.	0.	0.
TOTL 1"+	125.0	384.9	7.7	50.	45.	88.	.1	3952.	3338.	5151.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.7	1372.9	.3	4.	52.	2.	.1	2.	0.	0.
TOTL 1"+	141.5	537.6	6.9	39.	44.	73.	.2	4494.	3790.	7840.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.3	1083.9	.2	3.	50.	2.	.1	2.	0.	0.
TOTL 1"+	152.0	707.6	6.3	33.	46.	68.	.3	4772.	4071.	9740.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.1	887.7	.1	3.	49.	1.	.2	1.	0.	0.
TOTL 1"+	156.1	772.9	6.1	32.	45.	74.	.3	4801.	4060.	9565.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	736.8	.1	3.	50.	1.	.1	0.	0.	0.
TOTL 1"+	176.2	792.6	6.4	33.	42.	83.	.5	5388.	4550.	13010.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	623.6	.1	3.	50.	0.	.0	0.	0.	0.
TOTL 1"+	196.3	785.3	6.8	35.	38.	93.	.7	5976.	5044.	16030.

STAND 4: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 57. SPECIES 108
S1021504: C LAKES FOR MNG DEMO FIL15 S1021504

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.4	1680.0	.2	4.	54.	1.	.0	1.	0.	0.
TOTL 1"+	125.0	384.9	7.7	50.	45.	88.	.1	3952.	3338.	5151.
REMOVALS TYPE = CUT FROM BELOW									1999 cut	
TOTL 1"+	43.5	151.2	7.3	54.	37.	97.	.2	1369.	1153.	0.
RESIDUAL - AFTER CUT										
TOTL S+0	.4	1680.0	.2	4.	54.	1.	.0	1.	0.	0.
TOTL 1"+	81.6	233.7	8.0	47.	51.	82.	.1	2583.	2184.	5151.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.7	1449.8	.3	3.	51.	2.	.1	3.	0.	0.
TOTL 1"+	94.4	437.4	6.3	30.	49.	54.	.1	2983.	2558.	7849.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.3	1209.3	.2	3.	50.	1.	.2	1.	0.	0.
TOTL 1"+	109.3	588.0	5.8	26.	53.	52.	.2	3400.	2945.	10824.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	1083.1	.1	3.	50.	0.	.2	0.	0.	0.
TOTL 1"+	124.9	612.4	6.1	27.	52.	61.	.2	3827.	3263.	12932.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	985.7	.0	3.	50.	0.	.3	0.	0.	0.
TOTL 1"+	141.8	620.9	6.5	29.	48.	70.	.3	4270.	3687.	15605.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	872.0	.0	3.	50.	0.	.3	0.	0.	0.
TOTL 1"+	159.1	615.3	6.9	31.	44.	81.	.4	4725.	4110.	17581.

STAND 5: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 45. SPECIES 108
S1021505: C LAKES FOR MNG DEMO FIL15 S1021505

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.1	650.0	.2	3.	49.	3.	.3	0.	0.	0.
TOTL 1"+	163.5	1223.8	4.9	28.	31.	82.	4.3	3343.	2240.	1736.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.0	395.2	.1	2.	52.	1.	.5	0.	0.	0.
TOTL 1"+	141.2	856.6	5.5	30.	28.	96.	4.9	2940.	2095.	1750.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.0	284.9	.2	2.	51.	1.	.6	0.	0.	0.
TOTL 1"+	131.4	710.2	5.8	31.	29.	106.	5.1	2777.	2083.	2028.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	203.6	.1	2.	51.	1.	.5	0.	0.	0.
TOTL 1"+	115.9	587.4	6.0	32.	30.	116.	5.2	2477.	1881.	1813.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	169.7	.1	2.	50.	1.	.3	0.	0.	0.
TOTL 1"+	109.9	457.5	6.6	33.	32.	127.	5.2	2395.	1868.	2638.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	167.4	.1	2.	50.	0.	.3	0.	0.	0.
TOTL 1"+	104.9	374.9	7.2	34.	34.	136.	5.2	2315.	1890.	3279.

STAND 5: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 45. SPECIES 108
S1021505: C LAKES FOR MNG DEMO FIL15 S1021505

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.1	650.0	.2	3.	49.	11.	.3	0.	0.	0.
TOTL 1"+	163.5	1223.8	4.9	28.	31.	82.	4.3	3343.	2240.	1736.
REMOVALS TYPE = CUT FROM BELOW									1999 thin	
TOTL S+0	.1	650.0	.2	3.	49.	11.	.3	0.	0.	0.
TOTL 1"+	143.5	1186.6	4.7	27.	31.	81.	4.4	2841.	1814.	429.
RESIDUAL - AFTER CUT										
TOTL 1"+	20.0	37.2	9.9	45.	59.	99.	3.8	502.	426.	1307.
STAND CONDITIONS AT YEAR 2009										
TOTL 1"+	21.0	33.9	10.7	46.	52.	108.	4.4	533.	470.	1681.
REMOVALS TYPE = CUT FROM ABOVE									2009 ovRm	
TOTL 1"+	21.0	33.9	10.7	46.	52.	108.	4.4	533.	470.	1681.

STAND 6: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 34. SPECIES 108
S1021506: C LAKES FOR MNG DEMO FIL15 S1021506

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.0	220.0	.0	2.	50.	0.	1.1	0.	0.	0.
TOTL 1"+	131.8	923.7	5.1	28.	35.	79.	4.3	2604.	1860.	260.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.0	169.2	.0	1.	50.	0.	1.1	0.	0.	0.
TOTL 1"+	131.7	815.6	5.4	30.	33.	91.	4.9	2613.	1873.	464.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.0	118.9	.0	1.	50.	0.	.5	0.	0.	0.
TOTL 1"+	124.2	732.3	5.6	30.	31.	102.	5.4	2464.	1773.	498.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	118.9	.0	1.	50.	0.	.7	0.	0.	0.
TOTL 1"+	111.7	670.9	5.5	30.	31.	112.	5.7	2208.	1566.	495.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	118.9	.0	1.	50.	0.	.8	0.	0.	0.
TOTL 1"+	107.4	581.1	5.8	30.	30.	122.	5.8	2124.	1565.	728.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	118.9	.0	1.	50.	0.	.8	0.	0.	0.
TOTL 1"+	98.7	479.7	6.1	31.	30.	132.	5.9	1951.	1456.	808.

STAND 6: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 34. SPECIES 108
S1021506: C LAKES FOR MNG DEMO FIL15 S1021506

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.0	220.0	.0	2.	50.	0.	1.1	0.	0.	0.
TOTL 1"+	131.8	923.7	5.1	28.	35.	79.	4.3	2604.	1860.	260.
REMOVALS TYPE = CUT FROM BELOW									1999 cut	
TOTL 1"+	61.8	683.9	4.1	25.	32.	70.	4.6	1124.	680.	0.
RESIDUAL - AFTER CUT										
TOTL S+0	.0	220.0	.0	2.	50.	0.	1.1	0.	0.	0.
TOTL 1"+	70.0	239.8	7.3	36.	47.	106.	3.5	1480.	1180.	260.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.0	218.8	.0	2.	50.	0.	1.5	0.	0.	0.
TOTL 1"+	72.9	222.2	7.8	37.	40.	116.	4.1	1574.	1292.	646.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.0	214.5	.0	2.	50.	0.	1.8	0.	0.	0.
TOTL 1"+	74.1	201.8	8.2	38.	37.	125.	4.6	1625.	1377.	1018.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	207.2	.0	2.	50.	0.	2.1	0.	0.	0.
TOTL 1"+	72.3	176.7	8.7	39.	36.	136.	4.9	1608.	1357.	1365.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	197.6	.0	1.	50.	0.	2.4	0.	0.	0.
TOTL 1"+	70.3	154.7	9.1	40.	37.	146.	5.2	1580.	1335.	1797.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	186.2	.0	1.	50.	0.	2.4	0.	0.	0.
TOTL 1"+	66.4	132.6	9.6	41.	37.	156.	5.5	1505.	1272.	2342.

STAND 7: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 39. SPECIES 108
S1021507: C LAKES FOR MNG DEMO FIL15 S1021507

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.2	628.7	.2	3.	49.	5.	1.2	1.	0.	0.
TOTL 1"+	66.7	338.5	6.0	21.	66.	86.	4.0	1182.	933.	2031.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.2	572.7	.3	3.	50.	5.	1.3	1.	0.	0.
TOTL 1"+	62.1	303.6	6.1	21.	55.	90.	4.4	1111.	854.	2125.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.1	525.7	.2	2.	50.	2.	1.5	0.	0.	0.
TOTL 1"+	58.3	278.1	6.2	20.	51.	94.	4.8	1048.	826.	2075.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	502.4	.1	2.	50.	1.	1.8	0.	0.	0.
TOTL 1"+	53.8	230.2	6.5	21.	49.	103.	5.1	974.	757.	2005.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	484.8	.0	2.	50.	0.	2.2	0.	0.	0.
TOTL 1"+	48.4	178.6	7.1	23.	49.	114.	5.3	886.	691.	1979.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	463.5	.0	2.	50.	0.	2.6	0.	0.	0.
TOTL 1"+	43.4	136.6	7.6	24.	50.	125.	5.4	807.	638.	1917.

STAND 7: RECOMMENDED TREATMENT

N/A

STAND 8: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 40. SPECIES 108
S1021508: C LAKES FOR MNG DEMO FIL15 S1021508

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	1.3	3600.0	.3	3.	54.	0.	.0	4.	0.	0.
TOTL 1"+	18.5	753.7	2.1	10.	89.	10.	.2	179.	78.	54.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.5	3077.3	.2	2.	51.	0.	.1	2.	0.	0.
TOTL 1"+	34.9	1253.1	2.3	11.	64.	15.	.3	301.	77.	60.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.0	2959.3	.0	2.	50.	0.	.2	0.	0.	0.
TOTL 1"+	54.3	1324.5	2.7	13.	56.	24.	.5	496.	110.	79.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	2957.2	.0	2.	50.	0.	.3	0.	0.	0.
TOTL 1"+	73.7	1263.2	3.3	15.	50.	34.	.7	737.	199.	76.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	2933.4	.0	2.	50.	0.	.4	0.	0.	0.
TOTL 1"+	93.3	1195.7	3.8	17.	46.	43.	1.0	1015.	367.	112.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	2876.8	.0	2.	50.	0.	.6	0.	0.	0.
TOTL 1"+	113.4	1158.6	4.2	18.	43.	53.	1.3	1319.	588.	97.

STAND 8: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 40. SPECIES 108
S1021508: C LAKES FOR MNG DEMO FIL15 S1021508

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	1.3	3600.0	.3	3.	54.	0.	.0	4.	0.	0.
TOTL 1"+	18.5	753.7	2.1	10.	89.	10.	.2	179.	78.	54.
REMOVALS TYPE = CUT FROM ABOVE									1999 OvRm	
TOTL 1"+	7.1	25.2	7.2	26.	60.	182.	6.0	112.	78.	54.
RESIDUAL - AFTER CUT										
TOTL S+0	1.3	3600.0	.3	3.	54.	0.	.0	4.	0.	0.
TOTL 1"+	11.3	728.5	1.7	9.	90.	4.	.0	67.	0.	0.
REMOVALS TYPE = CUT FROM BELOW									1999 thin	
TOTL S+0	1.3	3600.0	.3	3.	54.	0.	.0	4.	0.	0.
TOTL 1"+	2.0	190.5	1.4	9.	90.	3.	.0	11.	0.	0.
RESIDUAL - AFTER CUT										
TOTL 1"+	9.3	538.0	1.8	10.	90.	4.	.0	56.	0.	0.
STAND CONDITIONS AT YEAR 2006										
TOTL 1"+	16.7	536.4	2.4	14.	58.	11.	.0	142.	0.	0.
REMOVALS TYPE = CUT FROM BELOW									2006 xmas	
TOTL 1"+	4.6	233.4	1.9	13.	58.	10.	.0	36.	0.	0.
RESIDUAL - AFTER CUT										
TOTL 1"+	12.1	303.0	2.7	14.	57.	12.	.0	107.	0.	0.
STAND CONDITIONS AT YEAR 2009										
TOTL 1"+	14.6	301.9	3.0	16.	53.	15.	.0	144.	3.	0.
STAND CONDITIONS AT YEAR 2019										
TOTL 1"+	24.4	299.0	3.9	20.	47.	25.	.0	306.	92.	0.
STAND CONDITIONS AT YEAR 2029										
TOTL 1"+	35.0	297.2	4.6	23.	45.	35.	.0	490.	258.	0.
STAND CONDITIONS AT YEAR 2039										
TOTL 1"+	45.9	293.7	5.4	25.	43.	45.	.0	702.	439.	0.
STAND CONDITIONS AT YEAR 2049										
TOTL 1"+	57.2	290.9	6.0	27.	41.	55.	.0	939.	710.	0.

STAND 9: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 40. SPECIES 108
S1021509: C LAKES FOR MNG DEMO FIL15 S1021509

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.4	1300.0	.3	3.	55.	1.	.5	1.	0.	0.
TOTL 1"+	102.4	527.3	6.0	28.	59.	61.	3.1	2121.	1777.	324.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	.3	1102.4	.2	3.	48.	2.	.8	1.	0.	0.
TOTL 1"+	101.2	518.6	6.0	27.	48.	63.	3.4	2089.	1661.	766.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.1	965.3	.2	2.	49.	1.	1.1	1.	0.	0.
TOTL 1"+	94.1	425.7	6.4	27.	44.	73.	3.9	1946.	1523.	1221.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.1	887.8	.1	2.	50.	1.	1.4	0.	0.	0.
TOTL 1"+	90.5	357.0	6.8	28.	43.	84.	4.3	1870.	1537.	1443.
STAND CONDITIONS AT YEAR 2039										
TOTL S+0	.0	833.5	.1	2.	50.	0.	2.1	0.	0.	0.
TOTL 1"+	76.6	258.9	7.4	30.	43.	96.	4.5	1575.	1283.	1584.
STAND CONDITIONS AT YEAR 2049										
TOTL S+0	.0	811.2	.0	2.	50.	0.	2.8	0.	0.	0.
TOTL 1"+	68.1	223.3	7.5	30.	42.	101.	4.4	1378.	1095.	1483.

STAND 9: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 40. SPECIES 108
S1021509: C LAKES FOR MNG DEMO FIL15 S1021509

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	.4	1300.0	.3	3.	55.	1.	.5	1.	0.	0.
TOTL 1"+	102.4	527.3	6.0	28.	59.	61.	3.1	2121.	1777.	324.
REMOVALS TYPE = CUT FROM BELOW									1999 ovThn	
TOTL 1"+	20.3	122.4	5.5	29.	64.	37.	2.5	355.	283.	0.
RESIDUAL - AFTER CUT										
TOTL S+0	.4	1300.0	.3	3.	55.	1.	.5	1.	0.	0.
TOTL 1"+	82.1	404.9	6.1	28.	57.	68.	3.3	1766.	1494.	324.
REMOVALS TYPE = CUT FROM BELOW									1999 thin	
TOTL S+0	.4	1300.0	.3	3.	55.	1.	.5	1.	0.	0.
TOTL 1"+	1.4	101.9	1.6	11.	75.	14.	.0	9.	0.	0.
RESIDUAL - AFTER CUT										
TOTL 1"+	80.7	303.0	7.0	34.	51.	86.	4.4	1757.	1494.	324.
STAND CONDITIONS AT YEAR 2009										
TOTL 1"+	77.6	228.8	7.9	37.	45.	106.	5.3	1704.	1377.	852.
STAND CONDITIONS AT YEAR 2019										
TOTL 1"+	70.5	185.6	8.3	38.	42.	115.	5.5	1552.	1256.	1328.
STAND CONDITIONS AT YEAR 2029										
TOTL 1"+	63.7	149.1	8.9	38.	41.	123.	5.7	1402.	1183.	1573.
STAND CONDITIONS AT YEAR 2039										
TOTL 1"+	49.0	105.6	9.2	38.	39.	131.	5.6	1077.	894.	1780.
STAND CONDITIONS AT YEAR 2049										
TOTL 1"+	38.0	75.7	9.6	37.	39.	138.	5.5	833.	694.	1642.

STAND 10: NO TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 42. SPECIES 108
S1021510: C LAKES FOR MNG DEMO FIL15 S1021510

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	2.5	2160.0	.5	5.	73.	5.	.0	10.	0.	0.
TOTL 1"+	53.5	2520.0	2.0	11.	90.	15.	.0	405.	0.	0.
STAND CONDITIONS AT YEAR 2009										
TOTL S+0	1.3	1202.4	.4	5.	46.	5.	.0	9.	0.	0.
TOTL 1"+	105.6	3408.4	2.4	16.	39.	23.	.0	1157.	139.	0.
STAND CONDITIONS AT YEAR 2019										
TOTL S+0	.1	856.1	.2	3.	49.	1.	.0	1.	0.	0.
TOTL 1"+	157.9	3484.0	2.9	20.	30.	33.	.0	2163.	578.	0.
STAND CONDITIONS AT YEAR 2029										
TOTL S+0	.0	673.0	.0	3.	50.	0.	.0	0.	0.	0.
TOTL 1"+	209.4	3308.6	3.4	25.	23.	43.	.0	3401.	1284.	0.
STAND CONDITIONS AT YEAR 2039										
TOTL 1"+	227.0	2725.4	3.9	29.	19.	53.	.0	4203.	2085.	0.
STAND CONDITIONS AT YEAR 2049										
TOTL 1"+	235.5	2231.1	4.4	32.	18.	63.	.0	4844.	2691.	0.

STAND 10: RECOMMENDED TREATMENT

FILE GENOUT.STD - WHOLE STAND SUMMARY

LODGEPOLE PINE STANDS - PER ACRE BASIS - GROSS VOLUMES
REGION 2 FOREST 2 DISTRICT 2 SITE INDEX = 42. SPECIES 108
S1021510: C LAKES FOR MNG DEMO FIL15 S1021510

	BA	TPA	DBH	HT	PCTCRN	AGE	DMR	TCF	MCF	BFS
STAND CONDITIONS AT YEAR 1999										
TOTL S+0	2.5	2160.0	.5	5.	73.	5.	.0	10.	0.	0.
TOTL 1"+	53.5	2520.0	2.0	11.	90.	15.	.0	405.	0.	0.
REMOVALS TYPE = CUT FROM BELOW									1999 cut	
TOTL S+0	2.5	2160.0	.5	5.	73.	5.	.0	10.	0.	0.
TOTL 1"+	36.2	2217.0	1.7	11.	90.	14.	.0	262.	0.	0.
RESIDUAL - AFTER CUT										
TOTL 1"+	17.3	303.0	3.2	14.	90.	18.	.0	144.	0.	0.
STAND CONDITIONS AT YEAR 2009										
TOTL 1"+	28.9	300.6	4.2	19.	50.	28.	.0	342.	175.	0.
STAND CONDITIONS AT YEAR 2019										
TOTL 1"+	41.4	297.4	5.1	24.	45.	38.	.0	597.	358.	0.
STAND CONDITIONS AT YEAR 2029										
TOTL 1"+	53.9	291.0	5.8	28.	41.	48.	.0	894.	674.	0.
STAND CONDITIONS AT YEAR 2039										
TOTL 1"+	66.4	284.7	6.5	31.	38.	58.	.0	1230.	951.	0.
STAND CONDITIONS AT YEAR 2049										
TOTL 1"+	79.5	280.6	7.2	34.	36.	68.	.0	1601.	1284.	0.

APPENDIX C

REFNO	102					PROJSIZE	79							BAF	20		
SURVTYPE	S					PARCELNO	Multiple							FPS	300		
AFREFNO	S1021501					PARCSIZE	.							LARGEFPS	.		
DATALABL	Crystal Lakes Stand Exam Filing 15					CMPTMNT	"15"							SMALLFPS	.		
LANDOWNR	Crystal Lakes Road and Recreation Association					STAND	"01"							DEADBAF	.		
CONTACT	Dick Rosecrans					ACRES	2.6							DEADFPS	.		
STREET	300 Tami Rd.					OTHERID	Mixed ownership							NPOINTS	5		
CITY	Red Feather Lakes					ELEV	9150							GROPER	10		
STATE	CO					FORTYPE	LP							BKPNTDBH	5		
STATLONG	Colorado					PURPOSE	STAND EXAM							BKPNTDRC	.		
ZIP	80545					YEAR	1999							CREW	W.K.OLSEN		
PHONE	(970)881-2250					MONTH	"09"										
COUNTY	Larimer					DAY	"02"							REFPOINT			

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST														
1	1	L	PICO	5	7.6	44	26	32	30	2		79	1				
1	2	L	PICO		8.1	40	23	32		3		1					
1	3	L	PICO		8.2	52	32	43		1		1				12	117
1	4	L	PICO		9.6	49	24	40		1			2				
1	5	L	PICO		0.3	6	0			2				7			
1	6	L	PICO		0.3	7	0			2				3			
1	7	L	PICO		0.8	9	0			2				2			
1	8	L	PICO		1.3	10	0			1				1			
1	9	L	PICO		1.0	9	0			2				3			
1	10	L	PICO		1.3	10	0			2				1			
1	11	L	PICO		1.2	9	0			2			1	1			
1	12	L	PICO		1.0	9	0			2				1			
1	13	L	PICO		0.2	5	0			2				4			
1	14	L	PICO		0.0	2	0			4				23			
2	1	L	PICO	5	8.7	48	25	36		2			3				
2	2	L	ABLA		6.1	28	9	12		3		79					
2	3	L	PICO		8.8	50	30	39		2			3				
2	4	L	ABLA		8.7	40	4	22		3							
2	5	L	PICO		8.2	46	28	36		2			4				
2	6	L	PICO		0.2	5	0			4							
2	7	L	PICO		0.0	4	0			4				1			
2	8	L	PICO		0.0	2	0			4				1			
2	9	L	ABLA		0.0	3	0			4							
3	1	L	PICO	6	7.7	47	27	38	15	1		79	2				
3	2	L	PICO		1.2	10	0			1			1				
3	3	L	PICO		0.8	9	0			2							
3	4	L	PICO		1.0	9	0			2							
3	5	L	PICO		1.2	9	0			2							
3	6	L	PICO		1.2	9	0			2							
3	7	L	PICO		0.4	7	0			2							
3	8	L	PICO		0.2	5	0			2							
3	9	L	PICO		0.8	7	0			2							
3	10	L	PICO		0.5	7	0			2			1				
3	11	L	PICO		0.8	7	0			2							
3	12	L	PICO		1.0	8	0			2							
3	13	L	ABLA		1.8	12	0			2							
3	14	L	PICO		0.9	7	0			2							
3	15	L	ABLA		0.8	6	0			2							
3	16	L	ABLA	5	1.8	9	0			2							
3	17	L	ABLA		1.0	8	0			2							
3	18	L	ABLA		1.3	10	0			2							
3	19	L	PICO		0.8	6	0			2							
3	20	L	ABLA		1.0	10	0			2							
3	21	L	ABLA		0.0	3	0			4				1			
3	22	L	PICO		0.0	1	0			4				3			
4	1	L	PICO	12	8.6	52	38	41	5	2		72	1				
4	2	L	PICO		7.8	51	38	40	10	2			5				
4	3	L	PICO		8.6	54	38	44	15	2		79	6				
4	4	L	PICO		9.6	57	24	45		2			0				
4	5	L	PICO		11.6	55	34	46	5	2		81	0				
4	6	L	PICO		9.2	52	34	44	5	2		79	0				
4	7	L	PICO		0.0	4	0			2				8			
4	8	L	PICO		0.0	3	0			3				5			
4	9	L	PICO		0.0	2	0			3				6			

4	10	L	PICO		0.0	1	0		4			5
4	11	L	PICO		0.8	6	0		2			
4	12	L	PICO		0.6	7	0		2			
4	13	L	PICO		0.4	5	0		2			
4	14	L	PICO		0.4	5	0		2			
5	1	L	PICO	12	8.9	50	34	40	2		1	
5	2	L	PICO		0.5	6	0		1			
5	3	L	PICO		0.0	4	0		2			2
5	4	L	PICO		0.6	6	0		1			
5	5	L	PICO		0.0	2	0		4			2
5	6	L	PICO		0.6	6	0		4			
5	7	L	PICO		2.8	11	0		1			
5	8	L	PICO		0.8	9	0		2			
5	9	L	PICO		0.6	7	0		3		2	
5	10	L	PICO		0.0	1	0		4			1

REFNO	102				PROJSIZE	77								BAF	30	
SURVTYPE	S				PARCELNO	Multiple								FPS	100	
AFREFNO	S1021502				PARCSIZE	.								LARGEFPS	.	
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.	
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"02"								DEADBAF	.	
CONTACT	Dick Rosecrans				ACRES	11.3								DEADFPS	.	
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	21	
CITY	Red Feather Lakes				ELEV	9150								GROPER	10	
STATE	CO				FORTYPE	LP/SF								BKPNTDBH	5	
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.	
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN	
PHONE	(970)881-2250				MONTH	"09"										
COUNTY	Larimer				DAY	"04"								REFPOINT		

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST														
1	1	L	POTR5	21	5.9	36	26		100	4		44					
1	2	L	PICO		10.6	44	21	34	5	4		74	6				
1	3	L	POTR5		5.0	30	22		100	4		44					
1	4	L	PICO		7.9	48	32	36	0	2			2			3	113
1	5	L	ABLA		2.9	12	3			4		61					
1	6	L	ABLA		2.1	10	1			4		61					
1	7	L	ABLA		0.0	4	0			4				4			
1	8	L	ABLA		0.0	3	0			4				5			
1	9	L	ABLA		0.0	2	0			4				1			
1	10	L	ABLA		0.0	1	0			4				4			
1	11	L	ABLA		0.0	0.5	0			4				1			
1	12	L	ABLA		2.0	12	0			4		61					
1	13	L	PICO		1.1	6	0			4		61	6				
1	14	L	ABLA		1.5	11	0			4							
1	15	L	POTR5		0.0	1	0			4				3			
2	1	L	ABLA	44	5.1	46	22	22		4		61					
2	2	L	PICO		14.1	76	36	67	2	1		72				4	113
2	3	L	PICO		11.2	66	32	54		2						7	55
2	4	L	ABLA		7.2	43	27	33		3							
2	5	L	PICO		15.0	75	41	63		2							
2	6	L	PICO		10.0	64	34	48	3	2		79					
2	7	L	PICO		15.5	69	38	58	30	2		72					
2	8	L	PICO		8.1	44	27	31		4							
2	9	L	ABLA		5.2	48	22	21		4							
2	10	L	ABLA		3.2	38	24	6		4							
2	11	L	ABLA		1.8	12	7			4							
2	12	L	ABLA		2.0	18	11			4							
2	13	L	ABLA		3.2	30	16			4							
2	14	L	ABLA		0.0	1	0			4		61		6			
2	15	L	ABLA		0.0	2	0			4		61		1			
2	16	L	ABLA		0.0	0.5	0			4		61		2			
2	17	L	POTR5		0.0	3	0			4		61		1			
3	1	L	PICO	9	12.0	75	43	64		2							
3	2	L	PICO		11.7	75	40	65		2							
3	3	L	ABLA		15.6	85	40	70		2							
3	4	L	PICO		12.2	64	37	54		3							
3	5	L	PICO		11.0	74	34	62		3							
3	6	L	ABLA		10.2	80	46	58		3							
3	7	L	PICO		14.8	72	48	56	8	2		72					
3	8	L	PICO		14.5	76	38	62		2							
3	9	L	PICO		6.7	51	41	28		4							
3	10	L	PICO		11.8	68	32	54		2							
3	11	L	PICO		8.2	64	38	48		3							
3	12	L	ABLA		0.8	8	0			4		61					
3	13	L	ABLA		0.0	3	0			4		61		1			
3	14	L	PIPU		0.0	0.5	0			4		61		3			
3	15	L	ABLA		0.0	1	0			4		61		1			
3	16	L	ABLA		4.1	34	10	10		4		61					
3	17	L	ABLA		0.0	0.5	0			4		61		1			
3	18	L	POTR5		0.0	0.5	0			4		61		2			
3	19	L	POTR5		0.0	1	0			4				3			
3	20	L	ABLA		1.8	11	3			4		71					
3	21	L	ABLA		0.0	2	0			4		61		2			

3	22	L	ABLA		0.0	1	0			4	61		1		
3	23	L	PICO		12.0	58	36	47		2					
4	1	L	PICO		7.3	52	18	38		2				8	68
4	2	L	ABLA		5.6	42	19	18		3					
4	3	L	PICO		11.0	61	34	50		2					
4	4	L	PICO		12.1	76	32	50		1	42			4	102
4	5	L	ABLA		9.0	59	18	40		2					
4	6	L	ABLA		1.0	8	5			4	61				
4	7	L	ABLA		3.3	28	12			4	61				
4	8	L	PIPU		0.0	2	0			4	61		1		
4	9	L	ABLA		0.0	2	0			4	61		1		
4	10	L	ABLA		0.0	0.5	0			4	61		3		
5	1	L	PICO	29	7.8	54	26	41		2		1			
5	2	L	PICO		11.5	51	19	38		1				4	103
5	3	L	PICO		12.2	62	34	50		1					
5	4	L	PICO		9.2	48	20	40	2	2	79				
5	5	L	PICO		9.1	58	28	45		2					
5	6	L	ABLA		0.0	0.5	0			4	61		1		
5	7	L	ABLA		0.0	1	0			4	61		1		
5	8	L	PICO		4.5	34	19	20		4					
5	9	L	PICO		0.0	2	1			4	61				
6	1	L	PICO	31	7.0	36	18	28	5	3	79				
6	2	L	PICO		7.7	38	15	32		2					
6	3	L	PICO		6.0	44	31	32	5	2	72				
6	4	L	PICO		9.0	51	20	39		2					
6	5	L	PICO		7.6	38	18	29		3					
6	6	L	PICO		11.8	50	19	41		1					
6	7	L	PICO		0.0	1	0				61		4		
6	8	L	ABLA		0.0	1	0				61		2		
6	9	L	PICO		0.0	3	2				61		1		
7	1	L	ABLA	67	10.6	60	9	44		2					
7	2	L	ABLA		10.7	66	14	43		2	76				
7	3	L	ABLA		13.6	70	18	50		1				13	65
7	4	L	PIFL2		12.6	34	14	24	100	3	77				
7	5	L	ABLA		0.0	3	0			4	61		2		
7	6	L	ABLA		1.7	11	0			4	61				
7	7	L	ABLA		0.5	6	0			4					
7	8	L	POTR5		4.6	26	16			4	76				
7	9	L	ABLA		0.0	4	0			4			2		
7	10	L	ABLA		0.5	6	0			4					
7	11	L	ABLA		0.0	2	0			4	61		1		
8	1	L	PIPU		6.7	42	27	30		4	73				
8	2	L	PICO		6.8	62	46	44		3					
8	3	L	PICO		5.2	48	35	24		4					
8	4	L	PICO		6.9	68	39	48		2					
8	5	L	PICO		12.0	58	38	48		2				4	113
8	6	L	PICO		10.7	64	42	51		2					
8	7	L	ABLA		5.8	50	25	25		3					
8	8	L	POTR5		8.2	52	44	35		3					
8	9	L	ABLA		6.6	51	32	36		3				8	86
8	10	L	PICO		8.6	66	48	52		2					
8	11	L	PICO		7.2	61	46	49		3					
8	12	L	PICO		12.2	74	42	61		1					
8	13	L	ABLA		3.2	34	24			4	61				
8	14	L	ABLA		1.2	14	9			4	61				
8	15	L	ABLA		2.8	17	10			4	61				
8	16	L	ABLA		0.0	4	3			4	61		2		
8	17	L	PIPU		0.7	8	5			4	61				
8	18	L	ABLA		2.0	15	8			4	61			2	65
8	19	L	ABLA		0.5	8	6			4	61				
8	20	L	ABLA		0.5	6	5			4	61				
8	21	L	ABLA		1.0	9	5			4	61				
8	22	L	ABLA		1.0	9	7			4	71				
8	23	L	ABLA		0.7	8	5			4	61				
8	24	L	PICO		10.7	60	42	50	3	2	22				
9	1	L	PIPU	7	8.8	60	8	42	1	2	79				
9	2	L	ABLA		16.0	82	33	66		1	54				
9	3	D	PICO		8.5	36				2					
9	4	L	PICO		8.9	47	32	35	3	4	74				
9	5	L	PICO		7.5	59	38	48		2					

9	6	L	PICO		8.8	62	40	48		2						
9	7	L	PICO		8.8	67	42	53		2						
9	8	L	PICO		10.2	70	41	54	4	2	79					
9	9	L	PICO		8.6	68	46	56		3						
9	10	L	PICO		13.1	72	42	60		1						
9	11	L	ABLA		2.0	14	5			4	61					
9	12	L	ABLA		3.5	32	8			4	61					
9	13	L	ABLA		1.6	13	6			4	61					
9	14	L	ABLA		2.6	25	8			4	61					
9	15	L	ABLA		1.7	15	8			4	61					
9	16	L	ABLA		1.5	12	6			4	61					
9	17	L	ABLA		0.0	2	0			4	61		1			
9	18	L	POTR5		0.0	1	0			4	61		6			
9	19	L	PICO		15.0	72	31	61		2						
10	1	L	PICO	38	8.6	52	29	41		1						
10	2	L	PICO		7.3	48	24	37		2						
10	3	L	PICO		6.1	42	26	30		3						
10	4	L	PICO		6.9	40	10	30		3						
10	5	L	PICO		7.8	47	27	36		2						
10	6	L	PICO		0.5	6	2			4	61					
10	7	L	ABLA		0.9	8	1			4	61					
10	8	L	PICO		2.0	15	6			4						
10	9	L	PICO		2.5	21	10			4	61					
10	10	L	PICO		2.6	18	12			4	61					
10	11	L	PICO		1.2	9	5			4	61					
10	12	L	PICO		0.8	8	5			4	61					
10	13	L	ABLA		0.0	1	0			4	61					
10	14	L	PICO		8.3	40	19	32		2						
11	1	L	ABLA	10	11.9	72	34	54		1						
11	2	L	ABLA		9.2	51	9	32		4	61					
11	3	L	PICO		9.4	68	45	56		2						
11	4	L	PICO		10.4	72	50	62		1						
11	5	L	PICO		12.6	65	36	52		2						
11	6	L	PICO		13.4	74	42	56	5	2	72					
11	7	L	PICO		11.7	68	38	56		2						
11	8	L	PICO		8.2	62	40	42		2	79					
11	9	L	PICO		8.6	63	40	48	2	2						
11	10	L	ABLA		15.8	76	34			1						
11	11	L	ABLA		4.0	34	19			4	61					
11	12	L	ABLA		3.0	25	15			4	61					
11	13	L	ABLA		1.3	10	7			4	61					
11	14	L	ABLA		1.8	13	8			4	61					
11	15	L	ABLA		3.8	33	22			4	61					
11	16	L	ABLA		2.8	25	10			4	61					
11	17	L	ABLA		0.8	6	5			4	61					
11	18	L	ABLA		3.7	23	6			4	61					
11	19	L	ABLA		0.0	4	0			4	61		1			
11	20	L	ABLA		0.0	3	0			4	61		4			
11	21	L	ABLA		0.0	2	0			4	61		3			
11	22	L	ABLA		0.0	1	0			4	61		15			
11	23	L	PIPU		0.0	3	0			4	61		1			
12	1	D	ABLA	7	12.7	76										
12	2	L	PICO		8.5	63	40	55		3		6				
12	3	L	PICO		10.0	58	30	48		2						
12	4	L	PICO		6.9	53	40	44		3						
12	5	D	ABLA		6.3	34										
12	6	L	PICO		7.5	58	35	41		2						
12	7	D	ABLA		9.1	60										
12	8	L	PIPU		22.9	94	32	87		1				24	114	
12	9	L	ABLA		11.3	69	15	51		2						
12	10	L	ABLA		3.0	13	8			4	61					
12	11	L	PIPO		3.1	17	16			4	61	6				
12	12	L	PIPU		3.7	33	8			4	61					
12	13	L	ABLA		1.3	8	4			4	61					
12	14	L	ABLA		0.4	5	4			4	61					
12	15	L	ABLA		0.0	4	0			4	61		1			
12	16	L	ABLA		0.0	3	0			4	61		2			
12	17	L	ABLA		0.0	2	0			4	61		3			
12	18	L	ABLA		0.0	1	0			4	61		1			
12	19	D	ABLA		6.5	48										

13	1	L	PICO	17	5.3	33	14	14		3	74	6				
13	2	L	ABLA		10.4	54	8	34		2	78					
13	3	L	ABLA		0.0	2	0			4	61		1			
13	4	L	ABLA		0.0	1	0			4	61		8			
14	1	L	ABLA	15	10.9	68	11	52		1						
14	2	L	PICO		6.7	44	16	26				4		10	75	
14	3	L	PICO		9.8	33	10	20	10		79	4				
14	4	L	PICO		5.4	23	5	10			4	6				
14	5	L	PICO		10.1	52	21	41	10	2	79	4				
14	6	L	PICO		11.0	50	24	40	10	2	81	6				
14	7	L	PICO		0.0	1	0			4			1			
14	8	L	ABLA		0.0	1	0			4			2			
14	9	L	ABLA		0.0	3	0			4			1			
15	1	L	ABLA	18	20.5	74	15	60		1						
15	2	L	ABLA		8.1	58	18	42		2				11	98	
15	3	L	ABLA		8.8	60	14	44	20	1	79					
15	4	L	ABLA		8.1	52	22	38	20	2	79					
15	5	L	ABLA		8.2	47	20	31		2	79					
15	6	L	PICO		7.4	46	30	36		3		4				
15	7	L	ABLA		1.4	10	2			4						
15	8	L	ABLA		0.9	10	2			4						
15	9	L	ABLA		0.7	7	1			4						
15	10	L	ABLA		1.0	12	5			4	81					
15	11	L	ABLA		2.6	15	4			2						
15	12	L	ABLA		0.3	5	0			4						
15	13	L	ABLA		2.3	9	5			4	61					
15	14	L	ABLA		3.0	20	4			4	61					
15	15	L	ABLA		1.2	10	4			3						
15	16	L	ABLA		0.0	3	0			4			3			
15	17	L	ABLA		0.0	1	0			4			4			
15	18	L	ABLA		15.7	64	4	54	5	2	74					
16	1	L	PICO	13	9.7	58	32	46		2						
16	2	L	PICO		7.7	58	42	48		2						
16	3	L	PICO		10.0	63	36	50	20	1	72					
16	4	L	PICO		7.2	52	34	42		3						
16	5	L	PICO		8.6	56	32	39		2						
16	6	L	PICO		7.5	54	38	38		2						
16	7	L	PICO		11.2	61	34	50		1				3	102	
16	8	L	ABLA		2.4	24	6			4	61					
16	9	L	ABLA		0.0	1	0			4			4			
16	10	L	PIPU		0.0	2	0			4			1			
16	11	L	PIPU		0.0	1	0			4			3			
16	12	L	ABLA		0.5	6	2			4						
16	13	L	PICO		2.5	25	20			4	61					
16	14	L	ABLA		0.6	6	1			4	61					
17	1	L	PICO	42	16.1	70	18	58		1						
17	2	L	PICO		11.5	62	28	50		2						
17	3	L	ABLA		19.0	90	10	72		1						
17	4	L	ABLA		13.3	83	14	60		2						
17	5	L	ABLA		0.0	2	0			4	61		3			
17	6	L	ABLA		0.0	3	0			4	61		2			
17	7	L	ABLA		0.0	1	0			4	61		4			
17	8	L	PIPU		0.0	1	0			4	61		16			
17	9	L	PIPU		0.0	2	0			4	61		13			
17	10	L	ABLA		0.0	4	0			4	61		3			
17	11	L	ABLA		0.5	6	1			4	61					
17	12	L	PIPU		0.0	3	0			4	61		2			
17	13	L	ABLA		0.3	5	2			4	61					
18	1	L	PICO	26	13.6	74	24	55		1						
18	2	L	PICO		6.8	47	14	32		2						
18	3	L	ABLA		10.0	71	15	50		2	71					
18	4	L	ABLA		2.5	18	0			4	61					
18	5	L	PICO		4.9	36	10	13								
18	6	L	ABLA		3.2	15	3			4	61					
18	7	L	PICO		1.3	14	6			4	61					
18	8	L	PICO		3.0	19	8			4	61					
18	9	L	PICO		2.8	14	6			4	61					
18	10	L	PICO		0.3	5	3			4	61					
18	11	L	POTR5		0.0	3	2			4	61					
18	12	L	ABLA		0.0	2	0			4	61		2			

18	13	L	PICO		0.0	3	1			4	61	1		
18	14	L	ABLA		0.0	1	0			4	61	3		
18	15	L	PIPU		0.0	1	0			4	61	1		
18	16	L	PICO		0.0	1	0			4	61	4		
18	17	L	POTR5		0.0	1	0			4	61	2		
18	18	L	ABLA		0.0	3	0			4	61	1		
19	1	L	PICO	27	8.7	50	29	33	5	2	72			
19	2	L	PICO		9.7	52	20	43		2				
19	3	L	PICO		10.5	64	30	54		1				
19	4	L	ABLA		1.0	7	1			4	61			
19	5	L	ABLA		1.7	11	1			4	61			
19	6	L	ABLA		0.3	6	1			4	61			
19	7	L	ABLA		2.3	13	0			4	61			
19	8	L	ABLA		1.1	9	1			4	61			
19	9	L	ABLA		0.3	6	0			4	61			
19	10	L	ABLA		0.2	5	0			4	61			
19	11	L	ABLA		0.2	5	0			4	61			
19	12	L	ABLA		0.0	4	0			4	61	1		
19	13	L	ABLA		0.0	3	0			4	61	2		
19	14	L	ABLA		0.0	2	0			4	61	7		
19	15	L	ABLA		0.0	1	0			4		9		
20	1	L	PICO	7	1.0	11	4			3				
20	2	L	PICO		1.2	16	6			2				
20	3	L	POTR5		2.2	25	9			1				
20	4	L	PICO		3.3	20	5			2				
20	5	L	PICO		2.5	16	4			2				
20	6	L	ABLA		3.5	19	4			2				
20	7	L	ABLA		0.3	6	3			4	61			
20	8	L	ABLA		2.2	13	1			3				
20	9	L	PICO		1.2	10	3			3				
20	10	L	POTR5		0.6	12	5			4				
20	11	L	ABLA		0.3	5	1			4	61			
20	12	L	PIPU		1.4	11	1			4	61			
20	13	L	PICO		1.3	13	1			3	61			
20	14	L	ABLA		2.3	12	0			3				
20	15	L	ABLA		4.0	24	3			1				
20	16	L	POTR5		0.5	7	3			3				
20	17	L	PICO		1.1	9	3			3				
20	18	L	PICO		0.9	8	2			4				
20	19	L	POTR5		0.3	8	5			4	61			
20	20	L	POTR5		0.2	6	4			4	61			
20	21	L	POTR5		0.8	12	6			2				
20	22	L	PICO		0.8	8	3			3				
20	23	L	PICO		0.7	7	3			3				
20	24	L	POTR5		0.8	12	5			2				
20	25	L	POTR5		1.1	19	8			2				
20	26	L	PICO		0.0	3	2			4	61	5		
20	27	L	PICO		0.0	4	2			4	61	1		
20	28	L	POTR5		0.0	4	3			4	61	4		
20	29	L	ABLA		0.0	2	0			4	61	1		
20	30	L	ABLA		0.0	4	1			4	61	1		
21	1	L	PICO		13.1	81	25	60		2			13	81
21	2	L	PIPU		11.9	48	12	34		4				
21	3	L	PIPU		19.5	88	14	77		1	73			
21	4	L	PICO		14.6	66	21	54		2				
21	5	L	ABLA		0.0	3	0			4	61	2		
21	6	L	ABLA		0.0	2	0			4	61	1		
21	7	L	PIPU		0.0	1	0			4	61	1		
21	8	L	PICO		0.4	7	5			4	61			

REFNO	102				PROJSIZE	79								BAF	10	
SURVTYPE	S				PARCELNO	Multiple								FPS	100	
AFREFNO	S1021503				PARCSIZE	.								LARGEFPS	.	
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.	
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"03"								DEADBAF	.	
CONTACT	Dick Rosecrans				ACRES	2.2								DEADFPS	.	
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	4	
CITY	Red Feather Lakes				ELEV	9150								GROPER	10	
STATE	CO				FORTYPE	LP								BKPNTDBH	5	
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.	
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN	
PHONE	(970)881-2250				MONTH	"09"										
COUNTY	Larimer				DAY	"02"								REFPOINT		

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST														
1	1	L	PICO	37	9.5	60	44	52		2		81					
1	2	L	PICO		8.9	62	34	52		2		81					
1	3	S	PICO		8.0	64		52									
1	4	S	PICO		6.2	53		42									
1	5	L	PICO		10.1	59	38	52		2						5	104
1	6	L	PICO		11.0	59	31	48	10	2		81					
1	7	L	PICO		12.6	52	14	42		2							
1	8	L	PICO		8.7	46	14	34	5	3		81					
1	9	L	PICO		7.2	46	36	37		4		81					
1	10	L	PICO		9.2	57	46	48		2							
1	11	L	PICO		0.0	1	0			4				6			
1	12	L	PICO		0.7	6	0			4				2			
1	13	L	PICO		0.1	5	0			4				2			
1	14	L	PICO		0.0	3	0			4				1			
2	1	L	ABLA	28	1.3	11	0			1				1			
2	2	L	PICO		0.7	6	0			1				1			
2	3	L	PICO		0.0	4	0			1				1			
2	4	L	PICO		0.0	3	0			1				1			
2	5	L	PICO		0.0	1	0			1				1			
2	6	L	POTR5		0.0	3	0			2				25			
2	7	L	POTR5		0.0	4	1			1				1			
3	1	L	PICO	17	9.6	50	30	44	0	1		81				8	113
3	2	L	PICO		6.9	36	21	24	0	3							
3	3	L	PICO		7.7	42	24	33	2	2		72					
3	4	L	PICO		5.4	36	28	22		3							
3	5	L	PICO		9.2	48	21	39	0	2		81					
3	6	L	PICO		1.2	7	0			1		78					
3	7	L	PICO		0.3	5	0			1							
3	8	L	PICO		0.0	4	0			2				1			
3	9	L	PICO		0.0	3	0			2				10			
3	10	L	PICO		0.0	2	0			2				11			
3	11	L	PICO		0.0	1	0			2				9			
4	1	L	PICO	20	7.4	44	28	36	0	2		81					
4	2	L	PICO		7.8	49	35	42	1	2		81					
4	3	L	PICO		8.4	50	30	43	2	2		81					
4	4	L	PICO		6.8	44	30	34	2	3		81					
4	5	L	PICO		10.3	53	26	43	0	2						10	107
4	6	L	PICO		8.6	44	28	35	5	2		72					
4	7	L	PICO		7.9	46	26	34		2							
4	8	L	PICO		7.4	46	32	34		3		72					
4	9	L	PICO		0.0	0.5	0							2			
4	10	L	PICO		0.0	1	0							1			
4	11	L	PICO		0.0	3	0							1			

REFNO	102				PROJSIZE	79								BAF	20	
SURVTYPE	S				PARCELNO	Multiple								FPS	100	
AFREFNO	S1021504				PARCSIZE	.								LARGEFPS	.	
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.	
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"04"								DEADBAF	.	
CONTACT	Dick Rosecrans				ACRES	3.3								DEADFPS	.	
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	5	
CITY	Red Feather Lakes				ELEV	9150								GROPER	10	
STATE	CO				FORTYPE	LP								BKPNTDBH	5	
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.	
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN	
PHONE	(970)881-2250				MONTH	"09"										
COUNTY	Larimer				DAY	"01"								REFPOINT		

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST														
1	1	L	PICO	12	8.4	50	25	43		2		81				5	102
1	2	L	PICO		9.6	52	18	45		2							
1	3	L	PICO		6.8	51	22	37		2							
1	4	L	PICO		9.5	47	12	41	1	2		79	2				
1	5	L	PICO		9.5	48	17	40	5	2		72					
2	1	L	PICO	19	8.8	44	8	25	10	1						11	
2	2	L	POTR5		0.1	5	2			4				1			
2	3	L	POTR5		0.5	10	5			4				2			
2	4	L	POTR5		0.7	14	5			4				1			
2	5	L	POTR5		0.5	10	3			4				2			
2	6	L	POTR5		0.3	7	3			4				3			
2	7	L	POTR5		0.1	5	2			4				6			
2	8	L	POTR5		0.0	3	2			4				31			
2	9	L	ABLA		1.0	10	1			4				1			
2	10	L	ABLA		0.8	8	0			4				1			
2	11	L	ABLA		0.4	6	0			4				1			
2	12	L	ABLA		0.2	6	0			4				1			
2	13	L	ABLA		0.1	5	0			4				1			
2	14	L	PICO		0.5	5	1			4				5			
2	15	L	PICO		0.0	2	0			4				4			
2	16	D	PICO		8.3	51											
3	1	L	PICO	28	8.6	56	29	44		2			1			3	97
3	2	L	PICO		8.9	58	33	51		2							
3	3	L	PICO		7.1	56	31	45		3							
3	4	L	PICO		5.7	48	29	27	5	4							
3	5	L	PICO		8.3	60	31	52		2			1				
3	6	L	PICO		9.3	56	34	39		3							
3	7	L	PICO		10.2	58	24	50		3							
3	8	L	PICO		12.0	65	35	55	10	1							
3	9	L	PICO		8.4	54	20	44		2							
3	10	S	PICO		5.1	47											
3	11	S	PICO		8.6	60											
3	12	L	PICO		7.6	62	40	52		1							
3	13	L	PICO		7.6	52	33	41		3							
4	1	L	PICO	34	7.5	54	39	46		2							
4	2	L	PICO		8.1	56	37	46	5	2		79					
4	3	L	PICO		7.9	56	36	48		2							
4	4	L	PICO		8.0	59	34	50		1							
4	5	L	PICO		9.0	61	36	50	1	2		72					
4	6	L	PICO		10.3	64	30	52	3	1		72				5	112
4	7	L	PICO		8.2	56	36	38	3	2		72					
4	8	L	PICO		10.2	61	30	50		1							
4	9	L	PICO		6.4	54	37	42		3							
4	10	L	PICO		8.1	60	36	48	15	2		72					
4	11	L	PICO		8.7	58	37	47		2							
4	12	L	PICO		8.9	54	24	43		2							
4	13	L	PICO		3.5	38	33	7		4							
5	1	L	PICO	15	11.2	65	36	56	0	1		81				10	110
5	2	L	PICO		10.6	60	37	52		2							
5	3	S	PICO		8.9	63											
5	4	S	PICO		7.3	60											
5	5	L	ABLA		1.0	9	0			4				1			
5	6	L	PICO		0.0	3	0			4				4			
5	7	L	PICO		0.0	2	0			4				21			

REFNO	102				PROJSIZE	79								BAF	30	
SURVTYPE	S				PARCELNO	Multiple								FPS	300	
AFREFNO	S1021505				PARCSIZE	.								LARGEFPS	.	
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.	
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"05"								DEADBAF	.	
CONTACT	Dick Rosecrans				ACRES	11.5								DEADFPS	.	
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	12	
CITY	Red Feather Lakes				ELEV	9150								GROPER	10	
STATE	CO				FORTYPE	LP								BKPNTDBH	5	
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.	
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN	
PHONE	(970)881-2250				MONTH	"09"										
COUNTY	Larimer				DAY	"05"								REFPOINT		

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST														
1	1	L	PICO	17	9.2	45	19	34	10	2		72	2				
1	2	L	PICO		6.6	36	16	26	10	2			2				
1	3	L	PICO		10.0	39	10	32		2		76	4				
1	4	L	PICO		8.5	40	18	32		2			2				
1	5	L	PICO		9.5	33	12	26		3		74	6				
1	6	L	PICO		9.7	45	20	34	10	2		72	5				
1	7	L	PICO		0.0	4	3			4		61	3	3			
1	8	L	PICO		0.3	6	3			4		61					
1	9	L	PICO		1.2	8	5			4		61					
2	1	L	PICO	36	5.0	36	24	20		2			5				
2	2	L	PICO		6.1	37	25	26		2			5				
2	3	L	PICO		4.9	34	19	18		3			4				
2	4	L	PICO		1.9	20	15			4		61	3				
2	5	L	PICO		2.3	15	10			4		61	6				
2	6	L	PICO		2.0	20	17			4		61	6				
2	7	L	PICO		5.5	38	24	26		2		61	2			1	105
3	1	L	PICO	26	9.0	51	24	40		1			2			5	102
3	2	L	PICO		8.0	44	28	34		2			4				
3	3	L	PICO		6.4	42	32	34		2			4				
3	4	L	PICO		7.8	34	20	28		3		72	6				
3	5	L	ABLA		9.1	50	29	39		1							
3	6	L	PICO		8.4	48	20	38					4				
3	7	L	PICO		13.7	56	21	49	30	3		74	6				
3	8	L	PICO		3.9	34	30			4			6				
3	9	L	ABLA		0.0	3	0			4		61		1			
3	10	L	ABLA		0.0	1	0			4		61		2			
3	11	L	PICO		0.0	1	0			4		61		1			
4	1	L	PICO	22	5.7	36	28	22		2			4				
4	2	L	PICO		3.7	31	22	12		3		81	6				
4	3	L	ABLA		0.0	2	0			4				2			
4	4	L	PICO		0.0	1	0							11			
5	1	L	PICO	23	7.1	48	34	40		2			1				
5	2	L	PICO		7.8	50	26	38	5	2		72	1				
5	3	L	PICO		6.5	48	30	38		2			0				
5	4	L	PICO		8.4	54	35	44		1			1			5	
5	5	L	PICO		1.8	20	4			4		74					
5	6	L	PICO		4.0	34	26	14		4		61					
5	7	L	PIPU		0.4	6	1			4		61					
6	1	L	PICO	24	6.5	36	17	28		2			1				
6	2	L	PICO		8.7	36	18	27		2			4				
6	3	S	PICO		7.2	34											
6	4	L	PICO		8.6	43	20	34	10	2		72	0				
6	5	L	PICO		8.2	39	15	30		2			0				
6	6	L	PICO		5.1	26	14	12		3			0				
6	7	L	PICO		0.5	6	4			4		61	0				
6	8	L	PICO		0.3	6	4			4		61					
6	9	L	PICO		0.6	6	3			4		61					
7	1	N		23	0.0									0			
8	1	L	PICO		6.1	42	26	32	15	2		79	4				
8	2	L	PICO		10.0	48	20	38	20	1		79	4				
8	3	L	PICO		6.0	38	18	26	25	3		79	4				
8	4	L	PICO		9.2	42	16	34		2			6				
8	5	L	PICO		5.2	36	21	19	40	2		79	6				

8	6	L	PICO		7.8	42	22	32		2		6			
8	7	L	PICO		3.2	25	21			4		6			
8	8	L	PICO		4.3	32	18			4		6			
8	9	L	PICO		3.5	29	18			4		6			
8	10	L	PICO		2.3	23	16			4	79	6			
9	1	L	PICO	40	8.5	40	9	28	15	2	72	6			
9	2	L	PICO		9.2	46	20	36		2		2	8	92	
9	3	L	PICO		8.3	40	18	26		2		3			
9	4	L	PICO		10.3	46	11	32	3	2	72	5			
9	5	L	PICO		3.3	28	14			4	61	6			
9	6	L	PICO		1.2	8	3			4	61	0			
9	7	L	POTR5		0.0	1	0			4	61				
10	1	L	PICO	34	6.6	30	10	24	10	2	74	4			
10	2	L	PICO		5.3	29	14	12	33	2	79	3			
10	3	L	PICO		7.6	34	12	21		1		2			
10	4	L	PICO		6.4	28	13	20		4		2			
10	5	L	PICO		7.1	28	16	17	10	2	72				
11	1	L	ABLA	21	6.3	40	16	22							
11	2	L	PICO		7.9	33	20	25		2		4			
11	3	L	PICO		6.7	34	22	25		2		3	4	102	
11	4	L	PICO		4.7	25	16	9		3		6			
11	5	L	PICO		3.3	24	16			4		2			
11	6	L	PICO		3.8	28	22			4	76	6			
11	7	L	PICO		3.6	25	16			4		6			
11	8	L	PICO		4.3	23	14	8		4		6			
11	9	L	PICO		4.1	27	20	9		4		6			
11	10	L	PICO		2.7	22	16			4		6			
11	11	L	PICO		4.9	26	17	14		4		6			
12	1	L	PICO		7.5	31	18	22		2					
12	2	L	PICO		3.1	20	16			3	76	6			
12	3	L	PICO		4.3	22	15	9		2		6			
12	4	L	PICO		2.6	18	13			3		6			
12	5	L	PICO		3.9	18	8	8		3		6			
12	6	L	PICO		3.4	20	16	6		3		6			
12	7	L	PICO		3.8	19	15	8		3		6			
12	8	L	PICO		3.1	19	14			4		6			
12	9	L	PICO		2.4	19	15			4		6			
12	10	L	PICO		2.1	17	12			4		6			
12	11	L	PICO		2.4	19	14			4		6			

REFNO	102				PROJSIZE	79								BAF	30	
SURVTYPE	S				PARCELNO	Multiple								FPS	300	
AFREFNO	S1021506				PARCSIZE	.								LARGEFPS	.	
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.	
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"06"								DEADBAF	.	
CONTACT	Dick Rosecrans				ACRES	5.5								DEADFPS	.	
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	15	
CITY	Red Feather Lakes				ELEV	9150								GROPER	10	
STATE	CO				FORTYPE	LP								BKPNTDBH	5	
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.	
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN	
PHONE	(970)881-2250				MONTH	"09"										
COUNTY	Larimer				DAY	"08"								REFPOINT		

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST														
1	1	L	PICO	23	5.4	30	18	22		2			6				
1	2	L	PICO		5.3	32	20	21		2			6				
1	3	L	PICO		2.2	22	19			4			6				
1	4	L	PICO		3.2	25	14			3			6				
1	5	L	PICO		2.5	17	13			4		61	6				
1	6	L	PICO		3.0	22	18			3		61	6				
2	1	L	PICO		7.1	30	14	22		2			4				
2	2	L	PICO		7.6	36	16	26	40	2		79	2				
2	3	L	PICO		6.6	34	16	22		1			4				
2	4	L	PICO		2.2	14	6			4		61	6				
2	5	L	PICO		3.8	30	18			3			3				
3	1	L	PICO	16	6.6	27	14	18	25	2		72	1				
3	2	L	PICO		8.8	28	10	21	30	1		79	6				
3	3	L	PICO		2.9	24	0			4		61	1				
3	4	L	PICO		4.7	28	15	13		2			3				
3	5	L	PICO		4.4	28	18	10		3			2				
3	6	L	PICO		4.3	29	25	14		3			6				
3	7	L	PICO		1.9	14	12			4		61	6				
3	8	L	PICO		2.8	20	18			4		61	6				
3	9	L	PICO		5.0	30	18	15		2			4				
3	10	L	PICO		3.9	29	23			2			3				
4	1	L	PICO		8.5	36	14	26		2			6				
4	2	L	PICO		8.4	39	20	30		2			6			2	115
4	3	L	PICO		6.9	36	20	25	10	1		72	4				
4	4	D	PICO		6.1	37											
5	1	L	PICO		6.2	36	16	23		2			5				
5	2	L	PICO		5.8	38	22	23		2			6				
5	3	L	PICO		7.1	40	22	26	33	2		79	4				
5	4	L	PICO		6.1	36	22	26		2		78	4				
5	5	L	PICO		1.5	14	8			4		61	3				
5	6	L	POTR5		0.0	1	0			4		61		3			
5	7	L	POTR5		0.0	2	1			4		61		1			
6	1	L	PICO	40	6.5	40	24	30		2			0			7	
6	2	L	PICO		6.7	47	29	32	10	2		22	4				
6	3	L	PICO		6.8	52	36	40		2			3				
6	4	L	PICO		8.4	46	29	36		2			3				
6	5	L	PICO		4.3	28	16	12		4			6				
6	6	L	PICO		4.2	40	26	14		3			6				
6	7	L	POTR5		0.0	1	0			4		61		1			
7	1	L	PICO		5.3	32	22	22		2			4			2	90
7	2	L	PICO		5.8	32	22	22	15	2		72	3				
7	3	L	PICO		7.2	40	28	29	15	1		72	4				
7	4	L	PICO		5.8	40	28	28		2		23	4				
7	5	L	PICO		5.1	34	23	14	10	3		79	5				
7	6	L	PICO		5.7	36	24	21		3			5				
7	7	L	PICO		4.9	40	27	17		3			5				
7	8	L	PICO		2.2	18	8			4		61	6				
7	9	L	PICO		1.9	13	6			4		61	3				
7	10	L	PICO		3.6	32	18			4		61	6				
8	1	L	PICO	14	10.4	40	16	30	30	1		22	6				
8	2	L	PICO		6.7	26	4	12	100	3		77					
8	3	D	PICO		9.3	40											
8	4	L	PICO		0.0	4	1			4		61	6				
8	5	L	PICO		0.0	3	0			4		61	6				

9	1	L	PICO	12	5.2	36	16	23		3		6		
9	2	L	PICO		8.7	46	22	34	10	1	79	4		
9	3	L	PICO		6.1	38	26	26	10	3	23	5		
9	4	L	PICO		6.7	42	25	32	10	2	23	6		
9	5	L	ABLA		7.3	40	6	26		2	27			
9	6	L	PICO		10.6	34	13	22	25	3	74	6		
10	1	L	PICO	23	7.1	34	14	24		2		4		
10	2	L	PICO		6.3	29	11	20		2		5		
10	3	L	PICO		3.2	16	10			4	61	6		
10	4	L	PICO		3.8	18	9			4	61	6		
10	5	L	PICO		0.0	2	1			4	61	0		
11	1	L	PICO	33	5.0	24	11	17		3		6		
11	2	L	PICO		6.6	27	11	20		2		4		
11	3	L	PICO		6.4	29	15	23		1		6		
11	4	L	PICO		1.1	12	9			4	61			
12	1	L	PICO	31	8.7	44	34	34		1		5		
12	2	L	PICO		7.6	35	16	26		2		0		
12	3	L	PICO		6.0	34	14	22		2		2		
12	4	L	PICO		6.8	24	8	19		4	74	0		
12	5	L	PICO		3.2	21	17			4	61	5		
12	6	L	PICO		1.3	11	6			4	61	0		
13	1	L	PICO	36	8.3	36	17	27		2		4	2	116
13	2	L	PICO		6.8	34	20	26	20	2	79	5		
13	3	L	PICO		6.5	31	7	16	10	4	74	6		
13	4	L	PICO		8.8	38	23	30	10	2	79	2		
14	1	L	PICO	36	9.3	45	18	34	10		74	5		
14	2	L	PICO		6.5	43	36	28		2		6		
14	3	L	PICO		7.0	43	26	30	5	2	78	2		
14	4	L	PICO		7.5	33	12	27		2		6		
15	1	L	PICO	26	8.0	36	10	26		2		5		
15	2	L	PICO		0.0	1	0			1			3	

REFNO	102				PROJSIZE	77								BAF	20	
SURVTYPE	S				PARCELNO	Multiple								FPS	300	
AFREFNO	S1021507				PARCSIZE	.								LARGEFPS	.	
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.	
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"07"								DEADBAF	.	
CONTACT	Dick Rosecrans				ACRES	25.9								DEADFPS	.	
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	21	
CITY	Red Feather Lakes				ELEV	9150								GROPER	10	
STATE	CO				FORTYPE	LP								BKPNTDBH	5	
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.	
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN	
PHONE	(970)881-2250				MONTH	"09"										
COUNTY	Larimer				DAY	"06"								REFPOINT		

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST														
1	1	L	PICO	11	8.6	32	10	22	25	2		79	6				
1	2	L	PICO		10.2	36	18	30	10	2		79	6				
1	3	L	PICO		8.8	33	16	24		2			6				
1	4	L	ABLA		11.2	48	2	36		1							
1	5	L	PICO		10.6	33	14	28	20	2		74	6				
1	6	L	PICO		3.4	18	2			4			3				
1	7	L	PICO		1.0	8	3			4		61	6				
1	8	L	PICO		0.4	6	3			4			1				
1	9	L	PICO		0.4	6	3			4			3				
1	10	L	PICO		2.0	11	3			4			2				
1	11	L	PICO		0.3	6	3			4			6				
1	12	L	PICO		0.2	6	3			4			6				
1	13	L	PICO		3.0	14	3			4			6				
1	14	L	PICO		2.5	14	5			4			0				
1	15	L	PICO		2.0	11	3			4			6				
1	16	L	PICO		0.0	3	1			4			6				
2	1	L	PICO		5.3	31	16	18		3			6				
2	2	L	ABLA		11.0	48	6	34		1							
2	3	L	PICO		6.3	32	10	18		2			6				
2	4	S	PICO		9.5	27											
2	5	L	PICO		10.6	34	12		100	3		22	6				
2	6	L	PICO		7.5	36	15	24		2			4				
2	7	L	PICO		5.4	32	10	15		2			6				
2	8	L	PICO		0.0	3	0			4		61	6				
3	1	L	PICO	13	9.4	28	7	18		2			6				
3	2	L	PICO		12.1	28	4	21	100	2		77	6				
3	3	L	PICO		9.6	34	13	26	100	2		77	6				
3	4	L	PICO		6.1	12	4		100	4		77	6				
3	5	L	PICO		8.0	30	8	18		2			6				
3	6	L	PICO		0.0	3	0							1			
3	7	L	PICO		0.3	5	3			4		77	6				
4	1	L	PICO	11	6.4	19	6	14		3			6				
4	2	S	PICO		5.4	20											
4	3	L	PICO		7.9	26	2	18	100	2		77	6				
4	4	L	PICO		7.7	30	14	24		2			6				
4	5	L	PICO		8.3	29	22	24		2			6				
4	6	L	PIFL2		0.0	2	0			4							
5	1	L	PICO	10	2.7	13	2			2			6				
5	2	L	PICO		1.8	8	2			3			0				
5	3	L	PICO		3.6	18	1			1			6			11	
5	4	L	PICO		0.8	8	3			4			0				
5	5	L	PICO		0.0	4	0			4			0	2			
5	6	L	PICO		0.0	3	0			4			0	1			
5	7	L	PICO		0.0	2	0			4			0	1			
6	1	L	ABLA	11	10.0	37	2	22		2							
6	2	L	PICO		15.8	43	13	36	25	2		22					
6	3	L	PICO		4.9	28	2	7		3			3				
6	4	L	PICO		3.1	12	6			4		71					
6	5	L	PICO		0.0	1	0			4							
6	6	L	ABLA		0.0	2	0			4							
7	1	L	PICO		8.0	27	20	21	100	2		77	6				
7	2	L	PICO		10.6	36	28	30	35	2		72	6				
7	3	D	PICO		6.3	16											
8	1	L	PICO	8	9.6	20	1	11	100	1		77	6				

8	2	L	PICO		7.1	22	10	18		2	74	6			
9	1	L	PICO		6.6	28	16	20	40	2	79	6			
9	2	D	PICO		13.0	32									
9	3	L	PICO		1.7	8				4	61	6			
9	4	D	PICO		8.6	18									
10	1	D	PICO	15	8.3	24									
10	2	L	PICO		10.0	30	13	24		2					
10	3	L	PICO		8.4	34	8	24		2	74	6			
10	4	L	PICO		7.8	33	12	25		2		6		2	
10	5	L	PICO		1.5	10	0			4		1			
10	6	L	PICO		0.0	3	0			4		0			
11	1	L	PICO		5.9	26	2	14		2		0			
11	2	L	PICO		8.0	21	2	16	100	4	77	6			
11	3	L	PICO		15.1	48	15	38	15	1	72	6			
11	4	L	PICO		8.5	28	20	22	40	2	79	6			
11	5	L	POTR5		0.0	1	0			4	61		7		
12	1	L	PICO	15	13.3	46	9	38			74	6			
12	2	L	PICO		12.1	45	8	38	17	1	79	4			
12	3	L	PICO		10.7	30	10	24	100	4	74	6			
12	4	L	PICO		11.3	42	14	36		1		5		5	172
12	5	L	PICO		0.8	8	4			4		6			
12	6	L	PICO		0.5	6	3			4		0			
12	7	L	PICO		0.0	4	0			4		0	1		
13	1	L	PICO	15	9.2	35	20	26	100	1	75	6			
13	2	L	PICO		11.5	30	8	24		2		6			
13	3	S	PICO		6.6	26									
13	4	L	PICO		6.0	23	9	16	100		77	6			
13	5	L	PICO		9.2	30	6	21	100	2	75	6			
13	6	L	PICO		12.4	40	9	34	15	1	79	6			
13	7	L	PICO		10.6	32	10	26	100	3	77	6			
13	8	L	PIFL2		0.0	3	0			4					
14	1	L	ABLA	17	6.0	34	4	14		2					
14	2	L	PICO		12.8	37	10	30	100	2	77	6			
14	3	L	ABLA		8.0	48	1	32		1					
14	4	L	PICO		15.3	44	6	34	100	1	77	6			
14	5	L	PICO		10.4	26	10	18	100	3	77	6			
14	6	D	PICO		9.5	35									
15	1	L	PICO	15	11.3	41	11	35	100	2	77	6			
15	2	L	PICO		12.9	40	7	32	27	2	74	6			
16	1	L	PICO	12	6.9	34	18	29		1	74	6			
16	2	L	PICO		0.0	1	0			4			2		
17	1	L	PICO	15	0.3	5	1			3					
17	2	L	PICO		0.0	1	0			1			1		
18	1	L	PICO	17	12.1	42	16	34	15	2	74	6			
18	2	L	PICO		10.0	37	22	34		2		6			
18	3	S	PICO		11.0	44									
19	1	L	PICO	17	14.2	35	12	21		1		6			
19	2	L	PICO		0.0	4	0			1					
19	3	L	PICO		0.0	3	0			1			1		
19	4	L	PICO		0.0	2	0			1			3		
19	5	L	PICO		0.0	1	0			1			2		
19	6	L	PICO		0.0	3	0			1		6	1		
19	7	L	PICO		0.0	2	0			1		6	1		
19	8	L	PICO		1.3	8	0			1		1			
20	1	L	PICO	28	13.3	46	9	34		2		6			
20	2	L	PICO		10.5	41	19	34		2		6			
21	1	L	PICO	20	11.5	41	20	37		2		6			
21	2	L	PICO		11.5	48	32	40	5	2	72	6			
21	3	L	PICO		12.0	44	30	36		2	76	6			
21	4	D	PICO		10.3	48									
21	5	L	PICO		14.8	42	12	36		2	74	6			
21	6	L	PICO		11.0	36	21	28	25	3	79				
21	7	L	PICO		0.0	1	0			4		0	1		
21	8	L	ABLA		0.0	3	0			4			1		
21	9	L	ABLA		0.0	1	0			4			1		

REFNO	102					PROJSIZE	79							BAF	10		
SURVTYPE	S					PARCELNO	Multiple							FPS	300		
AFREFNO	S1021508					PARCSIZE	.							LARGEFPS	.		
DATALABL	Crystal Lakes Stand Exam Filing 15					CMPTMNT	"15"							SMALLFPS	.		
LANDOWNR	Crystal Lakes Road and Recreation Association					STAND	"08"							DEADBAF	.		
CONTACT	Dick Rosecrans					ACRES	5.7							DEADFPS	.		
STREET	300 Tami Rd.					OTHERID	Mixed ownership							NPOINTS	7		
CITY	Red Feather Lakes					ELEV	9150							GROPER	10		
STATE	CO					FORTYPE	LP							BKPNTDBH	5		
STATLONG	Colorado					PURPOSE	STAND EXAM							BKPNTDRC	.		
ZIP	80545					YEAR	1999							CREW	W.K.OLSEN		
PHONE	(970)881-2250					MONTH	"09"										
COUNTY	Larimer					DAY	"07"							REFPOINT			

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST	COMMENTS													
1	1	L	PICO	5	9.9	40	11	30		1			6				
1	2	L	POTR5		0.0	2	0			1				2			
2	1	L	PICO	5	1.2	8	1			1							
2	2	L	PICO		0.0	1	0							10			
2	3	L	PICO		0.0	3	0							1			
2	4	L	PICO		0.0	4	0							1			
3	1	L	PICO	8	1.5	10	1			2							
3	2	L	PICO		2.8	12	3			2							
3	3	L	PICO		1.7	11	4			2							
3	4	L	PICO		0.3	5	3			4		61					
3	5	L	PICO		0.8	6	2			4		61					
3	6	L	PICO		0.3	5	2			4		61					
3	7	L	PICO		1.2	10	3			3							
3	8	L	PICO		2.3	11	1			2							
3	9	L	PICO		1.8	11	0			2							
3	10	L	PICO		0.2	5	3			4		74					
3	11	L	PICO		0.0	4	2			4		61					
4	1	L	PICO		6.6	28	8	14		1		74	6				
4	2	L	PICO		1.2	7	0			3							
4	3	L	PICO		0.4	5	0			3			1				
4	4	L	PICO		1.8	11	2			4			0				
4	5	L	PICO		0.8	6	1			4			0				
4	6	L	PICO		0.0	4	0			3				1			
4	7	L	PICO		0.0	3	0			3				2			
4	8	L	PICO		0.0	2	0			3				2			
4	9	L	PICO		0.0	1	0			3				5			
4	10	L	PICO		0.0	3	0			4		74		1			
5	1	L	PICO		6.6	16	6	12	100	3		77	6				
5	2	L	PICO		6.6	26	10	22	30	3		74	6				
5	3	L	PICO		7.6	27	16	20		1			6				
5	4	L	PICO		0.0	3	0			2							
5	5	L	PICO		0.0	1	0			2							
6	1	L	PICO	5	1.2	8	0			2							
6	2	L	PICO		1.7	9	0			2							
6	3	L	PICO		2.0	9	0			2							
6	4	L	PICO		0.8	5	0			2							
6	5	L	PICO		0.6	6	0			2							
6	6	L	PICO		0.8	7	0			2							
6	7	L	PICO		0.5	6	0			2							
6	8	L	PICO		0.5	7	0			2							
6	9	L	PICO		0.8	7	0										
6	10	L	PICO		1.0	11	1			2							
6	11	L	PICO		2.3	11	2			2							
6	12	L	PICO		1.0	10	3			3							
6	13	L	PICO		1.0	8	3			3							
6	14	L	PICO		0.8	8	3			3							
6	15	L	PICO		0.0	4	0			3				4			
6	16	L	PICO		0.0	1	0			4				1			
6	17	L	PICO		0.0	2	0			4				1			
6	18	L	PICO		0.0	3	0			3				1			
7	1	L	PICO	5	0.3	5	0			1							
7	2	L	PICO		0.8	8	0			2							
7	3	L	PICO		1.2	8	0			2							
7	4	L	PICO		0.0	4	0			2				1			

7	5	L	POTR5	0.0	2	0		2	33

REFNO	102				PROJSIZE	79								BAF	30	
SURVTYPE	S				PARCELNO	Multiple								FPS	300	
AFREFNO	S1021509				PARCSIZE	.								LARGEFPS	.	
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.	
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"09"								DEADBAF	.	
CONTACT	Dick Rosecrans				ACRES	2.4								DEADFPS	.	
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	6	
CITY	Red Feather Lakes				ELEV	9150								GROPER	10	
STATE	CO				FORTYPE	LP								BKPNTDBH	5	
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.	
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN	
PHONE	(970)881-2250				MONTH	"09"										
COUNTY	Larimer				DAY	"07"								REFPOINT		

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST	COMMENTS													
1	1	L	PICO	5	6.7	40	23	31		2			5			2	102
SI																	
1	2	L	PICO		8.4	40	21	30	5	2		72	5				
1	3	S	PICO		8.5	47											
2	1	L	PICO	3	7.0	38	11	29		2			6				
2	2	L	PICO		6.3	38	30	30		2			6				
2	3	L	PICO		8.3	42	22	34		2			6				
2	4	L	PICO		7.1	42	26	28		2		76	6				
2	5	L	PICO		7.8	41	11	30		2			6				
2	6	L	PICO		8.8	41	21	27	30	2		72	6				
2	7	L	PICO		9.2	44	26	35		1			6				
2	8	L	PICO		8.2	40	20	33		2			6				
3	1	L	PICO	6	1.8	13	2			2							
3	2	L	PICO		1.0	8	1			3							
3	3	L	PICO		0.4	5	0			3							
3	4	L	PICO		0.0	4	0			3				1			
4	1	L	PICO	11	5.6	26	2	14		2			4				
4	2	L	PICO		8.0	30	2	16		1			4				
4	3	L	PICO		5.2	24	6	14		2			0			7	36
4	4	L	PICO		8.9	29	4	16		1			2				
4	5	L	PICO		1.8	12	4			4			0				
4	6	L	ABLA		0.8	7	0			4		61					
4	7	L	PICO		0.0	1	0			4		61		3			
5	1	L	PICO	6	8.4	31	6	22		1		72	4				
5	2	L	PICO		0.4	6	2			4			0				
5	3	L	PICO		0.3	5	0			4			0				
5	4	L	PICO		0.0	3	0			4			0	3			
5	5	L	PICO		0.0	2	0			4			0	9			
5	6	L	PICO		0.0	1	0			4			0	4			
6	1	L	PICO		6.1	38	32	28		2		76	5				
6	2	S	PICO		5.1	32											
6	3	L	PICO		5.8	36	24	28									
6	4	L	PICO		5.5	32	13	22		3			6				
6	5	L	PICO		7.4	36	11	24		2			5				
6	6	L	PICO		7.1	38	19	27		2			6				
6	7	L	PICO		0.8	5	3			4		61	6	1			
6	8	L	PICO		0.0	3	1			4		61	6	1			

REFNO	102				PROJSIZE	79								BAF	10		
SURVTYPE	S				PARCELNO	Multiple								FPS	300		
AFREFNO	S1021510				PARCSIZE	.								LARGEFPS	.		
DATALABL	Crystal Lakes Stand Exam Filing 15				CMPTMNT	"15"								SMALLFPS	.		
LANDOWNR	Crystal Lakes Road and Recreation Association				STAND	"10"								DEADBAF	.		
CONTACT	Dick Rosecrans				ACRES	1.5								DEADFPS	.		
STREET	300 Tami Rd.				OTHERID	Mixed ownership								NPOINTS	5		
CITY	Red Feather Lakes				ELEV	9150								GROPER	10		
STATE	CO				FORTYPE	LP								BKPNTDBH	5		
STATLONG	Colorado				PURPOSE	STAND EXAM								BKPNTDRC	.		
ZIP	80545				YEAR	1999								CREW	W.K.OLSEN		
PHONE	(970)881-2250				MONTH	"09"											
COUNTY	Larimer				DAY	"06"								REFPOINT			

PNT	TREE	STATUS	SPECIES	SLOPE	DBH	HT	HT2CR	HT3IN	DEFECT	VLAYR	I&D	DAMDTH	DM	TALLY	HTGRO	RADGRO	AGE
PCTDWD	CONSER	AZ	DIST	COMMENTS													
1	1	L	PICO		1.5	10	0										
1	2	L	PICO		0.3	6	0										
1	3	L	PICO		0.6	9	0										
1	4	L	PICO		0.8	8	0										
1	5	L	PICO		0.3	6	0										
1	6	L	PICO		1.2	11	0										
1	7	L	PICO		1.2	11	0										
1	8	L	PICO		0.5	6	0										
1	9	L	PICO		0.5	6	0										
1	10	L	PICO		2.1	11	0										17
1	11	L	PICO		1.8	11	0										
1	12	L	PICO		0.0	3	0										
2	1	L	PICO	10	1.0	8	0							11			
2	2	L	PICO		1.4	10	0										
2	3	L	PICO		2.3	12	0										
2	4	L	PICO		2.9	14	0										
2	5	L	PICO		1.0	9	0										
2	6	L	PICO		2.8	14	0										
2	7	L	PICO		3.5	16	0										
2	8	L	PICO		0.0	3	0							2			
3	1	L	PICO	8	2.7	16	0										
3	2	L	PICO		1.0	13	0										
3	3	L	PICO		0.3	5	0										
3	4	L	PICO		0.8	8	0										
3	5	L	PICO		1.7	12	0										
3	6	L	PICO		1.2	11	0										
3	7	L	PICO		2.6	16	0										
3	8	L	PICO		0.2	5	0										
3	9	L	PICO		1.0	10	0										
3	10	L	PICO		1.0	10	0										
3	11	L	PICO		2.3	16	0										
3	12	L	PICO		0.8	12	0										
3	13	L	PICO		2.8	16	0										
3	14	L	PICO		2.5	14	0										
3	15	L	PICO		0.8	9	0										
3	16	L	PICO		2.5	13	0										
3	17	L	PICO		0.8	10	0										
3	18	L	PICO		0.0	3	0							3			
4	1	L	PICO		0.8	5	0										
4	2	L	PICO		0.5	8	0										
4	3	L	PICO		0.2	5	0										
4	4	L	PICO		3.5	14	0										
4	5	L	PICO		2.1	11	0										
4	6	L	PICO		2.0	12	0										
4	7	L	PICO		1.2	10	0										
4	8	L	PICO		1.7	12	0										
4	9	L	PICO		0.2	5	0										
4	10	L	PICO		0.8	7	0										
4	11	L	PICO		0.5	7	0										
4	12	L	PICO		1.5	10	0										
4	13	L	PICO		0.8	8	0										
4	14	L	PICO		0.8	8	0										
4	15	L	PICO		3.5	13	0										
4	16	L	PICO		0.2	5	0										

4	17	L	PICO		0.0	4	0	B
4	18	L	PICO		0.0	2	0	1
5	1	L	PICO	5	3.2	14	0	
5	2	L	PICO		2.0	10	0	

APPENDIX D

FID

Forest Insect & Disease Leaflet 18

U.S. Department of Agriculture Forest Service

Lodgepole Pine Dwarf Mistletoe

Frank G. Hawksworth[1] and Oscar J. Dooling[2]

F-784122

Lodgepole pine dwarf mistletoe (*Arceuthobium americanum* Nutt. ex Engelm.) is a native, parasitic, seed plant that occurs essentially throughout the range of lodgepole pine in North America. It is the most damaging disease agent in lodgepole pine, causing severe growth loss and increased tree mortality.

Surveys in the Rocky Mountains show that the parasite is found in one- to two-thirds of commercial lodgepole pine stands. Recent assessments of the effects of lodgepole pine dwarf mistletoe in Montana, Colorado, and Wyoming indicate that the annual loss exceeds 40 million cubic feet (1.1 million m³) per year.

Acceptable yields cannot be expected from stands infested when they are young. For example, 100-year-old stands that have been infested for 70 years averaged only 300 cubic feet (8 m³) of wood per acre, while healthy stands of the same age on similar sites averaged 2,350 cubic feet (65 m³) of wood per acre.

Hosts

In the United States, the principal host of *Arceuthobium americanum* is lodgepole pine. It is occasionally found on Jeffrey, limber, and ponderosa pines. Engelmann spruce, blue spruce, whitebark pine, and Rocky Mountain bristlecone pine may sometimes be infected.

In Canada, the principal hosts are lodgepole pine in British Columbia and Alberta and jack pine from Alberta to Ontario. In British Columbia, the parasite has also been found on shore pine, which is the low-elevation subspecies of lodgepole pine along the Pacific Coast. It has not been reported on this tree in the United States.

Figure 1 shows the distribution of lodgepole pine dwarf mistletoe in North America.

[1] Research Plant Pathologist, U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station, Fort Collins, Colo.

[2] Plant Pathologist, U.S. Department of Agriculture, Forest Service, Cooperative Forestry and Pest Management, Northern Region, Missoula, Mont.

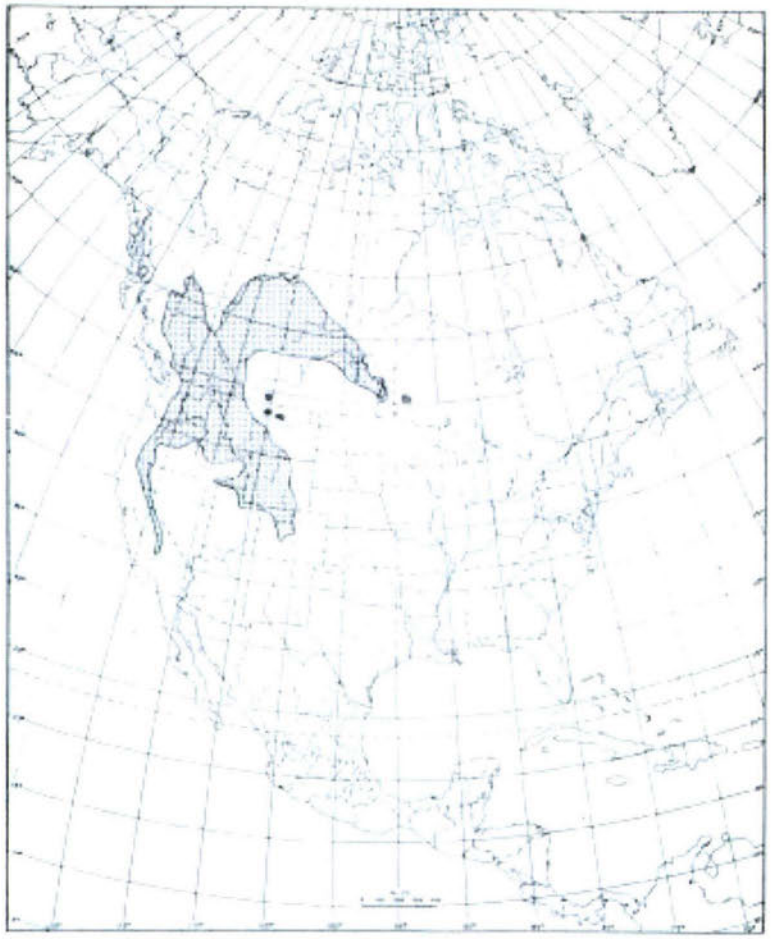


Figure 1—*Distribution of* Arceuthobium americanum *in North America.*

Appearance of Stands

Recently infested stands show few abnormalities except swellings and inconspicuous dwarf mistletoe shoots on branches and main stems.

Where the parasite has been present for a long time, the stand will have several groups of heavily damaged trees surrounded by increasingly healthier zones of trees. Affected trees are characterized by abnormally tufted branches. These growths, which are caused by the dwarf mistletoe, are called witches' brooms. (See cover photo.)

Brooms of another type—stimulation brooms—are frequently mistaken for those caused by dwarf mistletoe. Stimulation brooms are usually denser than dwarf mistletoe brooms (fig. 2). They occur in formerly suppressed trees or trees with dead or broken-out tops and are most common in residual trees left in cutover areas.

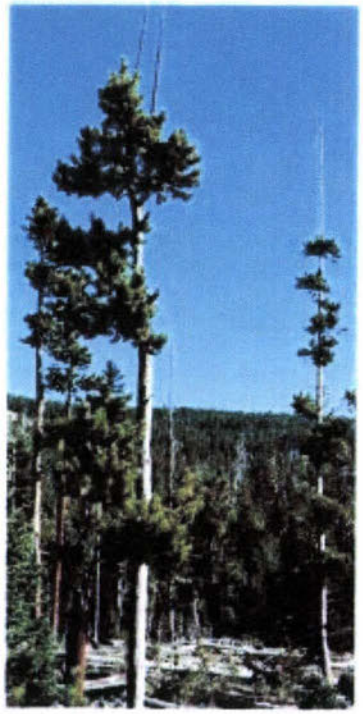


Figure 2—*Stimulation brooms, frequently mistaken for those caused by dwarf mistletoe.*

Damage

Older trees with well-developed, vigorous crowns may not show appreciable effects from the parasite for years after initial infection. As the parasite spreads through the crown, however, the tree's growth slows; eventually the crown dies and then the tree. Insects, particularly secondary bark beetles, frequently invade heavily infected trees and kill them.

Dwarf mistletoe also reduces seed production of the host trees and can cause commercially unacceptable deformities such as cankers and knots (fig. 3). Wood quality is also adversely affected.

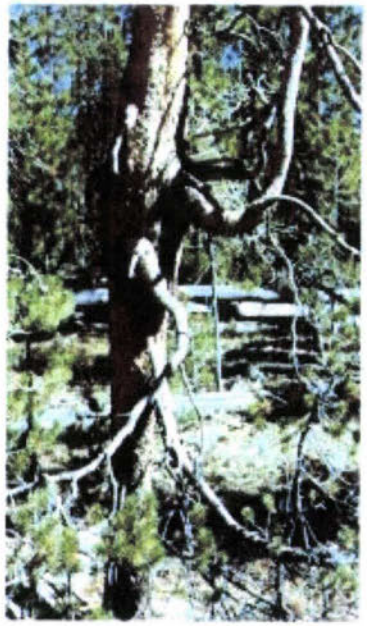


Figure 3—*Heavy dwarf mistletoe infection has distorted the trunk of this lodgepole pine.*

Growth losses attributed to dwarf mistletoe are related to the degree of infection, and a six-class system for

rating dwarf mistletoe intensity has been devised (fig. 4). Using the dwarf mistletoe rating system, the crown is visually divided into thirds. Each third is given a rating: 0 for no infection, 1 for light infection (less than half the branches infected), and 2 for heavy infection (more than half the branches infected). The ratings for each third are then added to obtain a tree rating. A tree heavily infected in each third would be rated class 6. The ratings of all live trees are averaged to obtain a stand rating, which can be used to estimate net volume growth per acre (table 1). This information is also used to make management decisions, such as when to plan thinnings or harvest cuttings in infested stands.

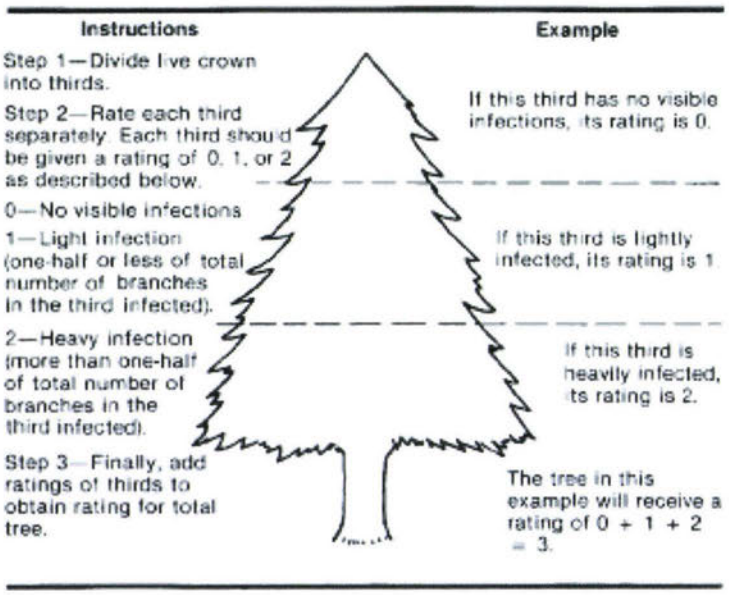


Figure 4—*Instructions and example of the use of the six-class mistletoe rating system.*

Life Cycle

Dwarf mistletoe is a parasitic seed plant. On the host tree's stem and branches, it produces slender, leafless, jointed shoots, which are olive-green to yellow in color. The principal function of these shoots is reproduction.

The plants are about half male and half female. The plants flower in the spring (March–June) (fig. 5). The flowers, which are pollinated by insects and wind, mature in about 15 months. Only the female plant bears the fruits that spread the disease (fig. 6).

Each berrylike fruit contains a single seed. At maturity, the elastic outer case of the fruit, which is under high hydrostatic pressure, breaks from its base, contracts violently, and shoots the seed into the air (figs. 7 and 8). The seeds travel at speeds of up to 60 miles (100 km) per hour. They can reach distances of up to 30 feet (9 m), but most seeds fall within 10 to 15 feet (3–5 m) of the source tree. The dispersal period is usually limited to about 3 weeks from late August to mid-September, although the period varies with the location and elevation.

A sticky substance (viscin) surrounds each seed and holds it fast to its landing surface. When seeds land on pine needles and the viscous coating is moistened by rain, the seeds slide down the needles. Some may be lost, but many are successfully transferred to the twigs. In the spring, the seeds that settled on twigs germinate, establish their root system in the bark, and start new infections. An incubation period of at least 3 to 5 years must elapse before the first shoots are produced (fig. 9).

The shoots bear the flowers and fruits, but synthesize little food. The parasite gathers nourishment through the network of absorbing strands within the pine's cortex and xylem (fig. 10).

Table 1—*Comparative effects of dwarf mistletoe intensity on volume growth based on average site conditions in the Rocky Mountains*

Average stand dwarf mistletoe rating	Mean net annual volume growth per acre
	Cubic feet
0	30
0.1 to 1.0	30
1.1 to 2.0	29
2.1 to 3.0	25
3.1 to 4.0	19
4.1 to 5.0	4
5.1 to 6.0	−24

Dispersal

Dwarf mistletoe spread depends primarily on the explosive force of the fruits. The presence of isolated infection centers, however, implicates birds or mammals in the dispersal of the parasite for long distances.

Dwarf mistletoe spreads at a rate of about 1 to 2 feet (0.3–0.6 m) per year through single-storied stands. The rate is more rapid in open than in dense stands. Similarly, it spreads faster in multistoried stands than in single-storied stands. The most rapid spread is from an open overstory to a vigorous understory.

Studies made in regenerated clearcuts in the Rocky Mountains (mainly in stands 10 to 25 years old) showed that 89 percent of the infected trees were within 30 feet (9 m) of the residual stand and 98 percent within 40 feet (12 m). Although about 85 percent of the young stands adjacent to infected overstory trees were

F-704329

Figure 5—*Male dwarf mistletoe plant in flower (spring). Note the three- or four-parted flowers with an anther on each segment.*

F-704328

Figure 6—*Female dwarf mistletoe plant with nearly mature fruit on bole of lodgepole pine sapling.*

infected before they were 10 years old, only a very small proportion of the trees were infected. Infection, however, increased rapidly in stands over 15 years old. Between ages 15 and 30, the percentage of infected trees essentially doubled each 5 years.

Ecology

Dwarf mistletoe development depends directly on the vigor of the host tree: the more vigorous the tree, the more vigorous the mistletoe. On good sites with vigorous hosts, the proportion of trees infected is higher than on poor sites, although the effects of the parasite are less on better sites.

As yet, little information is available on the distribution and intensity of dwarf mistletoe in various lodgepole pine habitats. In western Wyoming and southeastern Idaho, lodgepole pine dwarf mistletoe occurs more frequently in the subalpine fir-grouse whortleberry habitat type than in the Douglas-fir-pine grass habitat type. In the Medicine Bow National Forest in southeastern Wyoming, dwarf mistletoe is most common in stands that have a high proportion of grouse whortleberry ground cover; stands that have high coverage of elk sedge generally have less dwarf mistletoe.

Surveys indicate that *Arceuthobium americanum* generally occurs twice as frequently on ridges or hillsides than on bottom sites, apparently because of microclimatic effects.

In the Rocky Mountains, dwarf mistletoe is not found in a 300- to 500-foot (90–150 m) zone just below the upper elevational limits of the commercial lodgepole pine type. The upper limit of mistletoe ranges from

F-704327

Figure 7—*Diagram of mature dwarf mistletoe fruit and fruit just discharging its seed.*

about 9,200 feet (2,800 m) in northern Wyoming to nearly 11,000 feet (3,350 m) in central Colorado. In some areas, much of the commercial lodgepole pine lies in this dwarf mistletoe-free zone. The altitude limit for the mistletoe may be related to the short growing season, which is not long enough for the fruit to mature before severe frosts in the fall.

Fire affects dwarf mistletoe distribution. Partial burns that leave an open, infested overstory create an ideal situation for rapid infection of the regenerated stand. But large, complete burns can eliminate or greatly reduce the parasite, so it is of no further economic consequence in subsequent, regenerated stands. After a complete burn, dwarf mistletoe slowly invades the new stand from infected trees along the edges of the burn.

F-704328

Figure 8—*Expulsion of dwarf mistletoe seed.*

Control

Clearcutting is the best way to control dwarf mistletoe in mature lodgepole pine. All infected trees should be cut, or the sanitation value of the operation will be lost.

Clearcut units should have a low ratio of perimeter to area (fig. 11). Units should have a regular shape and be larger than 20 acres (8 ha). Narrow strips should be avoided. Cutting boundaries should be located in bottoms rather than on ridges and should pass through uninfected stands and natural or artificial openings where possible.

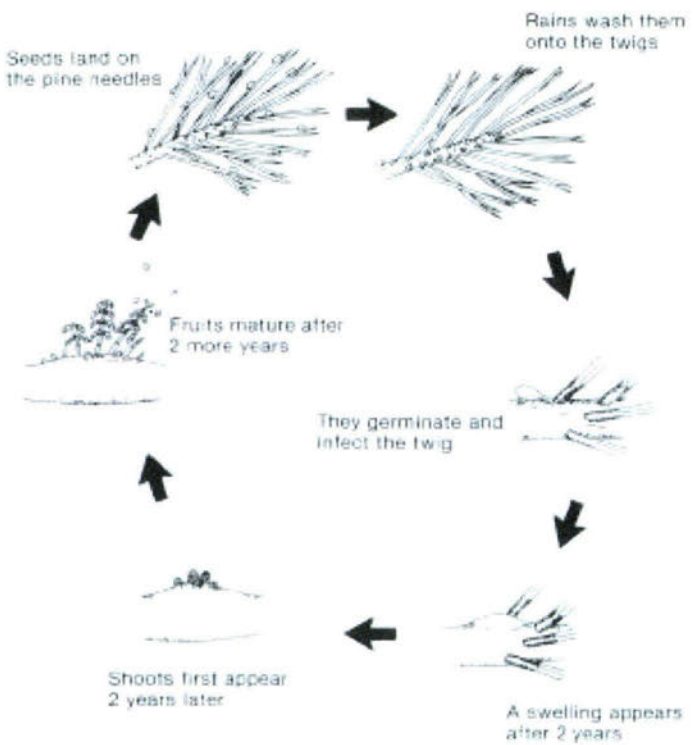


Figure 9—*Diagram of the typical lodgepole pine dwarf mistletoe life cycle from seed dispersal to mature plants.*

Even where stands are properly clearcut, some infection will develop in the regeneration bordering infected areas. Damage to the young stand will be relatively light if the residual blocks are cut within 10 years after the new stand is established.

In the past, partial cutting in dwarf mistletoe-infested stands has resulted in large acreages of heavily infested, uneven-aged stands; partial cutting in uneven-aged stands generally produces ideal conditions for rapid mistletoe spread.

Partial cutting is feasible in some infested, old-growth lodgepole pine stands, but timing of the final harvest cut is critical. The initial cut should be heavy enough to encourage regeneration. To minimize infection in the new reproduction, the final overstory cut should be made within 10 to 15 years, or before the reproduction is about 3 feet (1 m) high. If the infested overstory is left until the reproduction is larger, high infection levels in the reproduction could develop.

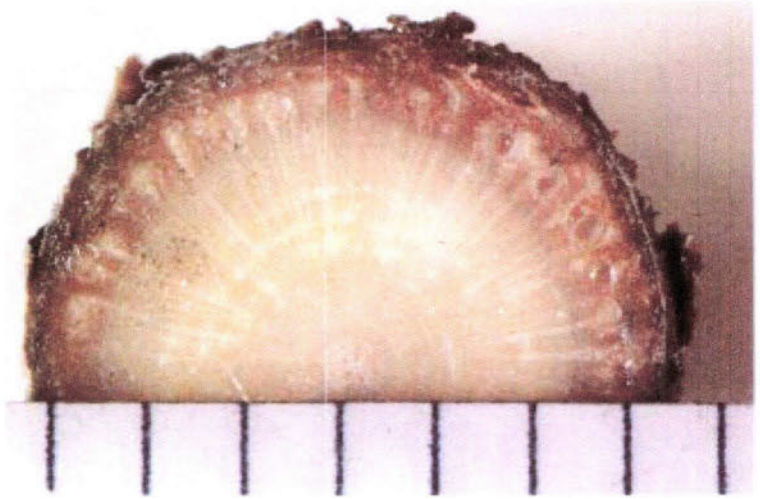


Figure 10—*Cross section of a lodgepole pine stem showing the parasite's root system in the bark and wood.*

Whether thinnings are feasible in mistletoe-infested lodgepole pine stands depends on several factors, including intensity of infection, site index, stand density, and stand age. As a general rule, thinning is recommended only in stands where infection is not too heavy—that is, stands with mistletoe ratings of 2 or less. At this intensity, about two-thirds of the trees are infected. Thinning should concentrate on cutting the most heavily infected trees. Thinning will usually not significantly increase yields in stands with average mistletoe ratings of over 2.

The Rocky Mountain yield (RMYLD) computer program for preparing simulated yield tables for infested stands can help determine which treatment (clearcut, partial cut, or thinning) will produce optimum yields. With the RMYLD program, it is possible to compare the predicted yields for a given stand under various management alternatives (thinning levels, cutting cycles, or rotation ages). Also, infested and healthy stands can be compared to determine the potential growth rates of the site.

Where lodgepole pines are of high value, as in recreational areas and homesites, infected branches may be pruned to save lightly infected trees. Before trees are pruned, any heavily infected trees nearby should be removed. When trees are pruned, all living branches up to two or more whorls above the highest visibly infected branch should be removed. The trees should be inspected within 3 to 5 years and pruned again, if needed.

Trees that have more than half of

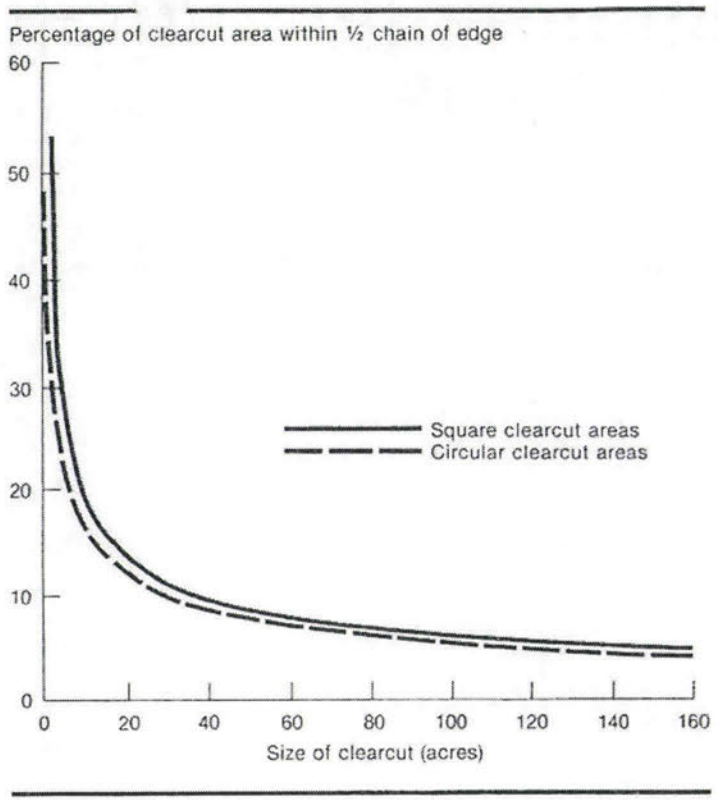


Figure 11—*Relationship of clearcut size to area within 1/2 chain (33 feet or 10 m) of the edge, which is the mistletoe seed-dispersal range from adjacent, infected trees.*

their crowns infected should not be pruned. Likewise, trees should not be pruned if branch infections have already reached a part of the trunk that measures 5 inches (13 cm) or less.

If an infection on a branch is close to the bole, the infection may have already reached the trunk. As a rule, the infection has reached the trunk if (1) branches are under 2 inches (5 cm) in diameter and the nearest mistletoe shoots are less than 4 inches (10 cm) from the bole or (2) branches are over 2 inches in diameter and the nearest mistletoe shoots are less than 5 inches (13 cm) from the bole.

Bole infections can be treated by periodically knocking off the mistletoe shoots and are not necessarily a reason for cutting the tree. Bole infections, particularly on parts of the bole over 5 inches (13 cm) in diameter, have little effect on tree growth; and since the plants produce very few seeds, the infections are not significant in spreading the parasite. Bole infections, however, can distort the trunk and cause commercially unacceptable deformities. (See fig. 3.)

No effective chemical or biological controls have been developed for the dwarf mistletoes. Even if they were available, proper forest management would still be necessary to control dwarf mistletoe in lodgepole pine stands.

References

Alexander, Robert R. Partial cutting practices in old-growth lodgepole pine. Res. Pap. RM-92. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; 1972. 16 p.

Baranyay, J. A. Lodgepole pine dwarf mistletoe in Alberta. Canadian For. Serv. Pub. 1286. Ottawa, ON: Canadian Department of Fisheries and Forestry; 1970. 22 p.

Dooling, Oscar J.; Pye, Laurel H.; Eder, Robert G. Dwarf mistletoe loss assessment on the Bitterroot and Lolo National Forests, Montana. For. Ins. and Dis. Manage. Rep. 80-14, Missoula, MT: U.S. Department of Agriculture, Forest Service, Northern Region; 1980. 12 p.

Edminster, Carleton B. RMYLD: Computation of yield tables for even-aged and two-storied stands. Res. Pap. RM-199. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; 1978. 26 p.

Hawksworth, Frank G. Dwarfmistletoe brooms and other brooms in lodgepole pine. Res. Note RM-59. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; 1961. 3 p.

Hawksworth, Frank G. Dwarf mistletoe and its role in lodgepole pine ecosystems. In: Baumgartner, D. A., ed. Proceedings, symposium on management of lodgepole pine ecosystems; 1973 October; Pullman, WA. Pullman, WA: Washington State University; 1975; 1: 342-358.

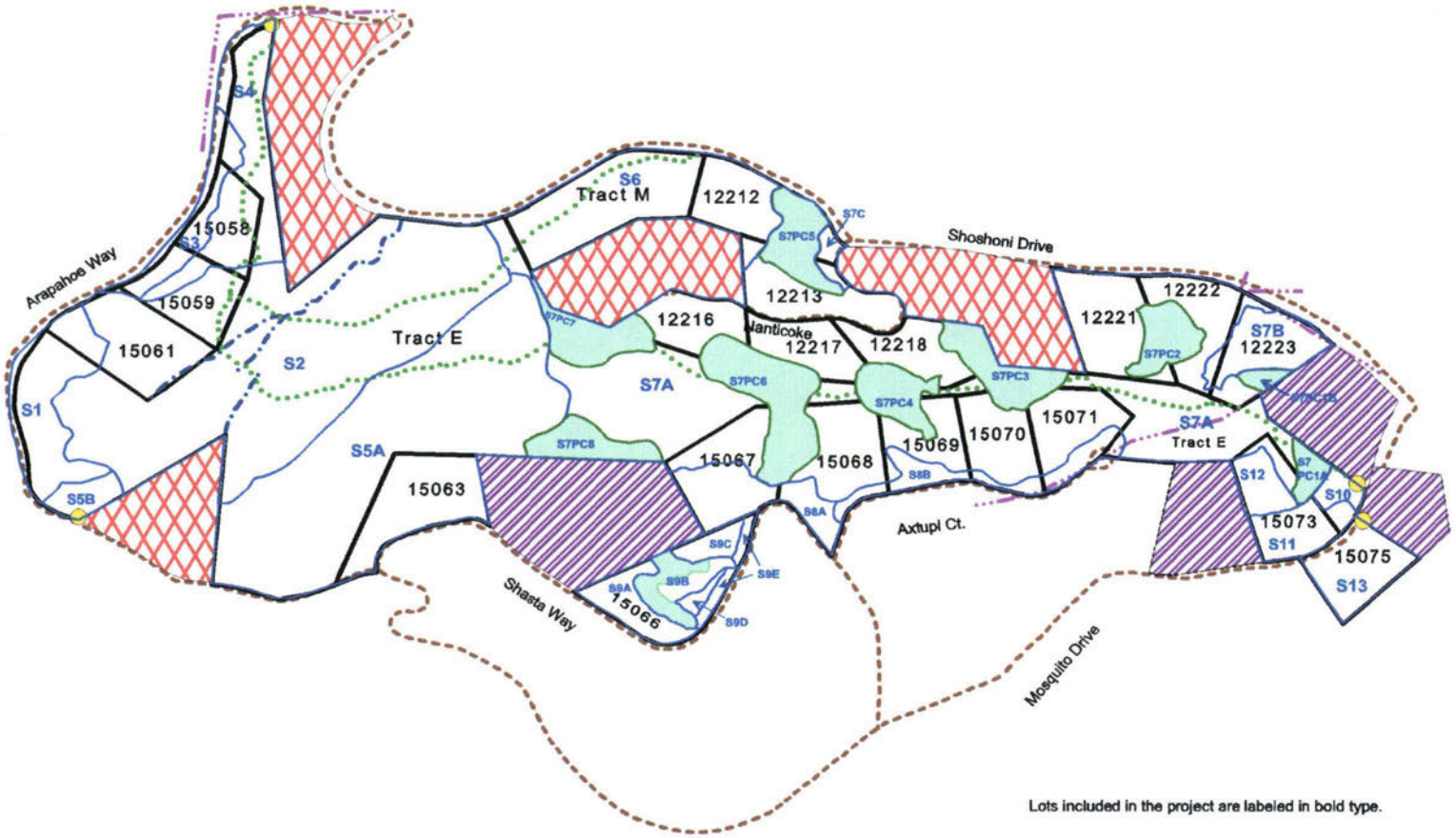
Hawksworth, Frank G. The 6-class dwarf mistletoe rating system. Gen. Tech. Rep. RM-48. Fort Collins, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Forest and Range Experiment Station; 1979. 7 p.

Hawksworth, Frank G.; Hinds, Thomas E. Effects of dwarfmistletoe in immature lodgepole pine stands in Colorado. J. For. 62: 27-32; 1964.

Hawksworth, Frank G.; Hinds, Thomas E.; Johnson, David W.; Landis, Thomas D. Silvicultural control of dwarf mistletoe in young lodgepole pine stands. For. Ins. and Dis. Manage. Tech. Rep. R2-10. Lakewood, CO: U.S. Department of Agriculture, Forest Service, Rocky Mountain Region; 1977. 12 p.

Johnson, David W.; Hawksworth, Frank G.; Drummond, David B. Yield loss of lodgepole pine stands to dwarf mistletoe in Colorado and Wyoming National Forests. Plant Dis. 65: 437-438; 1981.

Crystal Lakes Road and Recreation Association / Greenbelt Committee
Forest Mangement Demonstration Project - Filing 15/12
Final Project Map October 2000.



Lots included in the project are labeled in bold type.

Legend

- Landowner not participating
- Landowner implementing treatments independently
- Hiking trail
- Stream
- Overhead Power Line
- Patch cuts
- Reference point
- Roads

0 500 feet

N

v. 012202

CLRRA Filing 15/12 Forest Management Demonstration Project

Marking Information and Project Implementation
(v. 6/14/00; please check for later revisions/additions)

Stand No.	Silvicultural Treatment	Mark Type	Marking Paint Color[1]
1	Overstory removal	Leave Tree; cut DBH=5"+	Yellow
2	Thin from below	Leave Tree	Yellow
3	Overstory removal	Leave Tree; cut DBH=5"+	Yellow
4	Thin from below	Cut Tree	Blue
5	Seedcut/Shelterwood	Leave Tree	Yellow
6	Thin from below	Leave Tree	Yellow
7A	Crown thinning	Cut Tree	Blue
7B	Patch cuts	Patch Cut/Leave Tree	Yellow
8	Overstory removal	Leave Tree; cut DBH=5"+	Yellow
9	Mixed	Leave Tree; cut DBH=5"+	Yellow
10	Thin from below	Approx. 9x9 spacing	-

[1]Yellow paint is used for leave-tree marks; blue paint is used for cut-tree marks.

TIMBER MARKING NOTES:

Refer to the above guide to determine the method used for designating leave and cut trees. See the Management Plan maps for *approximate* locations of stand boundaries, project and stand objectives, and applied silvicultural prescriptions for your property. A revised map is in preparation.

To implement silvicultural treatments, methods are applied for specifying which trees are to be cut and which trees are retained. "Marked stands" contain trees marked with special paint; unmarked stands utilize specific written specifications for tree selection. In the list above, marked stands are indicated with a marking paint color of yellow or blue.

1. In a marked stand, paint is used to specify which trees will be cut (cut trees: blue paint) or not cut (leave trees: yellow paint). Color is mutually exclusive, i.e. only one color of paint is used in any one stand.

2. Unmarked stands utilize written specifications for the designation of trees to be removed and retained.

3. Limits on tree diameter at breast height (known as "DBH", measured on a tree at 4.5 feet above the ground) are used to further provide directions to the logger. In the table above, the lower diameter limit specified is the diameter at breast height for tree cutting. For example, in Stand 1, an overstory removal has been prescribed. All trees with DBH>=5.0" are to be cut, except for leave trees marked with yellow paint. In this instance, only wildlife snags (dead trees) are likely to be marked with yellow paint.

   Patch cuts are small clearcuts requiring removal of all trees, to promote establishment of new and healthy forests. Tree marking paint is generally not used in diameter limit cuts and patch cuts, but for this project, wildlife snags, and a small number of select large trees of preferred species, have been marked as leave trees with yellow paint in some patch cuts.

Please refer to the Management Plan for more information on these treatments.

FLAGGING COLORS:

Blue:	common boundaries between stands
Yellow:	patch cut boundaries within Stand 7
Blue stripes on white:	marks temporary trails, when designated, for skidding logs
Red polka-dots on white:	designated landings for log piling and loading operations
Single orange flagging and wood lathe:	location of lot survey markers (metal pins with survey caps)
Orange flagging/ orange paint on trees:	designates project boundaries along private lots of non-participating or independently-contracting landowners. Orange paint faces INTO treated stands. These boundaries will be heavily marked after the list of fully participating landowners is finalized.
Pink glo w/print:	Denotes special streamside management zone within Stand 2. Printed with "Streamside Management Zone" in black ink.

PLEASE HELP WITH THE SUCCESSFUL IMPLEMENTATION OF THIS PROJECT

The contract between CLRRA and the timber harvester is a legally binding agreement. Specifications will refer to field preparations needed to achieve silvicultural objectives, and specific marking, flagging and signage applications to guide administration of the timber sale will be referenced in the contract. **All field work must remain unaltered** to legally and fairly administer and enforce obligations required of the contractor, and of CLRRA, in implementing services and treatments for the project.

1. Do not alter any of the timber marking paint in any way.

2. DO NOT CUT ANY TREES ON YOUR PROPERTY until the Demonstration Project is complete. Administration of the timber sale contract requires that the forester is able to determine that the correct trees are cut, and that other contractual specifications are met by the logger. In addition, the logger MUST be assured that the trees offered at the time of the bid are the trees that are available at the time of harvest.

3. Do not add or remove flagging.

4. Signs will be posted to designate certain stand, treatment and property boundaries. Please do not alter or remove signs.

5. Slash piles will be oriented and sized to reduce heat/radiation damage to live trees. Please do not alter, move or add to slash piles created by the logger.

6. Timber harvesting is extremely dangerous. It is not possible for a logger to operate when people are present in the area. Noise and activities can prevent the logger from recognizing when people are nearby, and distractions can result in severe injury or death to the logger and/or to visitors. Please stay far away from **all** logging operations and **all** tree felling operations.

Remember: just because you see a logger does not mean the logger sees you!

Thank you for your cooperation. We look forward to achieving a safe, successful and beneficial forest management project.

ADVANCED
FORESTRY

WILLIAM K. OLSEN
(970) 495-1719

RESOURCE ANALYSIS
AND CONSULTING
FORESTRY SERVICES
FOREST RESEARCH
SEMINARS

247 Falls Creek Drive
Bellvue, Colorado 80512

September 22, 1999

Mr. Bill Smythe
Greenbelt Committee
Crystal Lakes Road and Recreation Association
800 Tami Road
Red Feather Lakes, CO 80545

Dear Mr. Smythe,

Enclosed you will find the completed report titled "Analysis and Recommendations for a Forest Management Demonstration Program - Crystal Lakes Road and Recreation Association - Filing 15/12" .

The following topics are included in the report for the proposed Demonstration Area:

1. An analysis of forest conditions

2. A proposed decision-making structure incorporated in a management plan framework

3. Specific stand-by-stand treatment recommendations

4. Estimates of standing timber volumes, timber removals based on recommended silvicultural treatments, and estimates of stumpage value for several pricing scenarios

5. Supporting data

I recommend that the Greenbelt Committee first review the report in its entirety. Before decisions are made regarding on-the-ground treatments, the Committee may wish to consider creation of a decision-making body, for which I have recommended a subcommittee or panel consisting of Greenbelt Committee members and participating landowners. That subcommittee would approve management objectives for the project that are incorporated into the management plan. Activities to be included in the management plan can then be resolved based in part on the stand-by-stand recommendations made in the report.

Thank you for the opportunity to conduct this assessment. If the report is satisfactory and meets your expectations, I will submit an invoice to the Association for the balance due to Advanced Forestry. I admire the willingness of the Greenbelt Committee, area landowners, and of the Association to evaluate forest conditions in the proposed Demonstration Area.

On the following page is an estimate of fees required for forestry services provided by Advanced Forestry if the Association decided to implement the recommended treatments. The estimate is based on several assumptions. First, all landowners are included as participants. Second, all areas in the 72 acres are treated as recommended. Third, timber harvesting is assumed to be completed over a 2-month period. Costs after the timber sale is closed, such as prescribed burning and precommercial thinning, are not included.

Treatment preparations Stand boundary marking Prepare final prescriptions and marking guides Timber marking Timber cruise Volume removal calculations Sale contract preparation "Show-me" trip Bid solicitation Contract finalization	$12,000
Sale administration Road and skid-trail layout Logging inspection and reviews Supervise and inspect sale-closing activities Closing report	$7,600
Expenses:	
Tree-marking paint	$550
Flagging	$20
Cutting unit signs	$230
Total Estimate	$20,400

This is approximately $284 per acre. For timber removed, the middle estimate of stumpage (standing) value for mixed products is about $25,000, or about $11,300 if valued only as fuelwood at a medium price. Stumpage estimates vary widely depending on price and product assumptions. (See Table 4 in the report.)

There are estimated to be 11,640 standing live trees on the Unit (diameter at breast height >= 5.0 inches). Of these, about 6620 trees would be removed if preferred current treatments were implemented. This includes about 60,080 merchantable cubic feet, or roughly 751 cords. About 68,900 merchantable cubic feet, or approximately 861 cords, would remain standing after this round of treatments.

Please feel free to call if you have any questions.

Special thanks go to Committee members and other volunteers that helped locate and flag Unit boundaries.

Yours Truly,

William K. Olsen

cc: Dick Rosecrans/CLRRA

FISHING CONTESTS AT BEAVER LAKE

by Inge Hongsermeier
Vice President, Fishing Board

July is fishing contests month at Crystal Lakes. Saturday, July 9 is Kids Fishing Derby for 2 categories, Children ages 5 to 8 and 9 to 14. Registrations begin at 8 AM. Children will select their own lures at time of registration and fishing starts at 9 AM. Prizes will be awarded for all age groups and must be picked up at the end of the contest by the winners. All children must be able to cast out and reel in their own catch. Everybody may catch 3 fish, siblings may help each other with netting. No parent may cross the yellow line. Please leave your pets at home, no exception.

Sunday, July 10, from 9 to 11 is Senior Fishing Derby. Registration begins at 8 AM. All seniors over the age of 65 are invited to participate in the contest. Any age physically challenged persons may also take part in the contest, with one attendant present, who may cast for the contestant, but may not reel in; if needed, help with netting is allowed. Three fish allowed per contestant.

Sunday afternoon, July 10, from 1 to 3 PM is Ladies Fishing Derby, for ages 15 to 64. Ladies, come and show your fishing skills, catch 3 of the biggest fish in the lake. Registration starts at noon. Trophies will be awarded for both morning and afternoon events.

Beaver Lake will be closed to the public for fishing from July 7 to July 10. Beaver Lake will be open for fishing for all ages, Monday, July 11. Thank you for your cooperation and come and have fun.

SUBSCRIPTION RATES

Ten issues per year at: Yearly rates
(FY =June 1 through May 31) $20.00
Each primary lot receives one complimentary copy of each issue of the *Wapiti Bugle* as part of membership.

GREENBELT COMMITTEE
L to R: John Holmboe, Bill Smythe, Hildie Kallweit, Glenda Wood. Not pictured: Gordon Lauts and David Smith

GREENBELT COMMITTEE

by Sharon Cooper

The Greenbelt Committee was formed in 1992 when the Developer of Crystal Lakes transferred the greenbelt properties to the Crystal lakes Road & Recreation Association. The purpose of the Greenbelt Committee is to maintain the beauty and health of approximately 400 acres of greenbelts and wetlands in Crystal Lakes.

Currently, the major greenbelt committee project is in the area between the 12th and 15th Filings surrounding Shasta Way, Mosquito, Shoshoni and Arapahoe Way. The committee receives advice from Bill Olsen, their hired forester. He advises which trees should be removed, thinned for fire abatement or what type of action should take place for the growth and health of the forest. The committee hires a professional logger to do the actual cutting and thinning of trees, as well as stacking slash for burning when enough snow is available.

In the past the Colorado State Forestry Service has given our Greenbelt Committee two matching fund grants that were matched by monies provided in the budget of the Crystal Lakes Road and Recreation Association.

The Greenbelt Committee usually meets at the Wapiti Center; however, they meet only when needed. Currently there are six volunteer committee members. They are: Bill Symthe, Chairman; John Holmboe, Hildie Kallweit, Gordon Lauts, David Smith and Glenda Woods. Bill Symthe has been Chairman of the Committee for about 5 years. Bill and his wife Ann plan to move from Crystal Lakes soon and he is resigning from the Committee effective June 1st, 2005. We thank these volunteers for their time and help maintaining our valuable and beautiful Crystal Lakes greenbelts.

The Association is looking for a new Greenbelt Chairperson. If you are interested is serving on this committee, call the Crystal Lakes Office.

CRYSTAL LAKES GREENBELT MANAGEMENT COMMITTEE (GMC)
MINUTES OF THE SEPTEMBER 14, 1994 MEETING

THE GMC meeting was called to order on September 14, 1994 at 4:00 p.m. at the Wapiti.
IN ATTENDANCE: Frank Hooper, Mary Roberts, Charlotte Lauric Ray Mehaffey and John Geter.

The minutes of the last two meetings were reviewed and approved as corrected.

OLD BUSINESS:
1. TRACK H, FILING 11 (THE MEADOW) Dick is talking with Don Weixelman for the completion of the west end of track H to provide access to tract H from that end, and also fence off a portion of the stream so the horses could have access to fresh water. The GMC feels this is a priority because of the potential liability of the watering tank.
2. BEAR GULCH AND MUMMY VIEW PARK MANAGEMENT PLAN: This extensive and well documented study was reviewed by Ray and resulted in the following motion.
RAY MEHAFFEY MOVED: GMC REQUESTS DICK ROSECRANS DIRECT WOOD CUTTERS TO THE BEAR GULCH GREENBELT AREA BORDERED ON OSAGE TRAIL AND OTTAWA WAY. THIS HAS BEEN DESIGNATED AS THE HIGHEST FUEL LOADING (15.8) TPA OF ANY POINT TAKEN IN THE STUDY. THE NORTHERN END OF BEAR GULCH BORDERED BY OSAGE TRAIL AND LOTS 42 AND 43 HAS A TPA OF 7.73 AND IS ALSO HIGH PRIORITY. MARY ROBERTS SECONDED THE MOTION WHICH PASSED UNANIMOUSLY.

Frank has secured access to these greenbelt areas thru Lots 42, 152 and 153. Downed timber removal will be our prime goal for the winter. Vegetation plans will be addressed later after the downed timber has been removed.
3.TRAILS: Mary is checking Asgard. Guidago from Hatchetumi Way to Shoshoni Dr. has been corrected.

NEW BUSINESS:
1. The two year terms of committee members Mary Roberts and Walt Wilson will expire in January of '95. These vacancies will be filled by appointment of the Association Board. The term of officers will also expire in January '95, the GMC will fill these offices. In March it was decided; because of the bookkeeping system, the Chairman will keep the financial records of the GMC and make the financial reports to the committee. Next officer elections will be for Chairman-Treasurer, Vice-Chairman and Secretary.
2. Frank reviewed expenditures of the GMC.
3. U.S. Forest Service has granted a timber cutting permit west of the 15th Filing

Next meeting: Wednesday October 26, 1994 at 4:00 p..m. at Wapiti .

Submitted by:
Charlotte Lauric
Charlotte Lauric
GMC Secretary

May 31, 1995

Dick Rosekrantz
C/O Crystal Lakes R & R
P.O. Box 158
Red Feather Lakes, CO 80545

Dear Dick,

The results of our confirmation survey of the MPB trees marked by Ed and his crew follow. This was the list, plus letters, that Kathy gave me this morning.

Filing 1, Lot 058
1 marked. Okay.
Filing 01, Lot 036
This is Ral0h's lot and we were to check it out. None found.
Filing 08, Lot 151
1 marked. 1 confirmed (lodgepole pine)
Filing 9, Lot 66
6 marked. 6 confirmed.
Filing 14, Lot 022
14 marked (actually 13), 2 added. Total now is 15.
Filing 14, Lot 024
23 marked (actualy 22), 3 added, 7 subtracted. Total now 18
Filing 14, lot 032
Marked trees cut and on ground, several not infested.
2 added. Total to go 2.
Filing 14, Lot 038
13 marked, 1 subtracted. Total now is 12.
Filing 14, Lot 039
33 marked (actually 27), 1 added, 3 subtracted. Total now 25
Filing 14, Lot 040
25+marked (actually 10), 2 subtracted. Total now is 8.
Filing 14, Lot 044
4 marked. Could not find current year marked trees.
Filing 14, Lot 049
2 marked. Cut already.
Filing 14, Lot 057
6 marked. Cut already. 2 were not infested.
Filing 14, Lot 059
None marked, 1 found. Total now is 1.

I took ribbons off of the trees subtracted. I put ribbons on the trees added. My ribbon is almost the same color as yours but is actually a flourescent yellow.

Let me know if you have more trees to check in the future.

Sincerely,

Tickler

1730
(11/91)

A G R E E M E N T

THIS AGREEMENT, made this 19th day of December, 1994, by and between the Greenbelt Management Committee of the Crystal Lakes Road and Recreation Association, c/o Frank Hooper P.O. Box 302, Red Feather Lakes, CO. 80545 hereinafter referred to as the LANDOWNER, and the State Board of Agriculture in behalf of the Colorado State Forest Service, Fort Collins District Forester, Bldg. 1052 Foothills Campus, Fort Collins CO 80523., hereinafter referred to as the CONTRACTOR; and

WHEREAS, the CONTRACTOR has the expertise to provide forest practice services; and

WHEREAS, the LANDOWNER desires to implement forest practices as described in this Agreement.

NOW, THEREFORE, it is hereby agreed that:

1. LANDOWNER warrants that he/she is the owner of the property described as follows or has obtained authority from the owner of said property to grant all rights to CONTRACTOR provided for in this Agreement. The property is described as follows:

   The Panhandle Greenbelt Area more specifically shown as a portion of Tract A-12th Filing and Tract H-12th Filing and a portion of Filing 15 located in Sections 2 and 3, T10N, R74W, 6th P.M., Larimer County, Colorado.

   (The map attached to this agreement shows the proposed area outlined in red and shaded in flourescent yellow) Estimated 110 acres .

2. LANDOWNER grants to CONTRACTOR the right to access to the above described property for the following purposes.

   Inventory and management recommendations for vegetation and wildfire hazard within the greenbelts. Similiar to the plan and recommendations for the Bear Gulch and Mummy View Greenbelts completed in 1993. Plan is dated March, 1994.

   Include aerial fuels.

3. CONTRACTOR agrees to provide the services specified in Paragraph 2 of this Agreement in consideration for:

   Actual costs based upon rate of $ 24 per hour.

   Estimated cost is $ 744 which includes 2 copies of the plan. Additional copies at the rate of $7.00 per copy.

4. It is understood between the LANDOWNER and the CONTRACTOR that this Agreement shall begin on the date first above written, and shall remain in force until September 30, 1995.

5. This Agreement may be terminated by either party ten (10) days following written notice to the other party.

6. CONTRACTOR may assign the rights provided for in this Agreement to a subcontractor of its choice without obtaining the approval of the LANDOWNER.

7. The CONTRACTOR shall maintain during the life of this Agreement such liability insurance as is required by Colorado law.

8. This Agreement shall be extended due to inability of the CONTRACTOR to perform the work due to circumstances beyond his control or as mutually agreed to by the LANDOWNER and CONTRACTOR. All extensions will be written and become a part of this Agreement.

9. Financial obligations of CSFS payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available.

10. The CONTRACTOR agrees as part of this Agreement that it will comply with all applicable laws regarding discrimination on the basis of race, creed, color, sex, or handicap including but limited to Executive Order 11246 as amended or as may be further amended hereafter.

11. The laws of the State of Colorado and rules and regulations issued pursuant thereto shall be applied in the interpretation, execution and enforcement of this Agreement.

12. The signatories hereto aver that they are familiar with 18-8-301, et. seq., (Bribery and Corrupt Influences) and 18-8-401, et. seq., (Abuse of Public Office), C.R.S. 1973, as amended, and that no violation of such provision is present.

13. The signatories aver that to his/her knowledge no CSFS employee has any personal or beneficial interest whatsoever in the services or property described herein.

IN WITNESS WHEREOF the parties hereto have executed this Agreement on the day first above written.

LANDOWNER

b/ Frank Hooper

CONTRACTOR

ESTIMATE OF JOB

CRYSTAL LAKES GREENBELT - PANHANDLE CREEK

Vegetative Management Plan

Job: Vegetation and wildfire the same as on Bear Gulch and Mummy View Plans.

Size: Approximately 105 acres +- 10%
Tract A - 12th Filing (portion of)
Tract H - 12th Filing (all)
15th Filing (portions of-open space)

Labor:

Inventory -	Forester	16 hours @	$24 =	$ 384
	Seasonal	16 hours @	7 =	112
Maps, Data -	Seasonal	8 hours @	7 =	56
Write Plan -	Forester	8 hours @	$24 =	192
				$ 744

Provides 2 copies of Plan at this price.
Extra copies of Plan at $ 7/copy.

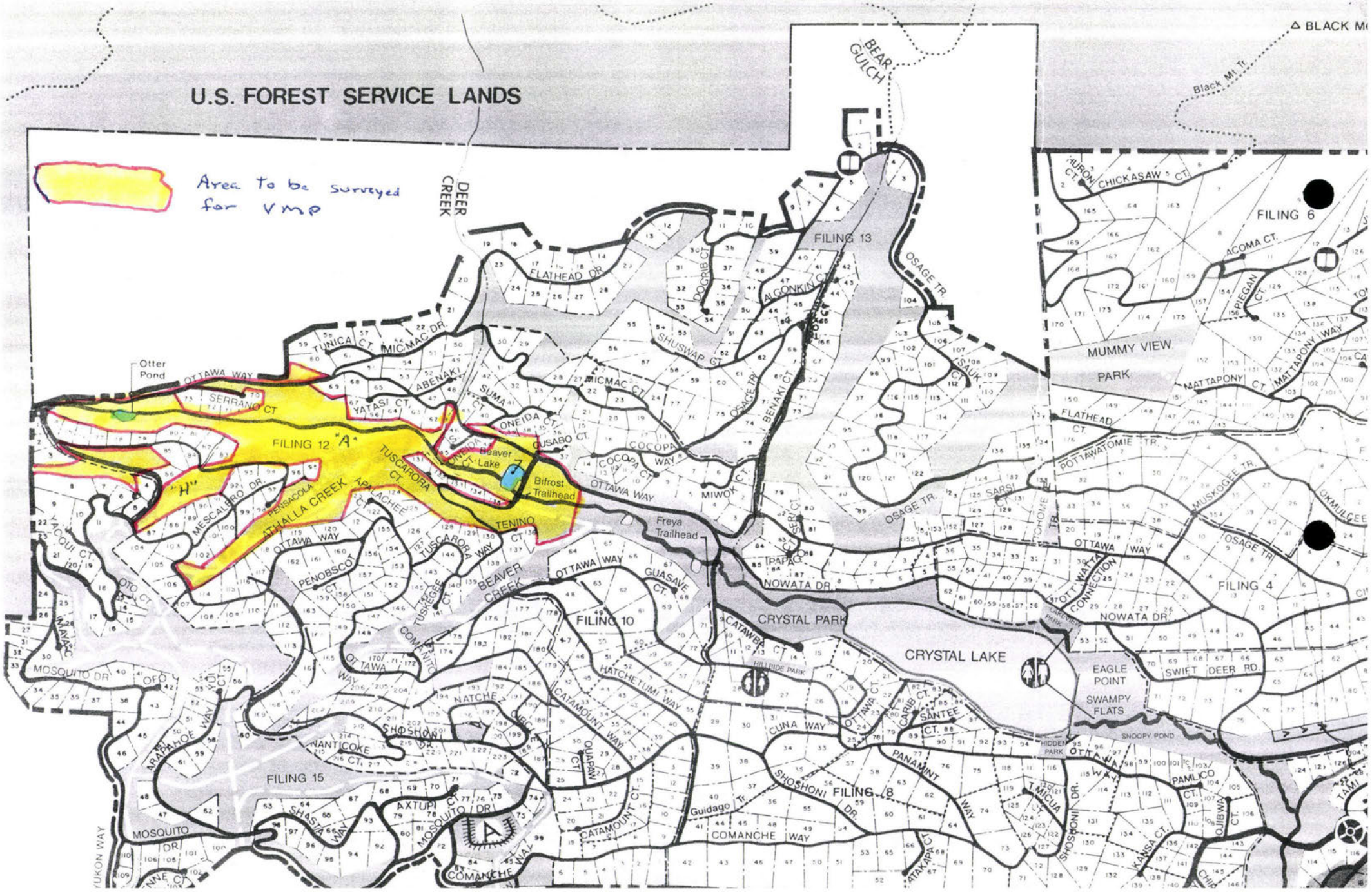
12/19/94

Portions of Sec. 2 & 3, T10N, R74W

District Copy

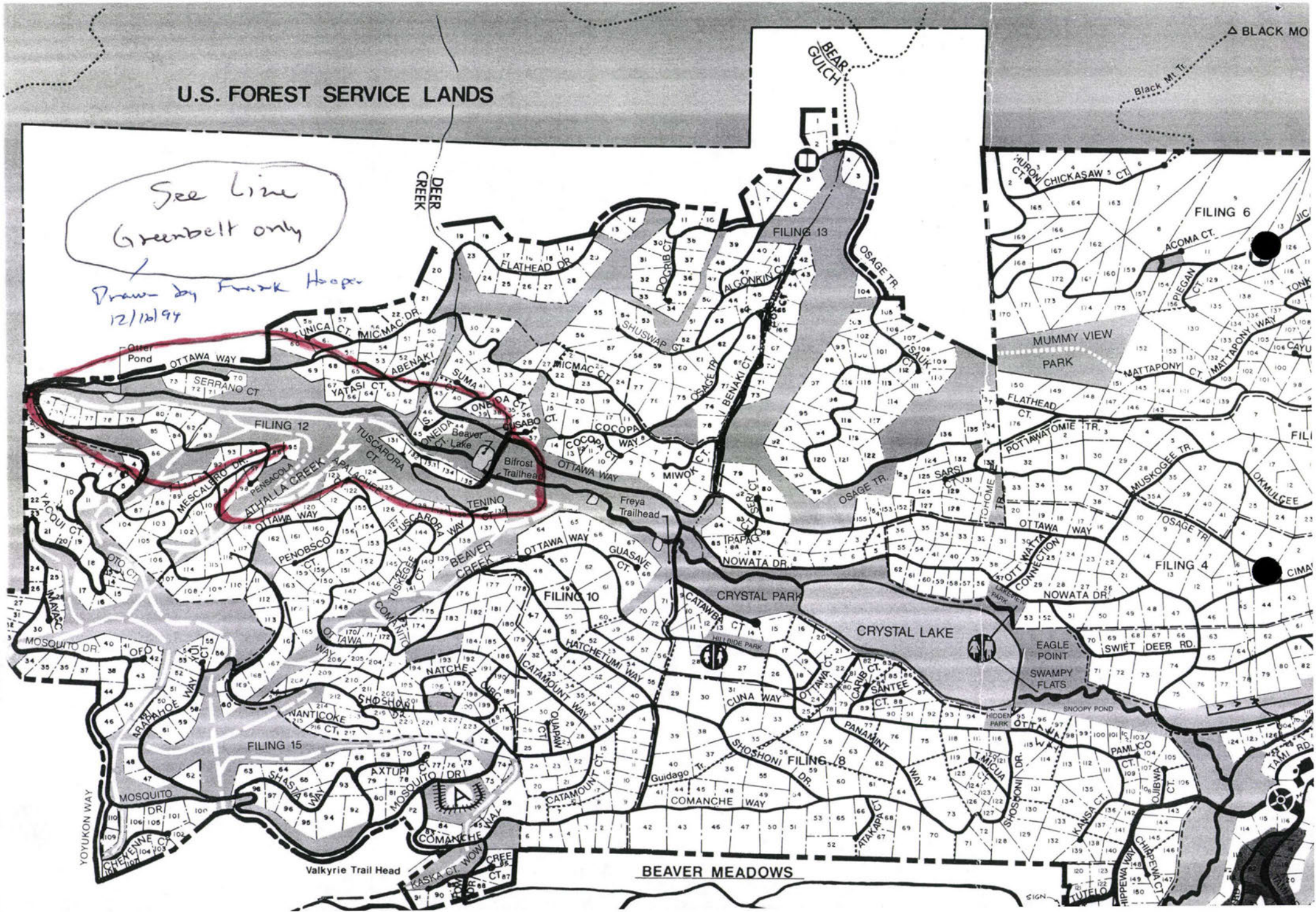
CRYSTAL LAKES MAP

Crystal Lakes
P.O. Box 158, Red



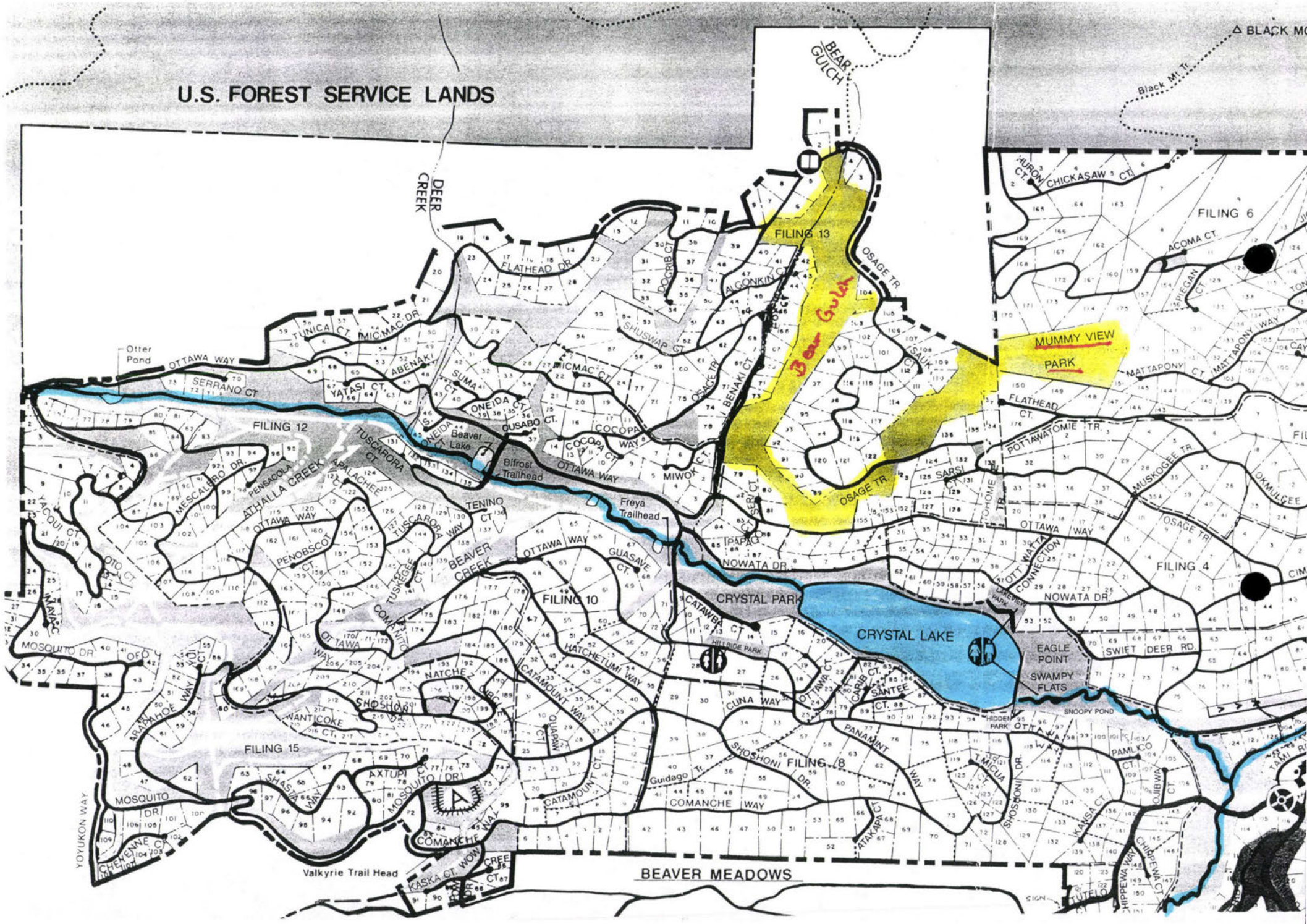
CRYSTAL LAKES MAP

Crystal Lakes
P.O. Box 158, Red F



CRYSTAL LAKES MAP

Crystal Lakes
P.O. Box 158, Red



RECOMMENDATIONS FOR BEAR GULCH VEGETATION MANAGEMENT
Greenbelt Management Committee
of
October 26, 1994

1. V1. Clean up aspen stand on north border.
   Fuelwood for property owners. 1 acre.

2. F2. Continue firewood removal.

3. F4. Remove or require adequate ground of TV antennas.
   Requires R & R Board action.

4. V2. Thin lodgepole pine near Flathead Drive.
   Can be commercial sale with revenue coming to homeowners association. 5+- acres. Should provide approximately $1,000 revenue. Need to pay a forester to mark the "leave" trees. Remove diseased trees.

   (V11) Treat slash. Pile & burn - volunteers at little cost.
   F1. Chip - Expensive. At least $ 700. Can use chips for erosion control.

5. V6.

Ray Mahaffey
10/26/94

7/9/93 Woodcutter

Gene Parryma
Tim Marion
Report to Frank (Ted's son)
To Frank by 20th of July (2)
6 copies
(1) SAR Cost to Frank

Photos of CL by Candy

1730
(11/91)

A G R E E M E N T

THIS AGREEMENT, made this 27th day of May, 1993, by and between Crystal Lakes Road & REcreation Association, Greenbelt Management Committee c/o Frank Hooper P.O. Box 302 Red Feather Lakes, CO, 80545. hereinafter referred to as the LANDOWNER, and the State Board of Agriculture in behalf of the Colorado State Forest Service, Fort Collins District Bldg. 1052 Foothills Campus, Fort Collins, CO 80523, hereinafter referred to as the CONTRACTOR; and

WHEREAS, the CONTRACTOR has the expertise to provide forest practice services; and

WHEREAS, the LANDOWNER desires to implement forest practices as described in this Agreement.

NOW, THEREFORE, it is hereby agreed that:

1. LANDOWNER warrants that he/she is the owner of the property described as follows or has obtained authority from the owner of said property to grant all rights to CONTRACTOR provided for in this Agreement. The property is described as follows:

   The Bear Gulch Greenbelt and Mummy View Park Greenbelt of Crystal Lakes

2. LANDOWNER grants to CONTRACTOR the right to access to the above described property for the following purposes.

   Inventory and mamagement recommendations for vegetation and wildfire hazard within the greenbelts.

3. CONTRACTOR agrees to provide the services specified in Paragraph 2 of this Agreement in consideration for:

   Actual costs up to $ 500.

Friday 8/27 4 PM

4. It is understood between the LANDOWNER and the CONTRACTOR that this Agreement shall begin on the date first above written, and shall remain in force until July 15, 1993.

5. This Agreement may be terminated by either party ten (10) days following written notice to the other party.

6. CONTRACTOR may assign the rights provided for in this Agreement to a subcontractor of its choice without obtaining the approval of the LANDOWNER.

7. The CONTRACTOR shall maintain during the life of this Agreement such liability insurance as is required by Colorado law.

8. This Agreement shall be extended due to inability of the CONTRACTOR to perform the work due to circumstances beyond his control or as mutually agreed to by the LANDOWNER and CONTRACTOR. All extensions will be written and become a part of this Agreement.

9. Financial obligations of CSFS payable after the current fiscal year are contingent upon funds for that purpose being appropriated, budgeted, and otherwise made available.

10. The CONTRACTOR agrees as part of this Agreement that it will comply with all applicable laws regarding discrimination on the basis of race, creed, color, sex, or handicap including but limited to Executive Order 11246 as amended or as may be further amended hereafter.

11. The laws of the State of Colorado and rules and regulations issued pursuant thereto shall be applied in the interpretation, execution and enforcement of this Agreement.

12. The signatories hereto aver that they are familiar with 18-8-301, et. seq., (Bribery and Corrupt Influences) and 18-8-401, et. seq., (Abuse of Public Office), C.R.S. 1973, as amended, and that no violation of such provision is present.

13. The signatories aver that to his/her knowledge no CSFS employee has any personal or beneficial interest whatsoever in the services or property described herein.

IN WITNESS WHEREOF the parties hereto have executed this Agreement on the day first above written.

LANDOWNER

Frank D. Hogen, Chairman

Richard G. Cross, Managers

CONTRACTOR

Ray Mehaffey

Fire Hazard of Bear Gulch and Mummy View Areas

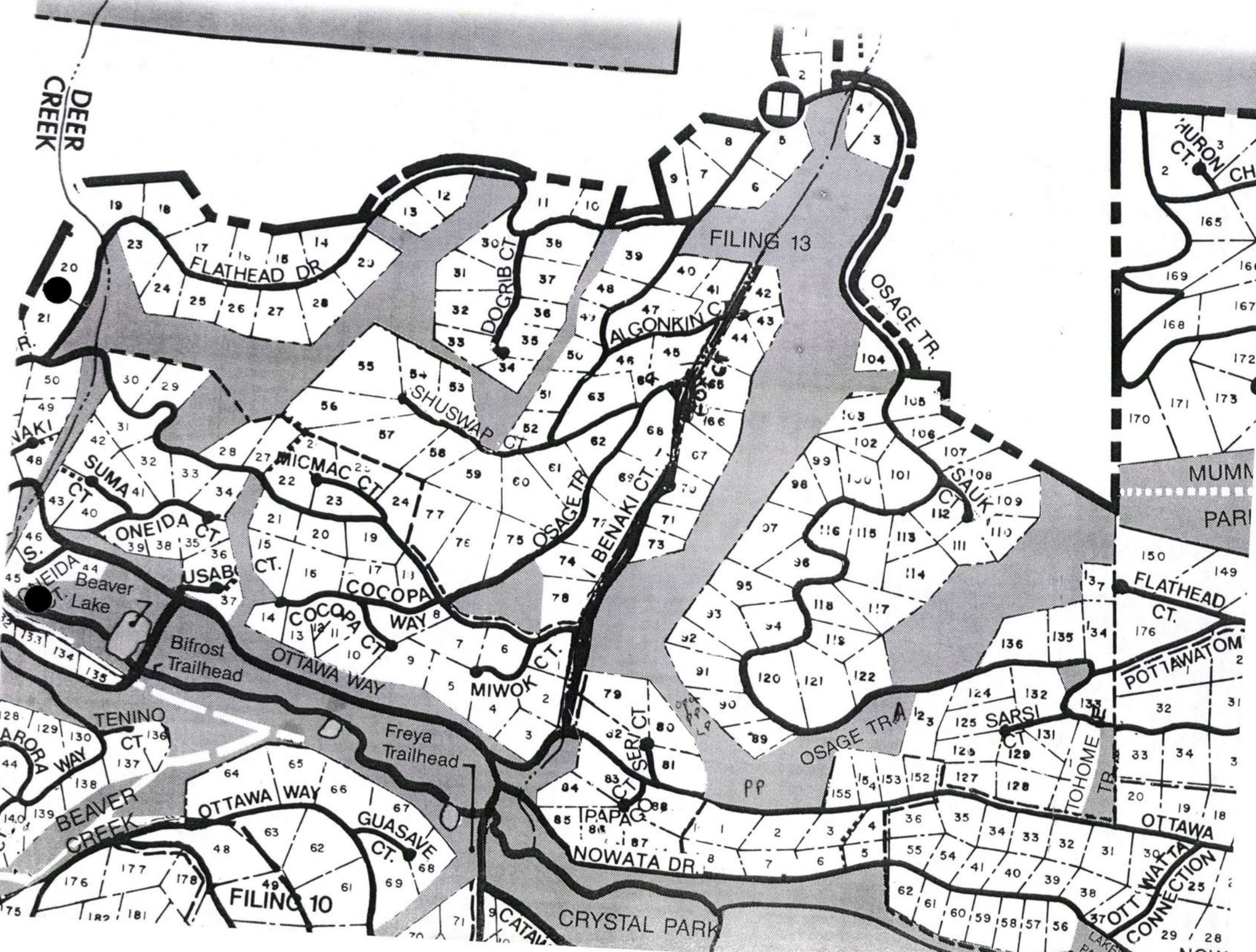
An important consideration in forest management is fire hazard reduction. The hazard was objectively measured using transects on selected plots that measured fuel loading in tons per acre. In addition, each transect was subjectively measured in terms of fuel continuity, fuel type, and slope. By considering both objective and subjective data, an area could have a very light fuel load but be a fire hazard because there are many continuous, small fuels that burn easily.

The Bear Gulch area was measured using three transacts (Please see attached map). The total fuel loading on plot one was 3.28 tons/acre, plot two 7.73 tons/acre, and plot three 3.29 tons/acre. The ground fire hazard for plot one is relatively small due to the light fuel loads and lack of continuity in large fuels necessary to sustain a ground fire. However, the basal area of the stand is 160 square feet with a slope of 35 percent. In lodgepole pine the basal area should be around 60 for minimum crown fire hazard; therefore a thinning is necessary to reduce the basal area for crown fire hazard reduction.

Plot two has the greatest fire hazard in the Bear Gulch area. This plot is located in an area burned by an old fire not hot enough to completely consume available fuels. The bulk of the fuels are of diameters one to three inches. There is also enough small diameter (< .25in) fuels, 0.65 tons per acre, to provide starter fuels that would ignite the larger diameter fuels. Management for this area should be to conduct a salvage fuelwood harvest of both standing and downed trees that would reduce the fuel loading.

Plot three is located near Osage Trail. This transect had low woody fuels loading of all diameters, and the fuels were mostly discontinuous. However, the grasses and forbs in the area are dense enough to warrant concern. This possibility is further indicated by the fire scars on the ponderosa pine illustrating an old grass fire. Management of the grasses could be accomplished through the use of prescribed fire. This would reduce the chance of an uncontrollable fire and would also increase forage and grazing production for deer and elk.

One fuel transect was measured in the Mummy View area indicating a total fuel loading of 15.8 tons per acre. Most of the load is continuous, downed lodgepole pine in the one to three inch diameter class. This material could be removed and chipped to reduce the loading. The slope of 35 percent in combination with the basal area of 180 square feet indicates the need for thinning to reduce the chance for a crown fire.


DEER CREEK
FLATHEAD DR
DOGRIB CT
ALGONKIN CT
FILING 13
OSAGE TR
SHUSWAP CT
MICMAC CT
SUMA CT
ONEIDA CT
COCOPA CT
COCOPA WAY
BENAKI CT
SAUK CT
Beaver Lake
Bifrost Trailhead
OTTAWA WAY
MIWOK CT
TENINO CT
Freya Trailhead
SERICT
SARSI CT
POTTAWATOM
FLATHEAD CT
AURON CT
BEAVER CREEK
OTTAWA WAY
GUASAVE CT
FILING 10
PAPAGO
NOWATA DR
OTTAWA
CRYSTAL PARK
CONNECTION

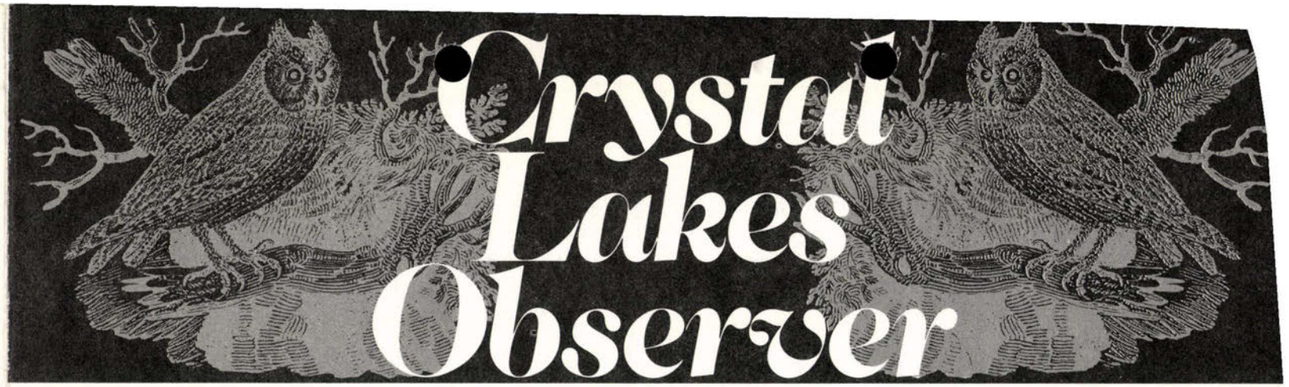
Crystal Lakes Observer

3200 East Mulberry
P.O. Box 2167
Fort Collins, Colorado 80521
(303) 482-1845

BULK RATE
U. S.
POSTAGE
PAID
Ft. Collins, Colo.
Permit No. 49

Ray L. Mchaffey, Jr.
Foothill Campus - Bldg 303
Ft. Collins, Colo

Compiled and Edited by Diane Weixelman



JANUARY, 1976

WINTERFEST – JANUARY 24th & 25th

Once again it's time to make your plans for an exciting, fun filled weekend for the family at Crystal Lakes January Winterfest on January 24th and 25th.

For those who plan to arrive Friday (the 23rd), we'll start off the fun with a pre-fest party at Wapiti Center at 7:30 p.m. There'll be singing and mingling. Then to wet your whistle, we've got hot spiced wine, hot chocolate and coffee.

On Saturday and Sunday, you can join in any or all of the following activities: tubing and sledding on the hill behind the community center, broom ball and ice skating at Snoopy Pond, and cross country skiing and snowmobiling on the trails.

If snow conditions permit, there will be snow sculpturing with prizes awarded for the most imaginative mind.

At 1:00 p.m., a speed skating contest is scheduled at Snoopy Pond. There are three age groups: 12 and under, 13 through 21, and 22 and over. You'll enjoy competing for prizes.

Anyone interested in joining a group snow mobile tour is invited to meet at Wapiti Center at 2:30 p.m. Saturday. And bring your snowmobile!

Saturday evening, there's a pot luck supper at 6:00 p.m. at the center, followed by a guided moonlight cross country ski tour at 7:30 p.m. We'll return to the center about 9:00 p.m. for a "night-cap" and snacks.

Sunday's big event will be a cross country ski race - against-time. You may begin any time between 10:00 a.m. and 2:00 p.m. Get entry blanks and details on the starting location at Wapiti Center. The age groups are the same as for skating races and prizes will be given.

Rides to Snoopy Pond from Wapiti Center will be furnished at 11:00, 12:30, 2:00 and 3:00 both days. And do check the bulletin board at the Center for a complete schedule of events.

A 2nd winterfest is planned for March 6th and 7th. The schedule will be similar to January's fest.

CROSS COUNTRY SKIING

Cross-country skiing at Crystal Lakes is in full swing. The development company has opened approximately 27 miles of ski trail. The ski trails are in timber and protected from the wind. The trails take a person through some of the most exciting mountain wonderland that one could expect to find anyplace. Trees are stunningly beautiful and, if you are so fortunate as to get out right after a snow, the country is spectacular.

Trail maps are available at Wapiti Center. All trails are marked, the hardest trails being marked with red ribbons, the intermediate trails with blue and the easy trails with yellow.

Crystal Lakes will offer cross-country ski lessons again this winter. Costs of the lesson will be $1.50 per person for a two hour lesson. Advance beginner lessons are also given. Guide service will be available on a reservation basis to take skiers into the back country. The cost will be $3.00 per hour for a group of up to six people plus $1.00 per person. The ski rentals with boots, poles, and skis will be $4.50 per day. Skis may be checked out at 9:00 a.m. and should be checked in by 5 p.m. Reservations for equipment and tours may be made by calling 881-2122.

There will be afternoon entertainment on Saturday afternoons from January through March at Wapiti Center. The entertainment will be guitar singing and group singing as well as a warm fireplace and good conversation. Coffee, hot chocolate, (and other liquids) and special snacks will be available in the store.

We are proud of our cross-country ski trails at Crystal Lakes; however, we are still looking for many ways to improve them and to make them better. Please observe the rules that there are to be no cross-country skiers on ski-doo trails and no ski-doos on cross-country trails.

STATE FORESTRY EXPERIMENTAL TREE THINNING

Many of you may have observed the activity on lots 96 and 97 of the 8th filing. In cooperation with the Colorado State Forest Service, Crystal Lakes Development Company is participating in a demonstration thinning of these heavily forested lots. Benefits to the remaining stand and to the suitability of the site for human habitation resulted from the thinning operation.

Trees in the thinned area benefit from increased "room to grow." Before thinning, there were over 1,400 trees per acre in this forest, created 55 years ago following a wildfire. Competition for sunlight, water, nutrients, and space reduced tree growth to a very low level. Some trees were so suppressed, they were dying. By checking the annual growth rings of the stumps, one can see how growth was slowed. Trees in this condition are most susceptible to insects, diseases, and natural mortality.

Following removal of competing pines, an average of 364 trees per acre still remains on the two lots. These are the best trees, selected on the basis of: form, position in the stand, absence of disease, absence of physical damage, needle color, needle length, and species.

Straight-stemmed and taller pines were normally selected as "leave trees." Ones with dark green, long needles were favored. Trees damaged by procupines or infected with dwarf-mistletoe were removed. Aspen and Fir trees were favored in small groups or clumps to give a diversity of composition and improve visual quality by varying texture, color, and profile. On occasion, a small opening was created to provide distant views and break up the visual monotony of a continuous forest.

Before Thinning

There are other beneficial aspects of "opening up" the forest to growth. The additional sunlight and increased available moisture favor establishment of grasses, wildflowers, shrubs, and young tree seedlings. The forest is perpetuated instead of being allowed to decay. Grasses, shrubs, and wildflowers eventually disappear as the "leave trees" grow and their crowns spread out and again exclude the sun. However, the seedlings remain. Future thinnings will favor these seedlings in the selection process in another 15 to 20 years.

Soil moisture available for plant growth is improved. Interception of rainfall and snow by tree crowns is reduced. As a result, more precipitation reaches the ground and evaporation losses are reduced. This moisture benefits the entire microenvironment on the site.

After Thinning

Wildlife benefit from thinnings also. The effect here on the experimental plots is not as pronounced as on larger acreages. Forage in the form of shrubs and grasses increase in the thinned area for up to seven years. Deer and elk move in and graze these areas. Lesser thought of wildlife such as bees, small mammals, and songbirds are also attracted.

Although fire played a role in the establishment of the existing tree cover, uncontrolled fire is not compatible with man's habitation of the forest. The thinning has removed over 200 tons of forest fuel from the two lots, at the rate of 53 tons per acre. Wildfire does not spread as rapidly in a thinned stand. There is less material to burn and green grasses and wildflowers that spring up after thinning tend to slow the rate of spreading. Thinning might be looked on as a form of fire insurance. Prevention, however, is still the key.

Material removed the thinning operations is used for posts and poles. Fuelwood is also a by-product of thinning. The accompanying table compares "before" and "after" characteristics of the demonstration area.

TABLE 1: Characteristics of Thinned and Unthinned Stands

Average Height (Range of Heights)	23 ft. (11-30)	27 ft. (21-30)	+4 ft.
Average Diameter (Range of Diameters)	4 in. (1-6 ¾)	4 ½ in. (2 ½-6 ¼)	+½ in.
Trees per Acre	1,418	364	-1,054
Tons of Vegetation/Acre	77 tons	24 tons	53 tons

Ray L. Mehaffey, Jr.
Assistant District Forester
Colorado State Forest Service

WEATHER REPORT

To find out weather and road conditions at Crystal Lakes this winter, call:

881-2122 - Wapiti Center
482-1845 - Continental West
office at Fort Collins
623-7835 - Denver toll free line

NEW ROAD AND REC OFFICE

The Crystal Lakes Road and Recreation office is now located on the lower floor of Wapiti Center in the back room. All books and records of the association will be kept here.

Kathy LeBay is the bookkeeper, secretary and gal-Friday for the Road and Recreation Association. Her hours are 9:00 a.m. to 3:00 p.m. Monday, Thursday and Saturday.

The phone number for the association is 881-2250 and the mailing address is P.O. Box 158, Red Feather Lakes, Colorado.

WINTER WEATHER BE PREPARED

When the driving in the mountains this winter, remember that the weather can - and will - change rapidly. So be ready for these changing conditions by having the necessary equipment in your vehicle.

Your "survival" kit should include shovel, jack, chains, tow chain, blankets or sleeping bags, and high energy foods and liquids. Remember - eating snow to obtain liquid will only chill you further.

If it is necessary to start a fire, the usual accumulation of paper in most cars, plus the cigarette lighter, will give you a good beginning. Then - slowly - add dry brush.

Be sure to carry warm clothing with you, as well as water repellent pants and jacket. Several layers of this clothing are warmer than bulky layers - and can be shed or added as needed. Also mittens are warmer than gloves, as four fingers together are warmer than each one separately. And don't forget a wool or knit cap, as 70% of your body heat is lost thru the scalp.

Chances are, you'll never have a problem, but just in case, let's be prepared.

BUBBLE FOR POOL

Last summer, about 300 property owners signed a petition asking for a bubble to be placed over the swimming pool.

The Board of Directors discussed this at their October meeting and decided to postpone a decision until spring, as it was too late to get a bubble ready for fall.

The advantages of such a bubble are reduced maintenance and cleaning costs for the pool and the fact that it would allow the pool to stay open 2 to 6 weeks longer.

The disadvantages are the high humidity and lack of "atmosphere" around the pool, plus the increase in expenses. (While operating costs would be lower with the bubble than without, the fact that the pool would be open longer would increase expenses in the long run).

The board would like to hear from property owners both for their opinions on the bubble and for any other suggestions on the pool, as it was noted the petition only allowed for favorable votes.

The annual Crystal Lakes Water & Sewer Association Meeting to be held February 11th (Wednesday) at 7:30 p.m. at the Continental West Realty office, 3200 E. Mulberry, Ft. Collins.

CLASSIFIED ADS NEEDED

The Crystal Lakes Observer will feature a classified ad section for property owners wishing to buy or sell such things as campers, generators, and so on. In addition, lost and found items and services may be advertised.

The ads will cost $5.00 per inch (approximately 30 words) and the minimum size is one inch. The amount of space allotted to this will be determined by the response.

Advertisers will be billed when the issue containing their ad appears. Send your ads to: Crystal Lakes Observer, % Crystal Lakes Road and Recreation Association, P.O. Box 158, Red Feather Lakes, Colorado.

Display advertising rates will also be $5.00 per column inch instead of $20.00 per ad as in the past. Previously, although the 1/6 page ads varied in size from 3½ to 5½ inches, all were charged the same rate. In the future, advertisers will be asked what size they wish to make their ad and will be billed per column inch.

Please Clip and Save!
Winter – 1976 – Calendar
Crystal Lakes

January 3rd & 4th Hangover Weekend at Wapiti Center Free coffee, aspirin, alka-seltzer	February 14th Valentine's Day Dance 8:00 p.m. - Wapiti Center
January 10th & 11th Winter equipment Swap at Wapiti Center	February 28th Pot Luck Supper 6:00 p.m. Wapiti Center-followed by games and cards
January 10th Pot Luck Supper 6:00 p.m. Wapiti Center	March 6th & 7th Winterfest (see page 1 for details)
January 24th & 25th Winterfest (see page 1 for details)	March 20th Pot Luck Supper 6:00 p.m. Wapiti Center followed by bingo.

Be sure to check the bulletin board in the Wapiti Center for additional information and/or additional events.

NEW - 9th - FILING

Crystal Lakes Development has opened its 9th filing. This filing has been approved by the office of Interstate Land Sales for selling and selling has begun. Anyone wishing to acquire property in the 9th filing is encouraged to stop by the sales office and discuss the matter with a salesman.

This filing is located about 3 miles south of Wapiti Center and 1 mile south of the 7th filing. One goes through the 9th filing on the way up to Crystal Lakes from Red Feather.

Roads are under construction and lots are now being staked. The 9th filing contains 136 lots with 106 lots being offered for immediate sale. There are approximately 380 acres in the filing and the average lot size is 2½ acres.

Other than a few small parks, the 9th has little common area. Most of the land is wooded with aspen and pine. There are many small meadows, and on certain lots horses will be allowed. Some lots have irrigation water for the meadows. Forest Service land adjoins the filing on three sides.

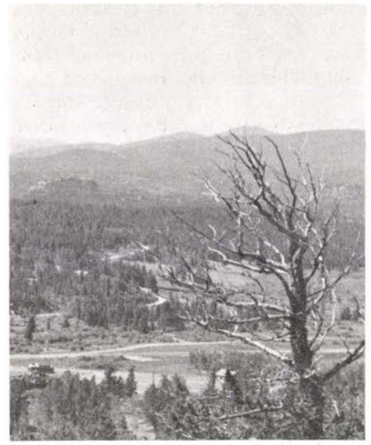
The property has a small lake, but because the lake was not adequate for community use (shallow and having a tendency to leak) the lake tract was sold. The Company felt better use would be made of funds by building additional lakes already planned than by trying to repair this lake.

PHOTO CONTEST WINNERS

Over 40 photos were entered in the Crystal Lakes photo contest, held last summer and fall. All were excellent pictures, making the judges' decision a hard one, but winners in each of four catagories were selected and are as follows:

(1) Wildlife catagory - 1st place (pictured at the right) went to Lee Plate (Lot 2, 3rd Filing) of Longmont. 2nd place went to James McQuiddy (Lot 14, 5th Filing) of Fort Collins and 3rd place to Peggy (Mrs. Lee) Plate.

(2) Wildflowers catagory - 1st place again went to Lee Plate as well as 2nd. 3rd place was awarded



to Brent Freeman (Lot 34, 4th Filing) of Fort Collins.

(3) Scenic catagory - 1st place, (pictured at the left) as well as 3rd place, went to Barbara Nichels (Lot 23, 4th Filing) of Englewood. 2nd place was again awarded James McQuiddy.

(4) Panorama catagory - 1st place (pictured above) went to James McQuiddy; 2nd place to Brent Freeman and 3rd place to Robert Lamb (Lot 85, 8th Filing) of Ault.

1st place winners will receive a Hawkeye pocket instamatic camera. 1st, 2nd and 3rd place winning photos will be displayed in Wapiti Center.

Many thanks to all who entered the contest; your pictures may be picked up at Wapiti Center.

Board of Directors' Meeting
Friday, January 16th and
Friday, March 19th
at 7:30 p.m. at Wapiti Center
Property Owners Welcome

BOARD & GENERAL PARTNERS MEET

The Crystal Lakes Road and Recreation Association Board of Directors and the Crystal Lakes Development Company general partners held a joint meeting on Nov. 7th, 1975. All five board members and 3 of the 4 general partners - Don Weixelman, John Zakovich and Pete Karabotsos - attended. The fourth general partner, Lee Stubblefield, was unable to attend because of illness.

Mr. Weixelman began the meeting with a brief history of Crystal Lakes, pointing out the increase in government regulations since the development's beginning. Herb Schaal of EDAW, Inc., a firm preparing the rezoning plan for the Forest Service trade land, described the work done by his firm thusfar.

Following that, Attorney John Kochenberger explained the meaning of covenants which he termed contracts between each and all the people in the area covered. These people are the ones to enforce covenants as they are directly involved.

The number of memberships necessary for Road and Rec. to be self-supporting was presented, and a budget fact sheet with future projection shown in connection with this. Other topics of discussion were green belt areas, water augmentation, fencing and trailers. About 20 property owners also attended the meeting.

Both board members and general partners felt the meeting was informative and hope to hold similar meetings in the future.

CRYSTAL LAKES – FOREST SERVICE LAND TRADE

The following is the U.S. Forest Service analysis of the long term public benefits gained by the Crystal Lakes - Forest Service trade.

"That, when the public interests will be benefited thereby, the Secretary of the Interior be, and hereby is, authorized in his discretion to accept on behalf of the United States title to any lands within the exterior boundaries of the National Forests which, in the opinion of the Secretary of Agriculture, are chiefly valuable for National Forest purposes, and in exchange therefore may patent not to exceed an equal value of such National Forest land, in the same State". . .

The quotation above, taken from the General Exchange Act of March 20, 1922 is the authority for National Forest Land Exchanges as exemplified by the Crystal Lakes Land Exchange. Negotiations for the Crystal Lakes exchange have been underway since the mid 1960's and are nearing completion. The exchange involves approximately 1760 acres of private land in exchange for about 1560 acres of National Forest land.

The exchange proposal starts at Ranger District level and is reviewed and worked upon by the Forest Supervisor's office and the Regional Forester's office before it makes its way to the Chief's office for final approval and execution of deeds by the Department of Interior.

A lot of analysis, study and plain old footwork takes place before an exchange proposal starts its way through the Forest Service administrative levels. Environmental studies and analysis reports are written after the input of the Ranger and his staff and other professions such as landscape architects, engineers, hydrologists, soil scientists and wildlife biologists. The private land owner also goes through land planning and analysis to see if exchange proposals fit his objectives.

Forest Service trade objectives are to obtain for the public (1) enhanced resources values, (2) better access, and (3) decreases in administrative costs. The Crystal Lakes Land Exchange has all three elements listed above. These are:

(1) The addition to present public fishing waters of about 3 miles of stream and the preservation of two elk migration routes. (This stream frontage is several miles from Wapiti Center.)

(2) Three of the 5 National Forest parcels which will become private land are surrounded by Crystal Lakes land. Access by the general public could be a problem to both the Forest Service and Crystal Lakes if the land remained in the Forest Service.

(3) After rearrangement of land ownership, there will be a reduction of 22 miles of boundary common to both parties. The reduction of boundaries pays dividends in reducing administrative costs for both Crystal Lakes and the Forest Service (and hence the public).

The General Exchange Act can be an effective tool in providing good land use planning for both public and private interest.

Gordon Seneff,
District Ranger, Red Feather Lakes District
Roosevelt National Forest

THE "BAY WINDOW" CABIN

Seventy two years ago, in the spring of 1904, a German immigrant named George Knell received the patent on a tract of land, near Lone Pine Creek and Tiny Bob Road, where, until recently, stood the most fashionable log cabin in the Crystal Lakes area.

Knell already owned a piece of land south of this one, near the present John Mitchell ditch. It was on the Mitchell ditch piece that Knell built his cabin, the remains of which still stand, about 1900. Perhaps he wanted additional land because of a large family, or perhaps he merely followed other homesteaders' habits of acquiring adjoining lands whenever possible.

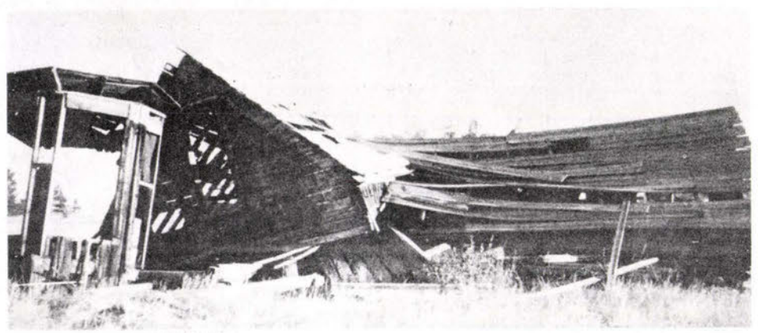
In 1916, George Knell deeded this land to Minnie Knell, undoubtedly a relative, maybe a daughter. The one room log cabin on the property may have been built by Minnie and her family or earlier by George Knell himself. Perhaps it was done at a house raising party for newly weds.

However one thing is certain - at a later date the cabin was enlarged by the addition of a second room, making a T-shaped building. This second room made the log home a house for it added a parlor with a loft for sleeping and a three sided bay window, complete with a small balcony on top.

At a period of time when bay windows were the latest thing in home design, but not considered a necessity for a log cabin, the family must have been quite proud of their fashionable abode. It appears that at the time of this addition, the old original one room cabin was resided with planed boards over the logs and its roof was shingled to match the new one.

Perhaps this addition was built to reward and please a hard working, loyal wife - perhaps in an attempt to satisfy a restless one. Perhaps the original building was resided by someone with an eye for conformity - perhaps to hide its humble beginnings. But whatever the reason, the large, bay windowed home must have been impressive.

But as time went on, the land was sold to neighbors with no need of a second home. And the abandoned building, pictured above, became not a home, not even a house, but a derelect shell, unsafe - in fact dangerous - because of its leaning, rotting timbers. So, because of vandalism and possible danger and because the company plans to locate a lake here in the future, the building was torn down and the land stands again as it did 72 years ago.



LET'S GO SNOWMOBILING!

What did you say? There isn't enough snow to go! Have you ever gone into the area above the air strip? You can get up into the Forest Service land from the end of Cimmeron Road.

Last year, the trails were flagged and ready for your enjoyment. There are several open areas up there for you to ride around in. They are in this order - Apache, Ute, Navajo and Sioux.

This can become a nice family activity if you enjoy the out-of-doors. Several people pack their lunch in a back pack and take their family on a nice long ride to one of these areas. It is a lot of fun to try and start a fire down in the snow, let alone find some dry wood to burn.

So we hope that you will try out trails and have some fun.

Marilyn Svoboda

Crystal Lakes Road & Recreation Association

	1975 Budget	Actual as of 11/30/75	1976 Budget
INCOME:			
No. of Memberships	525		667
Assessment per Membership	$65		$65
Total Assessment	$34,125	$33,632.21	$43,355
New Memberships & Delinquencies	3,250	5,238.48	3,600
Other Income	3,500	4,351.00	2,050
Total Income	$40,875	$43,221.69	$49,005
EXPENSES:			
Salaries & Payroll Taxes	8,850	8,674.47	20,690*
Road & Property Maintenance	8,960	6,125.19	9,300
Utilities, Phone, Rent	5,200	5,989.43	5,000
Fish Stocking	4,500	3,845.00	4,500
Office Supplies, Postage, Printing, Etc.	2,300	3,564.02	3,000
Accounting & Legal	450	1,127.50	2,500
Gasoline	800	753.63	1,200
Insurance	600	572.20	800
Recreation	–	138.96	500
Reserve for Contingencies	–		1,470
Total Expenses	31,660	30,790.40	48,960
INCOME OVER EXPENSES	$ 9,215	$12,431.29**	$ 45

*1976 Salary reflects new Assistant Treasurer, and Manager's providing own pickup, insurance, housing, and utilities.

**Used to pay off debt ($7,592.45) to CLDC; however, during 1975 an additional $11,215.69 debt was incurred. The current balance is $4,671.31.

The above budget does not provide for the following services: the manning and operation of Wapiti Center, two-thirds of the road cost on the Creedmore Lakes road, taxes, Observer editor, recreation manager, and many maintenance items.

The cost of these services and maintenance items amounts to about $32,000 and is now covered by the development company. As additional members are acquired, Crystal Lakes road and recreation association will take over these and the company will gradually drop out of the picture.

CROSS COUNTRY SKI CHAMP

Ski equipment and techniques have changed in the past 50 years, but not the qualities needed in a champion skier, feels John Steele (Lot 51, Filing 1st). A champion himself, Mr. Steele believes that, in addition to skill, one needs "to have the desire" and "to have some hardships."

Raised in Steamboat Springs, Steele won the state cross country ski championship three times. In the early 1920's at the age of 12, he broke the world's record in the under 14 age class. And in 1932, as a member of the U.S. Olympic ski jumping team, he placed 13th in the competition.

Mr. Steele with Crystal Lakes Ski Instructors, Nancy Norman and Scott Herbentson.

At that time, there were really only two types of competitive skiing - cross country (which included relay races) and jumping. Towns held their own winter carnivals and local ski champions competed against one another to select district and state champions. Steele thinks this method excellent for developing champion skiers.

Although there were no instructors as such in those days. Mr. Steele says he did pick up some pointers from Carl Howelson of Norway, who Steele called "the father of cross country skiing in Colorado."

Skis in the 1920's were longer - 9 feet - and wider - 4" to 6" - than todays models because, Mr. Steele explained, these were better suited for skiing in fresh snow. Todays narrower, shorter, and lighter skis are faster for racing and well suited for packed trails.

After 20 years of skiing all over the world, Mr. Steele says he no longer skis in competition. But he still skis for his own enjoyment, and like any of us, looks forward to the first "good" snow of the season.

REZONING MEETING

Crystal Lakes Development Company is hosting a meeting for property owners at 7:30 p.m. on Saturday, January 24th at Wapiti Center to explain the Crystal Lakes rezoning request and to answer any questions as they relate to the revised master plan.

The rezoning is on land being taken in by Crystal Lakes in the forest service trade. It is being requested so that the original concepts of Crystal Lakes can be achieved.

This rezoning has been recommended by the Larimer County Planning Commission and the request will be heard by the Larimer County Commissioners on January 28th, at 2:30 p.m. at the Larimer County Court House.

CARDS OR BINGO, ANYONE?

Pot luck suppers are always popular, and, as an added attraction, cards and games will be featured after February's pot luck on the 28th. Games will include checkers, chess and cribbage. Cards will feature everything from old maid to bridge, as popular demand warrants.

Bingo will be the attraction after the March 20th pot luck. Admission to the bingo party will be a food item such cookies, cake, jelly, etc. And by a strange coincidence, prizes will be food items such as cookies, cake, jelly, etc. In addition, there will be a small cash prize or two awarded during the evening.

Refreshments of coffee, hot chocolate and cookies will be served both nights. So bring the whole family! There'll be something for everyone of every age – fun!

NEW ROAD & RECREATION MANAGER

Charles "Skip" McKibbon has been appointed Road and Recreation Manager, at salary of $1,100 per month, by the Crystal Lakes Road and Recreation Board of Directors. He replaces Francis Egging who retired after holding the position of manager for four years.

Skip is not a newcomer to Crystal Lakes having worked for the company, on the work crew, a couple of years ago. He now lives on the project (lot 1, filing 5).

Originally from Wrangell, Alaska, Skip lived there until entering Humbolt College of California in 1956. He majored in Fisheries Biology, graduating in 1961. He then turned to Alaska and spent ten years working with the fish and game commission before coming to Colorado in 1971. He returned to Alaska in 1974 to run a saw mill, but came back to Colorado a year later.

Since most of his life has been spent in Alaska and Colorado, one would expect Skip to enjoy outdoor activities. This surmise is correct, as Skip's hobbies include camping, fishing, hunting and horseback riding. Crystal Lakes should be a place that fits Skip McKibbon to a "T".

VALENTINE'S DAY DANCE

Be sure to reserve the evening of February 14th on your social calendar. That's a Saturday night as well as Valentines Day and the "Colorado Country" band will be playing country western music as well as music from the 50's through the 70's from 8:00 p.m. until midnight at Wapiti Center.

So come and join the fun!

IS FALL REALLY GONE?

We keep thinking that fall is gone and winter is here. Are we really right to think this way? One day you have snow flurries and the next the sun is shining. Wind? Well we all know that every mountain area has to have some wind now and then. It just seems like when the wind blows we lose our chances of getting some fresh snow for skiing and tubing.

Now that we are getting ready for winter sports we will try and recap some of the things that have happened this fall.

Our first and most exciting adventure was the annual hike up Black Mountain. The day was a good, beautiful, fall day with a whisper of brisk breeze. Again, there was a good attendance for the hike. When arriving at the top, you were welcomed with hot cocoa, coffee, cookies, hot dogs, and some other extras.

Teen Social

We hope that some of you who have not been on one of our Black Mountain hikes will come and join us next year. This year, you even got a certificate for making the hike. If you were lucky enough, you maybe got in on some of the pictures that were taken. Did you see some one you knew in them? They were posted up on the Hiking Board at the Wapiti Center.

Our biggest attendance was at the annual Bar-B-Que which was courtesy of Crystal Lakes Development Company. There were over 300 people and 200 pounds of beef was eaten.

The Teen Social was not what we had hoped it to be; but, like everything else, the first time is a challenge for something new. We realize that maybe the time was not right nor the day. Sundays are busy and maybe your family heads home around that time. If anyone has any suggestions for our next Teen Social next fall let us know. And if anyone wants to help with it, he or she will be welcome to help.

Bar-B-Que

Our Art Fair the 8th and 9th of November was a very big success. We had several different things—from tree decorations to gifts to give away. There were several center pieces which were made out of pine cones, nuts, and dried flowers, then sprayed with spray snow. We hope that some of you got some ideas for your home.

Again, we have had several Pot Luck Suppers during the fall which seem to attract new people each time. This is one time that I can meet so many of you and take the time to sit and visit more than in the store.

Were you in the spirit of Christmas before December 6th? We hope you were after the Christmas caroling of that evening. Anyway, maybe it got us thinking about our Christmas shopping.

Decorating Tree

Have you been in to see how the Wapiti Center has come alive with Christmas? Our tree is very pretty again this year. The cranberries and miniature marshmellows that some of the helpers strung seem to brighten the tree from top to bottom. I hope that your center makes you feel at home up here during the holiday season.

The Wapiti Center will always be closed on Thanksgiving and Christmas Day. My family and I hope that you all have a Very Happy Holiday Season and a Brighter New Year here at Crystal Lakes.

Marilyn Svoboda

Black Mountain Hike

Christmas Tree

OFFICE MEMO

TO: Terry Beeson **Date** September 26, 1975

FROM: Mark Horvat

SUBJECT: Cost Figures - Crystal Lakes Thinning

REMARKS:

Basal Area

Before thinning:

High	220
Low	130
Average	175

After thinning (80 GSL):

41 square feet

Diameter

Before thinning:

4 inch DBH (.087 square feet of area)

After thinning:

4.8 inch DBH (.126 square feet of area)

Stems Per Acre

Before thinning:

$$175 \frac{\text{sq. ft.}}{\text{acre}} \div \frac{.087 \text{ sq. ft.}}{\text{tree}} = 2012 \text{ trees/acre}$$

After thinning:

$$41 \frac{\text{sq. ft.}}{\text{acre}} \div \frac{.126 \text{ sq. ft.}}{\text{tree}} = 325 \text{ trees/acre}$$

Labor 40 ÷ .110 = 364

A. Cutting

T/D	Man-hours	
480	12.5	
762	15.0	
640	16.5	COLORADO STATE FOREST SERVICE
855	10.0	
757	11.0	
3494	65.0	CONTINENTAL WEST EMPLOYEES (guesstimate)
1624	18.0	
4118	83.0	TOTAL

B. Trees per man-hour

4118 trees ÷ 83 hours = 50 trees per man-hour

C. Chipping

85.5 man-hours for 3.8 acres = 0.044 acres per man-hour

Costs

Labor - Cutting:

Colorado State Forest Service: 65.0 hours at average wage of $5.58 per hour		= $ 362.70
Continental West: 18.0 hours at $3.00 per hour (guess)		= 54.00
		$ 416.70

Piling Brush:

Continental West: 65.0 hours at $3.00 per hour (guess)		= $ 195.00

Chipping:

85.0 hours at $4.55 per hour (average guesstimate)		= $ 388.03

Travel Time:

54.0 hours at $5.58 per hour		= $ 301.32
	TOTAL	$1301.05

Equipment Costs

Colorado State Forest Service Pickup:

Number 3201: 114 miles (round trip) at 0.074 per mile x 7 trips		= $ 59.05
Number 869: 114 miles (round trip) at 0.074 per mile x 2 trips		= $ 16.87
		$ 75.92

Colorado State Forest Service Chipper:

17 hours at $4.10 per hour		= $ 69.70

Chainsaws

5 days at $17.00 per day - "rental"		= $ 85.00
	TOTAL	$ 230.62
	GRAND TOTAL	$1531.67

Cost per acre total

Total costs per acres

$1531.67 per 3.8 acres = $403.07

Cost per acre without brush piling or chipping

Labor:

Cutting	$416.70
Travel	301.32
	$718.02

Equipment:

Pickups	$ 75.92
Saws	85.00
	$160.92

Total: $878.94

878.94 ÷ 3.8 acres = $231.30

Costs as per FIP guidelines

83 man-hours per 8 hours per day = 10.4

10.4 days x $50.00 per day = $520.00

$520.00 (FIP) vs. $879.00 (Crystal Lake)

Thinning guidelines

FIP Precomm - fall in place, lop and scatter slash

400 trees per man per day

Crystal Lakes

430 trees per man per day

MBH/bkb

cc: Os

Many of you may have observed the Fall activity on lots 96 and 97 of the 8th filing. In cooperation with the Colorado State Forest Service, the Crystal Lakes Development Company is participating in a demonstration thinning of these heavily forested lots.

The purposes for removing a portion of the lodgepole pines are numerous. Benefits to the remaining stand and to the suitability of the site for human habitation resulted from the thinning operation.

Trees within the thinned area will now benefit from the increased "room to grow." Before thinning there were over 1,400 trees per acre in this forest created 55 years ago following a wildfire. Competition for sunlight, water, nutrients, and space itself had reduced tree growth to a very low level. Some trees were so suppressed that they were dying. By counting the annual growth rings of the stumps in the area, even the most casual observor can see how growth was being slowed as indicated by the rings becoming closer and closer together. Trees in this condition are most susceptible to insects, diseases, and natural mortality.

Following removal of competing pines an average of 364 trees per acre still remains on the two lots. These are the best trees and were selected on the basis of: form, position in the stand in relation to other trees, absence of disease, absence of physical damage, needle color, needle length, and species.

Straight-stemmed and taller pines were normally selected as "leave trees." The ones with dark green, long needles were favored. Trees damaged by porcupines or infected with dwarf-mistletoe were removed. Aspen and fir trees were favored in small groups or clumps to give a diversity of composition and improve visual quality by varying texture, color, and profile. On occasion a small opening was created to provide distant views and break up the visual monotony of a continuous forest.

There are other beneficial aspects of "opening up" the forest to growth. The additional sunlight and increased available moisture will favor establishment of grasses, wildflowers, shrubs, and young tree seedlings. Thus, the forest will be perpetuated instead of being allowed to decay. The grasses, shrubs, and wildflowers will eventually disappear as the "leave trees" grow and their crowns spread out and again exclude the sun. However, the seedlings will remain. Future thinnings will favor many of these seedlings in the selection process in another 15 to 20 years.

Soil moisture available for plant growth will be improved. Interception of rainfall and snow by tree crowns will be reduced. As a result, more of the precipitation will reach the ground and evaporation losses will be reduced. This moisture will benefit the entire micro-environment on the site.

Wildlife benefit from thinnings also. The effect here will not be as pronounced as it would be on much larger acreages. Forage in the form of shrubs and grasses increase in the thinned area for up to seven years. Deer and elk move in and graze these areas. Lesser thought of wildlife such as bees, small mammals, and songbirds are also attracted.

Although fire played a role in the establishment of the existing tree cover, uncontrolled fire or wildfire is not compatible with man's habitation of the forest. The thinning has removed over 200 tons of forest fuel from the two lots at the rate of 53 tons per acre. Potential heat from this source is equal to that produced by 140 tons of coal. Wildfire does not spread as rapidly in a thinned stand. Not only is there less material to burn but the green grasses and wildflowers that spring up after thinning tends to slow down the rate at which a fire spreads. Thinning might be looked on as one form of fire insurance. Prevention, however, is still the key.

Material removed in the thinning operations is being utilized for posts and poles on the development property. Fuelwood will also be a byproduct of the thinning.

An accompanying table compares the "before" and "after" characteristics of the demonstration area. It is interesting to note that the thinned stand has an average height four (4) feet higher and an average diameter 1/2 inch larger than the unthinned stand. This results from removal of the smaller trees in the thinning.

TABLE 1: Characteristics of Thinned and Unthinned Stands

	Unthinned	Thinned	Difference	% Change
Average Height (Range of Heights)	23 ft. (11-30)	27 ft. (21-30)	+4 ft.	+16%
Average Diameter (Range of Diameters)	4 in. (1-6 3/4)	4 1/2 in. (2 1/2-6 1/4)	+1/2 in.	+12%
Trees per Acre	1,418	364	-1,054	-74%
*Basal Area/Acre	123 sq. ft.	40 sq. ft.	-83 sq. ft.	-67%
*Cubic Foot Volume/Acre	2,235 cu. ft.	711 cu. ft.	-1,524 cu. ft.	-68%
Tons of Vegetation/Acre	77 tons	24 tons	53 tons	-68%

*Growing Site Index - 47 CCF - 212

*Not necessary to reproduce in article.

-PICTURES-

Before (Site) | After (Site) | Future (N.FK)

Submitted by:

Ray L. Mehaffey, Jr.
Assistant District Forester
Colorado State Forest Service

OFFICE MEMO

Copy

TO: Terry Beeson **Date** September 26, 1975

FROM: Mark Horvat

SUBJECT: Cost Figures - Crystal Lakes Thinning

REMARKS:

Basal Area

Before thinning:

High	220
Low	130
Average	175

After thinning (80 GSL):

41 square feet

Diameter

Before thinning:

4 inch DBH (.087 square feet of area)

After thinning:

4.8 inch DBH (.126 square feet of area)

Stems Per Acre

Before thinning:

$$175 \frac{\text{sq. ft.}}{\text{acre}} \div \frac{.087 \text{ sq. ft.}}{\text{tree}} = 2012 \text{ trees/acre}$$

After thinning:

$$41 \frac{\text{sq. ft.}}{\text{acre}} \div \frac{.126 \text{ sq. ft.}}{\text{tree}} = 325 \text{ trees/acre}$$

Labor

A. Cutting

T/D	Man-hours	
480	12.5	
762	15.0	
640	16.5	COLORADO STATE FOREST SERVICE
855	10.0	
757	11.0	
3494	65.0	CONTINENTAL WEST EMPLOYEES (guesstimate)
1624	18.0	
4118	83.0	TOTAL

B. Trees per man-hour

4118 trees ÷ 83 hours = 50 trees per man-hour

C. Chipping

85.5 man-hours for 3.8 acres = 0.044 acres per man-hour

Costs

Labor - Cutting:

Colorado State Forest Service: 65.0 hours at average wage of $5.58 per hour		= $ 362.70
Continental West: 18.0 hours at $3.00 per hour (guess)		= 54.00
		$ 416.70

Piling Brush:

Continental West: 65.0 hours at $3.00 per hour (guess)		= $ 195.00

Chipping:

85.0 hours at $4.55 per hour (average guesstimate)		= $ 388.03

Travel Time:

54.0 hours at $5.58 per hour		= $ 301.32
	TOTAL	$1301.05

Equipment Costs

Colorado State Forest Service Pickup:

Number 3201:	114 miles (round trip) at 0.074 per mile x 7 trips	= $ 59.05
Number 869:	114 miles (round trip) at 0.074 per mile x 2 trips	= $ 16.87
		$ 75.92

Colorado State Forest Service Chipper:

17 hours at $4.10 per hour		= $ 69.70

Chainsaws

5 days at $17.00 per day - "rental"		= $ 85.00
	TOTAL	$ 230.62
	GRAND TOTAL	$1531.67

Cost per acre total

Total costs per acres

$1531.67 per 3.8 acres = $403.07

Cost per acre without brush piling or chipping

Labor:

Cutting	$416.70
Travel	301.32
	$718.02

Equipment:

Pickups	$ 75.92
Saws	85.00
	$160.92

Total: $878.94

878.94 ÷ 3.8 acres = $231.30

Costs as per FIP guidelines

83 man-hours per 8 hours per day = 10.4

10.4 days x $50.00 per day = $520.00

$520.00 (FIP) vs. $879.00 (Crystal Lake)

Thinning guidelines

FIP Precomm - fall in place, lop and scatter slash

400 trees per man per day

Crystal Lakes

430 trees per man per day

MBH/bkb

cc: Os

Beth's Trailer lot 89 by Chris's house

Lot 73 - Hirsch
Lot 3 - Carpenter

42/43 Fire all around 43 has green

CRYSTAL LAKES MAP

Crystal Lakes Road & Recreation Association
P.O. Box 158, Red Feather Lakes, Colorado 80545 • 881-2250

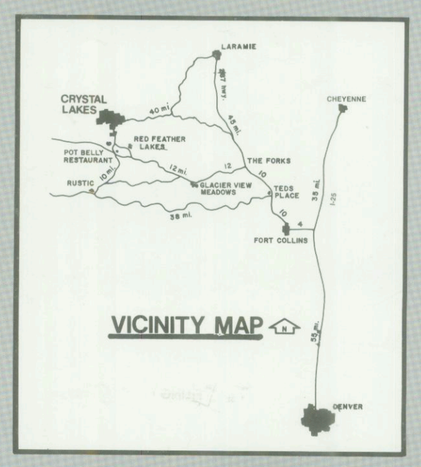
U.S. FOREST SERVICE LANDS
BLACK MOUNTAIN
Black Mt. Tr.
BEAR GULCH
DEER CREEK
Otter Pond
FILING 13
FILING 6
FILING 12
FILING 5
FILING 4
FILING 10
FILING 15
FILING 8
FILING 3
FILING 2
FILING 11
FILING 1
FILING 7
FILING 9
FILING 14
MUMMY VIEW PARK
CRYSTAL PARK
CRYSTAL LAKE
EAGLE POINT
SWAMPY FLATS
ROCKY POINTS PARK
ELK PARK
BEAVER MEADOWS
Valkyrie Trail Head
OTT-MATA CONNECTION
OTTAWA WAY
NOWATA DR.
SWIFT DEER RD.
CREEDMORE LAKES RD.
BEARTRAP RD.
CROW RD.
TINY BOB RD.
COMANCHE CIRCLE
LONE PINE DR.
FAWN CREEK
JENNY CREEK
NORTH LONE PINE CREEK
SAND LAKE
Private
LAKE ERIE
MITCHELL DITCH

COMMUNITY FACILITIES

- PARKS & OPEN SPACE
- POTABLE WATER SUPPLY
- SEWER PLANT
- RESTROOMS & TRAILER DUMP STATION
- SKI & HIKING TRAIL
- HIKING TRAIL
- PRIVATE PROPERTY, NOT PART OF CRYSTAL LAKES

AMENITIES

- Ⓐ Trailer Storage
- Ⓑ Base Camp Restaurant
  Wapiti Center
  Amphitheatre
  Association Office
  Potable Water Supplies
- Ⓒ Utility Building, Trash Disposal & Maintenance Shop



0 500 1000 2000 3000 Feet

NORTH

Revised in Sprng of 1992

Crystal Lakes Planning Area
Existing Fuels Reduction Areas

ROOSEVELT NATIONAL FOREST

- Crystal Lakes Planning Area
- Fuels Removal / Salvage
- Clearcut
- Commercial Thinning
- Nat Chngs-Wildfire
- Removal Cut-Overstory
- TSI Precomm Thin-Tree

N
W E
S

1:24000

Crystal Lakes Planning Area
Hazardous Fuels Rating Map