LANDSCAPE DISTURBANCE PROJECT
STAND ORIGIN MAPPING
1997

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DISCLAIMER

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SUMMARY

This report documents the acquisition of stand origin information within the Foothills Model Forest during 1997. The work is part of an ongoing program whose goal is to describe and interpret the pattern of forest age classes caused by wildfire in the Rocky Mountain and Foothills Natural Regions of Alberta. An improved understanding of historical disturbance patterns would make it possible for land management agencies to aim for future age class distributions that are within the range of natural variability.

The method used to reconstruct past fire events in this project is time-since-fire mapping (Johnson and Gutsell 1994). A time-since-fire map represents a mosaic of forest stand ages that are known or believed to have originated from stand replacing fires. Since not all stands sampled have supporting evidence of an exact fire date, the maps produced during this project are referred to as AStand Origin Maps≅.

The locations of stand origin mapping in 1997 are as follows:

- Forest Management Unit E4 (1,387 km^2) - no stand origin information available
- Edson River Old Patch (252 km^2) - contains combined older age classes

This report presents the methods used to reconstruct past fire events and the results from field work in 1997 in each of these areas. The main body is in the form of stand origin summaries, tables of stand origin dates, and lists of fire evidence. Final stand origin maps are included at the end of this report.

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1 INTRODUCTION

This report documents the acquisition of stand origin information within the Foothills Model Forest during 1997. The work is part of an ongoing program whose goal is to describe and interpret the pattern of forest age classes caused by wildfire in the Rocky Mountain and Foothills Natural Regions of Alberta. Prior to human settlement, the pattern of forest ages in this ecosystem was influenced predominantly by wildfire; this pattern is now influenced by activities such as fire suppression, prescribed fire, and clearcut harvesting. Patterns of forest age classes affect many ecosystem properties, including the distribution and abundance of species, the probability of disturbance by fire and insect outbreaks, and the rates of ecosystem processes such as the cycling of carbon and other elements. An improved understanding of historical disturbance patterns would make it possible for land management agencies to aim for future age class distributions that are within the range of natural variability.

The method used to reconstruct past fire events in this project is time-since-fire mapping (Johnson and Gutsell 1994). A time-since-fire map represents a mosaic of forest stand ages that are known or believed to have originated from stand replacing fires. Since not all stands sampled have supporting evidence of an exact fire date, the maps produced during this project are referred to as AStand Origin Maps≅.

Considerable stand origin mapping had already been done in this area prior to the start of this project. During the early 1960's, a stand origin map was produced for approximately 8,000 km^2 of land east of the Front Range by Jack Wright and co-workers of St. Regis Pulp and Power Ltd. The methods were similar to those described in this study, but detailed field records are no longer available (J. Wright, pers. comm). This stand origin map formed the basis of an analysis of fire frequency by Van Wagner (1978). An additional 2,000 km^2 of stand origin information was added during the late 1980's (S. Currie, pers. comm.). The combined map covers the current extent (10,400 km^2) of the Forest Management Agreement (FMA) area of Weldwood of Canada Ltd. (Hinton Division). In Jasper National Park, stand origin mapping was completed from 1986-1992 (Kubian, 1993) and covers approximately 10,000 km^2. This map incorporated previous fire history work completed by Tande (1979).

Additional stand origin mapping was completed in the Foothills Model Forest during 1996 (Rogeau 1996). A total of 823 km^2 of lands were mapped, including William A. Switzer Park, Forest Management Unit (FMU) E9, part of FMU E4, plus three areas of older forest for which existing maps show all stands older than 150 years combined as one age class.

As shown in Figure 1, locations of stand origin mapping in 1997 are:

- Forest Management Unit E4 (1,387 km^2) - no stand origin information available
- Edson River Old Patch (252 km^2) - contains combined older age classes

This report presents the methods used to reconstruct past fire events and the results from field work in 1997 for both study areas. The main body is in the form of stand origin summaries, tables of stand origin dates, and lists of fire evidence. Field notes for each sample plot are presented in Appendices B (site information) and C (tree information), while stand origin maps are found in Appendix D.

Figure 1. The locations of stand origin mapping in 1997.

2 METHODS

2.1 General

The fire regime of the study area appears to be dominated by high intensity stand replacing fires. Identifying the extent of low intensity surface fires, which also occur in the study area, would require a sampling strategy that is very time consuming due to the high number of sample plots required. For this reason, only stand replacing fires were mapped. The method used to reconstruct past fire events is called Time-Since-Fire Mapping (Johnson and Gutsell 1994). A time-since-fire map represents a mosaic of forest stand ages that are known or believed to have originated from stand replacing fires. Since not all stands sampled had supporting evidence of an exact fire date, it is more appropriate to call the maps produced for this project AStand Origin Maps≅.

Following is a description of the procedure used to reconstruct past fire events in the Foothills Model Forest in 1997.

2.2 Photo Interpretation

Air photos were used to identify stand boundaries, which were defined by a change in texture and tone on the image (Heinselman 1973, Johnson *et. al.* 1990). In areas affected by a poor quality of air photos, aerial or ground reconnaissance was necessary to complement the air photo interpretation.

Two series of black and white air photos were available for most of the FMF. One set dated from 1949 to 1952 at a scale of 1:40,000, while the other dated from 1993 at a scale of 1:15,000. For the Provincial Corridor (FMU E4), a recent set dating from 1996 at a scale of 1:15,000 was also available. The 1949-52 series was the preferred choice for boundary identification and delineation. This scale allowed for easy transfer of fire boundaries onto 1:50,000 topographic maps. The scale was also large enough to cover a large surface area without compromising the ability to detect fire boundaries. In that regard, the oldest photos were also preferred because historic fires can be better identified. The 1993 and 1996 series were used primarily for navigation and to identify road or aerial accessibility to sampling sites.

The stand boundaries identified on the air photos were transferred to 1:50,000 topographical

maps (labelled as AMaster copies≅). These maps, used in conjunction with air photos, served to locate the sampling sites and were used in the field to refine the exact location of stand boundaries when necessary.

2.3 Sampling location

Gathering information to reconstruct the fire history of a forested stand is best done by aging patches of remnant trees within, or on, the edges of a burn, and by sampling trees that germinated following the last fire (Arno and Sneck 1977).

Sample plots were located on each side of stand boundaries identified on the air photo. The number of sampling sites increased as the size of the stands increased, so that multiple burn histories within stands could be detected. When a stand appeared to be heterogeneous on the air photos, but no definite fire boundaries were visible, additional plots were taken.

2.4 Tree selection

Trees were sampled after doing a stand assessment, which consisted of walking through the forest in the vicinity of the plot location in search of survivors that could carry a fire scar or a release. A release is a sudden and significant increase in the ring growth pattern[1] due to a lack of competition for light and nutrients. Trees that show a release are frequently the survivors living on edges or within a burn. Unlike fire scars, a release can only be seen from a tree cross-section.

Sample trees were selected from survivors that might carry evidence of fire, and also from trees that had regenerated after the fire (Arno *et. al.* 1993). The most common size trees were sampled; these were not necessarily the largest trees. An average of four trees per stand were collected; eight trees when the sampling site fell on a fire boundary.

[1] The release should be sustained for a minimum of 10 years to be considered fire related (pers. obs.)

In stands containing several tree species, tree samples were taken from dominant and subdominant species. Most frequently, the dominant species was lodgepole pine (*Pinus contorta* Loudon)[2], white spruce (*Picea glauca* (Moench) Voss) and the black spruce (*Picea mariana* (Mill.) BSP). At higher elevation, mixed Engelmann spruce (*Picea engelmannii* Parry)/subalpine-fir (*Abies lasiocarpa* [Hook.] Nutt.) stands could also be found. In this case, the spruce was chosen over the fir, because the latter is considered to be a late seral species and is usually younger than the spruce (Aplet *et. al.* 1988, pers. obs.). In mixed stands of conifers and deciduous tree species such as aspen (*Populus tremuloides* Michx) and balsam poplar (*Populus balsamifera* L.), conifers were sampled because their annual growth rings are much easier to count, and their life expectancy is generally longer.

If the ages of the sampled trees differed by more than 20 years (as determined by a field count), up to three additional samples were collected in an attempt to more accurately estimate the date that the stand originated.

2.5 Field notes

While assessing the stand, the following information was recorded for each sampling site:

- date and sampling team
- plot number, UTM coordinates, descriptive location
- aspect, slope, elevation
- human disturbance such as logging or facilities
- dominant + subdominant tree species
- fire evidence such as charcoal, burnt snags or stumps, scars
- visual observation of the amount of deadfall (few, moderate, much)
- visual observation of the duff layer (low, moderate, thick)[3]
- main understory species
- number of trees sampled with species names and presence of fire related scars or releases

Note: a sample Field Sheet is provided in Appendix A.

The sample numbering scheme was as follows: year - study area - plot number. Each study area was designated by a code. The FMU E4 was divided in three sections to accommodate

[2] Moss 1992 serves as the reference for all tree names used in this report.

[3] A description of the amount of deadfall and duff layer can serve in the identification of the fuel type.

the length of this study area. Upper E4 was referred as >UE4=, Middle E4 as >ME4', and Lower E4 as >E4'. The Edson River Old Patch was designated by >M=, which stands for the Marlboro Working Circle.

2.6 Tree samples

2.6.1 General

Tree samples consisted largely of tree cross-sections (Acookies≅) but sometimes cores were taken when it was impossible to use a chainsaw. However, preference was given to cutting cross-sections as they are more accurate in tree aging (McBride 1983). All tree samples, including cross-sections and cores, are housed at the Environmental Training Centre, Hinton.

2.6.2 Cutting

Cross-sections were taken as close to the ground as possible to reduce the potential error due to a growth time-lag and to avoid missing growth rings (Zackrisson 1981, McBride 1983). However, no correction factor was applied for germination and growth time-lag, because field experience indicates that trees do not grow at the same rate due to several factors including genetic diversity and site.

Normally full cross-sections were not taken because of weight and space restrictions during transport to the laboratory. In addition, a dissecting scope used to count growth rings frequently cannot reach the pith of full cross-sections. Therefore the cross section was usually cut in half along the pith. For trees showing a release, the cross-section was taken from the side facing the burned area. As this side of the tree is favoured, due to reduced competition for space and light exposure, the release pattern is usually more significant.

2.6.3 Coring

Cores were taken at about 30 cm (12 inches) above the ground (Arno and Sneck 1977), or as low as possible for the reasons stated above. No cores were taken from scarred trees or from potential fire survivors, which might show a release in the ring width pattern, because such cores are unreliable in those circumstances (McBride 1983).

2.7 Sample preparation

2.7.1 General

Preparation of cross-sections and cores, and procedures for counting rings followed the

methods of Arno and Sneck (1977).

2.7.2 Cross-sections

The plot number and tree species were marked on each tree sample in the field with a waterproof pen. These samples were air dried for several days, and then sanded with an 80 grit paper on a belt sander until the surface was smooth and easily readable. A dissecting scope (10X) was used for ring counting and light oil was spread on the wood to enhance the visibility of the rings. A carving knife was used to plane areas of very constricted rings. A tick was marked on the sample at every 10^{th} ring.

2.7.3 Cores

Core samples were stored in plastic straws and labelled while in the field. In the lab, they were mounted on boards with glue, and allowed to dry for several days. These samples were sanded by hand, but otherwise the ring counting method was similar to that described for cross-section samples.

2.8 Tree aging

The aging of trees and scars followed methods of Arno and Sneck (1977). Multiple radii were counted on cross-sections when it appeared that scars or releases did not closely match the post fire generation ages. This was done to account for false or missing rings (Zackrisson 1981). Releases were searched for when a tree sample had been taken directly along an obvious fire boundary or if the sampled tree was a remnant surrounded by younger post-fire regeneration trees.

2.9 Database

Field information, tree ages and fire years established from scars and releases were stored in a digital spreadsheet program for easy access and ease of data manipulation.

2.10 Analysis (Preliminary mapping)

A sheet of mylar was overlayed on the topographical map (Master copy) showing the location of stand boundaries. The boundaries were drawn on the mylar and all tree ages and scar or release ages (fire years) related to each plot were marked.

Data were interpreted and stand ages were assigned using the following criteria.

(H) - based on a known date from historical records such as fire reports, dated photographs, old newspapers, etc.;
(S) - based on fire scars and post fire regeneration tree samples;

(R) - based on releases and post fire regeneration tree samples;

(O/5) - based on the oldest tree, 5 year class ;

(O) - based on the oldest tree, actual tree date;

(M/5) - based on the modal tree age, 5 year class;

(M) - based on the modal tree age, actual tree date;

(2^{nd} O) or **(3^{rd} O)** - based on the second or third oldest tree;

(E) - even-age stand;

(U) - uneven-age stand.

In the case of multi-aged stands where trees differed in age by more than 20 years, either the oldest tree or the modal tree age was chosen to represent the stand age. In each case the stand date was rounded to the older five-year-age-class rather than giving the actual tree date; i.e. if the oldest or modal tree was 1712, the year 1710 was assigned to it. If the oldest or modal tree happened to be on the five-year-age-class, the actual tree date was used.

The second or third oldest tree was used when the oldest tree(s) was not representative of the stand. This occurred when a long time period existed between the oldest tree(s) and the other ones. In the table of results for each study area, the year of the oldest tree(s) is posted in brackets.

During this procedure, some of the stand boundaries initially observed on the air photo were readjusted by adding or deleting one or more boundaries. This happened most frequently when two adjoining stands were old and no textural difference in the forest cover could be identified to outline the extent of the stand in question. The other common case was when two burns dating less than 20 year apart shared a common fire boundary. In each situation,

additional photo interpretation was done to subjectively trace the fire boundaries by using natural fuel breaks such as water bodies, rock outcrops, ridges and gullies.

2.11 Final Mapping

The final mapping procedure was to overlay a transparent acetate on the preliminary map in order to reproduce the stand boundaries and the stand origin dates. A non-permanent marker was used to allow boundary modification that may result from future research or new fires. This map was produced in a format ready for digitizing.

3 RESULTS

3.1 General

Results of the fire history work during 1997 are presented by study area. In the summary, each stand age identified in the area is presented, and discussed if the stand was multi-aged as a result of succession or multiple lower intensity fires, or if stand boundaries were subjectively defined.

All geographical references made in the text are based on the 1:50,000 NTS topographic maps. It should also be noted that tree species are simply referred to as pine or spruce stands, or by their designated species code. The legend of the tree species code is a follow: lodgepole pine (Pl), white spruce (Sw), black spruce (Sb), balsam fir (Fb), Engelmann spruce (Se), subalpine fir (Fa), aspen (Aw), and balsam poplar (Pb).

A summary table called AStand origin date statistics≅ follows each stand origin summary and explains how the stand origin dates were assigned based on the established criteria (section 2.10). Each stand age received a unique stand identification number (stand id). However, when stands with similar ages were thought to be from a different fire event, a separate stand id was given. The third column of the table represents the range of all tree ages found within the stand; the fourth column lists the criteria used to assign the stand date, while the fifth column reports the number of plots sampled. The last column shows the number of representative trees in comparison to the total number of trees sampled within that stand. The number of representative trees represents all trees within, and in the vicinity of the stand, that support the age of the stand. The age of a representative tree is never more than 20 years younger than the stand origin date. Occasionally, the number of representative trees is greater than the number of trees sampled in the stand. This is because some of the trees sampled in surrounding stands were used to support the date of the stand in question. This occurred when ages of neighbouring trees were very close to the stand origin date of interest, or when those trees showed a scar or a release testifying to the fire in question. Basically, the larger the ratio Arepresentative/total≅, the more accurate the stand origin date. For example, if a stand has 15 representative trees out of a total of 20 trees sampled (15 / 20), the stand age would be considered accurate.

The second table entitled AField statistics, fire scars and releases list≅ provides the basic field statistics for the area by listing the total number of plots, sampled trees, scarred trees and trees showing a release. The dates of all scars and releases found are also enumerated.

3.2 EDSON RIVER OLD PATCH

Stand origin summary

This study area is located north of the Town of Edson and is delineated to the south and east by the edge of the 1:50,000 83 F/15 topographic map. The western and northern boundaries of the area follow the height of land outlining the Edson River watershed. It encompasses a total of 252 km^2.

This forest mosaic turned out to be younger than what was suggested on the previous stand origin map done in 1960. It had been identified as an old age stand dating prior to 1831, but in fact only one very small stand dates prior to that (1755).

Three large fires occurred on this landscape in the last 150 years. The most recent dates from 1889 and burned the greater portion of the eastern half of the study area. Prior to that, an extensive fire, which happened circa 1870, burned most of the study area, leaving behind patches of stands dating from 1850, 1840 and 1835. Extrapolating from scattered patches of stands dating from 1840, which were found throughout the area, it would appear that the year 1840 was also a major fire year.

Plots taken in muskegs represented, with one exception, ages that were older than the surrounding area. It would appear that the wetter nature of such sites favours the survival of trees during fire.

As a general rule, the fire history research for this study area was challenging on all aspects. Poor quality of air photos in combination with a mixed forest of pine, spruce and aspen, made difficult the identification of fire boundaries. To further confuse the issue, selective logging was already present on the landscape prior to 1949. Since harvesting operations favour bigger size trees, it was simply assumed that logged areas were older and they were delineated as such during the stand identification phase of the stand origin mapping process.

To date, most of this landscape has been clearcut. Small buffers of trees remain west of Silver Summit Road, while a greater portion of a homogeneous pine stand still lies intact on the east side of Silver Summit Road. It is also to the west of Silver Summit Road that the greatest number of aspen and poplar trees are found. These trees were left uncut as they were not economically viable to the local industry at the time.

The difficulty with sampling these old aspen and poplar trees is that they are extremely rotten for aging and hardly ever carry evidence of fire. As a result, in patches of harvest remnants,

conifers were chosen over deciduous trees. However, in heavily logged areas, it was not always obvious if pioneer trees were being sampled. The remaining trees left in cut areas were often the smaller ones, making it difficult to now ascertain if they were part of the first cohort of trees. On the other hand, smaller trees are often the result of suppression due to site conditions, and can still accurately represent the origin of the stand.

The normal strategic sample layout for fire history research was put aside for this area as no fire boundaries remained to the west of Silver Summit Road. Instead, plots were distributed in patches of harvest remnants of significant sizes that were easily accessible. The road and seismic line networks existing in this region favoured the distribution and collection of 103 plots.

Note: The following information should be read in conjunction with Table 1 and with the stand origin map for this study area found in Appendix D.

1935 (105)* This patch represents a swampy area east of the Silver Summit Road in the 1889 stand (id 104).

1889 (104) Large stand covering the east portion of the study area. The several scars and releases found ranged from 1881 to 1904, while post-fire regeneration occurred between 1891 and 1907. Based on this information, and knowing that 1889 was a dry year where several other fires occurred in Alberta, the date 1889 was assigned to this stand.

Along and south of the Mayberne Fire Lookout road, three sites show dates ranging from 1931 to 1947. However, scars and releases found in vicinity of these sites date from circa 1889. It is possible that for some reasons, these sites were subjected to conditions leading to a lower recruitment rate.

1870 (99) Large stand covering most of the western portion of the study unit. Patches dating from 1870 are also found on the eastern boundary of the area under the 1889 fire (id 104). This suggests that this fire burned most of the study area at that time. The 1870 fire also burned with lower intensities in some areas as trees dating from the 1840 (id 103) and 1850 (id 101) were found among trees dating from 1870.

1850 Small patch of spruce along a ridge within the 1870 stand. No other evidence

(101) was found to support the existence of a fire in 1850. This stand may have originated from the 1840 fire (id 103) under a slower tree recruitment rate.

1850 (106) Scattered patches of remnants on the east side of Silver Summit Road. They are found along creeks, draws, and wet areas within the 1889 burn.

1845 (109) Two small patches of remnants within the 1870 burn, located along the >A= road (Emerson Creek Road).

1840 (103) Scattered patches of remnants throughout the study area. Stand composition is similar to the 1870 burn (id 99). Patches vary in size, and for the most part, stands delineation are arbitrary. However, delineation is more accurate for patches within the 1889 burn (id 104). No scars or releases were found, but the numerous trees that originated shortly after 1840 strongly suggest that there was a stand replacing event of a large magnitude at that time.

1835 (100) Due to absence of trees, only a very small area was sampled. The older aged trees found indicate that they are part of an older aged forest, which was selectively logged prior to 1950. As no stand boundaries remain today, it was assumed that the selectively cut area was older and represented the delineation of the stand.

1830 (108) Three small patches of spruce remnants within the 1889 burn. These patches are located about three kilometres south of Silver Summit Ski Hill.

1805 (102) Small clumps of old trees in the northwest corner of the study area. These patches are scarce and not obvious on the air photos. The delineation of these stands is arbitrary.

1755 (107) Small remnant stand of dense Sb located along a creek on the east side of Silver Summit Road. This stand encompasses the oldest tree found in the region.

* Please note that the stand identification numbers for this unit starts at 99 and follow the numbering system from the 1996 field season (Rogeau, 1996).

Table 1. Stand origin date statistics for the Edson River Old Patch*.

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1935	105	1935 - 1938	O, E	1	3 / 3
1889	104	1891 - 1943	S, R, E, U	27	79 / 95
1870	99	1870 - 1889	S, O, E	29	112 / 124
1850	106	1850 - 1878	3rd O, E, U (1780, 1837)	3	8 / 12
1850	101	1851 - 1882	2nd O/5, E, U (1804)	2	6 / 18
1845	109	1849 - 1859	O/5, E	1	3 / 3
1840	103	1840 - 1919	2nd O, E, U (1829)	24	72 / 95
1835	100	1839 - 1879	O/5, E, U	2	5 / 8
1830	108	1833 - 1899	O/5, E	1	3 / 4
1805	102	1806 - 1955	O/5, U	3	4 / 9
1755	107	1759 - 1809	O/5, U	1	1 / 4

* For explanation of how to read this table, please refer to sections 2.10 and 3.1.

Table 2. Field statistics, list of fire scars and release for the Edson River Old Patch.

Statistics	Scars	Releases
103 plots 394 trees 27 trees with one scar 72 trees with one release 4 tree with two releases	1978, 1974, 1964, 1962, 1956, 1938, 1935, 1912, 1904, 1901, 1896x2, 1895, 1894x2, 1893, 1892x2, 1890, 1889x5, 1886, 1867, 1865	1978, 1974, 1964, 1956, 1937, 1936, 1934x2, 1927x2, 1926, 1925x3, 1923x2, 1915, 1912, 1904x2, 1901, 1900, 1896, 1895x2, 1894, 1892x4, 1890, 1889x2, 1882, 1881, 1877 logging/cutline: 1991, 1986, 1983, 1980, 1977, 1976, 1975, 1972x2, 1971x3, 1970, 1968, 1965, 1963x3, 1962x3, 1961, 1960, 1959, 1958, 1957x5, 1956, 1955x2, 1954, 1952x2, 1951, 1950, 1949x2, 1948x2, 1940,

1933

3.3 PROVINCIAL CORRIDOR: UPPER E4

This portion of the Corridor was previously referred to as FMU E4. For ease of data compilation and presentation, Upper E4 (UE4) was divided into two areas. The first one represents the Rock Lake area and covers the landscape south of the Willmore Wilderness Park to, and including, Solomon Creek watershed. The other portion of UE4 includes all headwaters of creeks between Solomon Creek and Brule Lake. It is referred to in this document as the Brule Area. The area of these two sections are covered by the 1:50,000 topographical maps 83E/8 and 83E/9, and 83 F/5, respectively.

Stand origin summary

3.3.1 Rock Lake Area

The Moosehorn Trail valley appears to have the shortest mean fire return interval of the area, particularly near Moosehorn Lakes where fires occurred circa 1910, 1890 and 1840. As for the remaining part of the valley, which appears as a homogeneous pine stand, evidence of fires occurring around 1890, 1850, and possibly in the 1860's and 1870's, were found as well.

The 1890 and 1850 burns are the two largest of the area, and the 1890 fire overlaps a significant portion of the 1850 stand. Due to the age of these fires and the relatively short interval between them, boundaries are rather arbitrary. Additional plots would refine the delineation and extent of the 1890 fire, but access is limited in this region.

The most recent burns, 1925 and 1905, occurred just north of Rock Lake. Further north is also where the oldest forest of this region is found. These old stands range in age from 1630 to 1765. Aside from the old homogeneous pine stands along Mumm Creek, stand boundaries could not be identified on air photos. Selective logging also occurred in the 1940's and 50's to further confuse the issue. Additional plots are therefore strongly recommended to increase the accuracy of stand aging and delineation in the Mumm Creek valley. One thing to keep in mind, field crews would be faced with limited helicopter access and long bush walks would be necessary.

Note: The following information should be read in conjunction with Table 3 and with the stand origin map for this study area found in Appendix D.

1925 The most recent burn of this region is located along the north shore of Rock

(170) Lake and extends to the boundary of JNP. The stand is mainly composed of Pl trees.

>1920 (186) Unsampled recent burn straddling the boundary of Willmore Wilderness Park by Collie Creek. Extrapolating from the 1950 air photos, the fire should have occurred sometimes after 1920.

>1910 (155) Unsampled pine stand at the headwaters of an unnamed side creek to the east of Moosehorn Trail Creek and in proximity to the study area boundary. It is possible that this stand originated at the same time as its neighbour stand dating from 1880 (id 156). A longer recruitment time after the burn would explain the younger appearance of this stand on the 1950 air photos.

1910 (160) Recent fire that burned along the slopes of two unnamed creeks between Rock Lake and Moosehorn Lakes. Post-fire regeneration stand is mainly composed of Se trees with some Pl and Fb.

1905 (172) Pine stand extending from the north side of Rock Lake to Collie Creek, covering the bottom slopes of the Wildhay valley.

1890 (159) Large fire extending from the south shore of Rock Lake to Moosehorn Lakes and about half way down the Moosehorn Trail Valley. Most boundaries adjacent to the 1850 (id 168) burn were delineated subjectively due to the homogeneous aspect of this landscape and restricted number of plots that could be layed in.

1890/ 1910 (157) Pine stand by Moosehorn Lakes. The 1910 fire (id 160) burned over the 1890 burn (id 159) at a lower intensity, leaving more than 50% of the trees originating from the 1890 fire.

>1890 (149) Unsampled stand located on the study area boundary just east of Solomon Creek. This stand could not be visited due to limited access.

1880 (156) Association of Pl and Se trees in a no name valley to the east of Moosehorn Trail Creek and along the study area boundary. The boundary of this stand with the 1850 (id 168) one, is arbitrary.

1870 Stand of mixed Pl and Sw trees along Jackson Creek and extending into the

(174) Willmore Wilderness Park.

1870 (184) Scattered patches of pine in the 1905 burn (id 172) west of Collie Creek.

1865 (169) Small patches of Se remnants found at treeline of a side creek to the east of Moosehorn Trail Creek.

1860 (173) Scattered patches of Sw tree remnants north of Rock Lake in the 1905 burn (id 172).

1855 (185) Pine stand on the west side of Collie Creek.

1850 (163) Small Se stand straddling the JNP boundary by Bosh Range.

1850 (168) Large Pl and Se stand covering the rolling hills between Rock Lake and the Moosehorn Trail Valley. Evidence of this burn was also found north of Rock Lake. It also appears that the 1890 fire (id 159) would have burned over a great part of this fire. Boundaries with the 1890 burn are for the most part arbitrary.

1850 (182) Located in the Wildhay valley, just east of Mumm Creek, this stand was not sampled but appeared to be similar to the other 1850 stands (id 168).

1840 (158) Two small patches of Se along the Moosehorn Creek Trail, located about 1.5 km downstream of Moosehorn Lakes.

<1840 (150) Unsampled stand located on the study area boundary just east of Solomon Creek. This stand could not be visited due to limited access.

<1840 (154) Unsampled Se stand located on the boundary of the study area at the headwaters of a side creek off Solomon Creek.

<1840 (167) Unsampled Se stand along the JNP boundary. This stand was not sampled due to restricted helicopter access.

<1840 Two unsampled patches of spruce at the headwaters of a side creek off the north

(183) side of the Wildhay River. These stands could not be visited due to restricted helicopter access.

1830 (162) Se stand located in a small valley to the west of Moosehorn Lakes and enclosed by the JNP boundary. This stand shows some unevenness in age. Additional plots would bring up the comfort level, but access near the valley bottom is limited.

1810 (166) Small patch of Se remnant found in the 1910 burn (id 160). The stand is located along an unnamed creek in proximity to the JNP boundary.

1785 (151) Homogeneous Se stand with a few Pl at the headwaters of Solomon Creek.

1765 (181) Multi-aged spruce stand along Mumm Creek. This stand was partially logged in the 1940's and 50's.

1735 (152) Se stand at the headwaters of Solomon Creek.

1730 (179) Se stand on the east side of Mumm Creek. Boundaries with the 1680 (id 175) and 1765 (id 181) stands are subjective.

1725 (171) Small patch of Se tree remnants along Jackson Creek. This stand survived the 1905 (id 172) and 1925 (id 170) fires.

1720 (178) Multi-aged Se stand on the east side of Mumm Creek. Boundaries and date of this stand are somewhat arbitrary.

1705 (180) Mixed stand of Se and Fa trees at the headwaters of a side creek off the east side of Mumm Creek.

1680 (175) Patches of homogeneous pine within a large spruce stand located along Mumm Creek.

1675 (165) Scattered small patches of Se found at treeline in the 1910 burn (id 160), along JNP boundary.

1665 (153) Multi-aged Se stand in a side creek valley to the west of Solomon Creek.

1665(164) Scattered small patches of Se found at treeline in the 1910 burn (id 160), northwest of Moosehorn Lakes.

1660 (161) Se stand at the headwaters of a side creek on the east side of Moosehorn Creek Trail.

1660 (177) Se stand at the headwaters of Mumm Creek. Evidence of selective logging in the late 1950's was observed. Stand boundaries with the 1680 (id 175) and 1720 (178) stands are arbitrary.

1630 (176) Small homogeneous pine stand up Mumm Creek, in proximity to the Willmore Wilderness Park.

Table 3. Stand origin date statistics for UE4 - Rock Lake Area*.

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1925	170	no data	air photos + JNP data		
>1920	186	no data	air photos		
1910	160	1911 - 1945	R, E, U	8	26 / 35
>1910	155	no data	air photos		
1905	172	1907 - 1939	S, E, U	4	17 / 16
1890	159	1894 - 1947	S, R, E, U	14	49 / 52
>1890	149	no data	air photos		
1890 / 1910	157	1898 - 1939	R, E	3	16 / 14
1880	156	1865 - 1892	M, E, U	3	7 / 10

1870	174	1871 - 1898	O/5, E	3	10 / 11
1870	184	1872 - 1883	O/5, E	1	3 / 3
1865	169	1865 - 1869	O, E	1	3 / 3
1860	173	1861 - 1878	O/5, E	2	8 / 8
1855	185	1855 - 1900	O, E, U	3	8 / 11
1850	163	1853 - 1862	O/5, E	1	4 / 4
1850	168	1783 - 1906	R, E, U	20	45 / 77
1850	182	no data	stand id 168		
1840	158	1844 - 1853	O/5, E	1	4 / 4
1840	167	no data	air photos		
<1840	183	no data	air photos		
<1840	150	no data	air photos		
<1840	154	no data	air photos		
1830	162	1834 - 1906	O/5, U, E	2	2 / 8
1810	166	1813 - 1831	O/5, U	1	1 / 2
1785	151	1786 - 1818	2nd O/5, E, U (1775)	2	4 / 8
1765	181	1767 - 1859	O/5, U	1	1 / 4
1735	152	1735 - 1907	O, E, U	1	3 / 5
1730	179	1730 - 1776	O, E	1	3 / 4
1725	171	1726 - 1757	O/5, E	1	3 / 4
1720	178	1724 - 1866	O/5, U	2	2 / 8
1705	180	1709 - 1750	O/5, E, U	1	2 / 3
1680	175	1683 - 1829	O/5, E, U	2	3 / 8
1675	165	1676 - 1771	O/5, E, U	1	2 / 4
1665	153	1665 - 1859	O, U	2	1 / 8
1665	164	1665 - 1666	O, E	2	2 / 2
1660	161	1662 - 1805	O/5, U	1	1 / 4
1660	177	1661 - 1688	O/5, E	1	3 /4

1630	176	1632 - 1652	O/5, E	1	3 / 4

* For explanation of how to read this table, please refer to sections 2.10 and 3.1.

Table 4. Field statistics, list of fire scars and release for UE4 - Rock Lake Area.

Statistics	Scars	Releases
94 plots 368 trees 15 trees with one scar 46 trees with a release 4 trees with two releases 1 tree with three releases	1951, 1921, 1913, 1912, 1911, 1910x2, 1905x2, 1892, 1891, 1837, 1817, 1782, 1755	1987, 1985, 1964, 1962, 1960, 1959, 1958x2, 1957x3, 1956, 1955x2, 1954, 1953, 1952x2, 1949, 1947, 1943, 1937, 1935, 1931, 1927, 1925, 1917, 1914, 1912x2, 1911, 1907, 1902, 1900, 1899, 1898, 1897x3, 1895, 1892x2, 1891x2, 1882, 1878, 1877, 1867, 1852, 1847, 1837x2, 1827, 1817x2, 1797, 1737

3.3.2 Brule Area

All headwaters of creeks at the foot of Boule Range show older aged forests. Few plots could be taken in this area due to restricted access. However, the little information collected showed tree dates ranging mainly in the mid to early 1700's. In contrast, Black Cat Mountain Area has experienced more fires in comparison to other areas of the Front Range.

Descriptions of the origin of several stands of this region have been presented in the 1996 Stand Origin Mapping Report (Rogeau 1996). For the reader=s convenience, it is repeated in this report. However, it should be noted that the stand ids from last year=s study have not been used. The entire Provincial Corridor has its unique numeric system, so common stands to last year=s study have been given a new identification number.

Note: The following information should be read in conjunction with Table 5 and with the stand origin map for this study area found in Appendix D.

1946 (141) Most recent burn of the area, locally referred to as the ABlack Cat≅ burn. Trees sampled at higher elevations, along the edge of the burn, showed releases from the 1946 fire, but also from disturbances that occurred around 1898, 1926 and 1962. Post fire regeneration trees were found only for the 1898 release.

1936(136)	This fire was also identified in FMU E9 as stand id 7 and in W.A. Switzer Provincial Park as stand id 2 (Rogeau 1996). It is thought to have been ignited along the slopes of Boule Range, or along the shore of Brule Lake.
1915 (139)	This fire covers the east slopes of Mount Solomon. It was also identified in the FMU E9 as stand id 10 (Rogeau 1996).
1899 (148)	Mixed stand of Pl and Sw trees along Solomon and Levi Creeks.
1885 (138)	Located on the north shore of the Athabasca River, this stand escaped the 1915 (id 139) and 1936 (id 136) fires. Most of this stand has been logged, so trees sampled may not be representative of the original stand.
1880 (145)	Scattered patches of Pl in and above the 1946 fire (id 141). These patches were not sampled due to limited access. Stand information was drawn from a similar looking large stand dating from 1880 located nearby Sheba and Prine Creeks.
1860 (187)	Small stand along the east shore of Brule Lake. Stand is composed of evenly aged trees, but the delineation of the stand with the 1760 stand (id 135) is somewhat arbitrary.
<1840 (143)	Stand at the headwaters of Supply Creek, just west of Brule Lake. This stand could not be visited due to limited access. An approximate age-class was assigned base on the 1950 air photos.
1830 (144)	Spruce stand at the headwaters of Scovil Creek. Only one plot was taken due to limited access.
1820 (140)	Small remnant patches found along the border of the 1915 (id 139) and 1936 (id 136) burns. Evidence of this fire is also present in the 1795 (id 137) burn (plot 96-E4-155). However, it was not mapped since no fire boundaries could be identified between the 1820 and 1795 stands.
1795 (137)	Strip of spruce remnants extending along the west shore of Brule Lake and downstream along the north bank of the Athabasca River.
1760	This stand falls in the Camp One Area east of Brule Lake. With a homogeneous

(135) appearance, this stand is in fact multi-aged. This may be attributed to the quality of some of the trees sampled, which were taken in patches of remnants in cutblocks or along edges of cutblocks.

1755 (142) This stand is located at high elevation above the Black Cat burn. It appears to be homogeneous over an extensive area along the Boule Range. However, only one plot was taken due to limited access. Stands under similar conditions and in similar locations (north of the 1755 stand) dated in the early 1700's. Therefore, it should not be precluded that this stand is older.

<1750 (147) This stand, located at the headwaters of Levi Creek, was not sampled. An arbitrary age-class is assigned based on the 1950 air photos and stand dates from surrounding areas.

1705 (146) Se stand at the headwaters of Sheba and West Fork Creeks. Due to limited access, only two plots were taken. The one at the headwaters of West Fork Creek shows a very homogeneous stand dating from 1705, while the other plot, located at treeline of the headwaters of Sheba Creek, display much younger tree ages. Air photo texture do not indicate the presence of a younger burn. During field sampling, it was common to find younger aged trees near treeline or at the very headwaters of creeks. This could be associated to the fact that high elevation areas are more subject to harsher weather conditions, favouring a longer post-fire recruitment time.

Table 5. Stand origin date statistics for UE4 - Brule Area*.

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1946	141		96 fire history study, FMU E4 std id 98		
1936	136		96 fire history study, FMU E4 std id 7		
1915	139		96 fire history study, FMU E4 std id 10		
1899	148	1902 - 1910	S, E	1	7 / 4
1885	138		96 fire history study, FMU E4 std id 94		

1880	145	1883 - 1898	O/5, E	1	3 / 3
1860	187		96 fire history study, Camp One Area std id 81		
<1840	143	no data	air photos		
1830	144	1833 - 1899	O/5, E, U	1	2 / 4
1820	140		96 fire history study, FMU E4 std id 95		
1795	137		96 fire history study, FMU E4 std id 96		
1760	135		96 fire history study, Camp One Area std id 80		
1755	142		96 fire history study, FMU E4 std id 97		
<1750	147	no data	air photos		
1705	146	1705 - 1892	O, E, U	2	4 / 8

* For explanation of how to read this table, please refer to sections 2.10 and 3.1.

Table 6. Field statistics, list of fire scars and release for UE4 - Brule Area.

Statistics	Scars	Releases
5 plots 19 trees 2 trees with one scar	1899, 1902	

3.4 PROVINCIAL CORRIDOR: MIDDLE E4

This portion of the Corridor was previously referred to as FMU E5. For ease of data compilation and presentation, Middle E4 (ME4) was divided into two areas. The first one covers the landscape between the Yellowhead Highway and the Hamlet of Cadomin, while the remaining portion of ME4 falls between the Hamlet of Cadomin and the Cardinal Divide. It also corresponds to the areas covered by the 1:50,000 topographical maps 83F/3 and 83F/4, and 83 C/14, respectively.

Stand origin summary

3.4.1 Yellowhead Highway to Cadomin

From circa 1840 to 1920, there was evidence of burning every 5 to 20 years, with the largest fire dating from 1887. This fire covered the slopes of the Folding Mountain watershed and extended all the way down to the Hamlet of Cadomin.

The oldest stand found dated back to 1620 and, as with the majority of all stands dating from the 1700 and 1600's, it was located at the headwaters of creeks adjacent to JNP boundary. In that regard, stands located at the headwaters of creeks also had a tendency to be multi-aged and to possess much younger trees around treeline. This could be explained by a longer post-fire recruitment time due to harsher weather conditions found at such elevations. Younger aged trees could also reflect the uphill movement of treeline overtime under a prolonged lack of disturbances.

As a general rule, the stand origin dating and mapping for this part of the Corridor is not as accurate as it could be. This is the result of the following combined factors: darkish air photos, extensive mining, which modified the landscape, restricted access by helicopter due to dense and continuous vegetation cover, lack of road or all terrain vehicle access, and a short fire interval that prevented the identification of clear distinct fire boundaries.

If more accuracy is desired with stand dating in the Mountain Park Area and between Folding Mountain and Sphinx Creek, I strongly suggest collecting an additional 20 to 30 plots placed in strategic areas and in undated polygons. However, this sampling would be time consuming due to logistics of dealing with an area of very limited access. These plots would have to be approached by foot in challenging terrain. When possible, the help of a helicopter for drop offs and pick ups would be advantageous, and extra heli-pads would also improve access. Additional plots on both mine sites would be required as well. This would involve

obtaining permission to enter the mine sites and train a crew for mine safety.

Note: The following information should be read in conjunction with Table 7 and with the stand origin map for this study area found in Appendix D.

>1980 (102)	Small fire that occurred on the Gregg River Resources mine site.
1930 (92)	Three small patches of young Pl and Sw trees along meadows north of Cadomin.
>1930 (94)	Very small burn on the Cardinal River Coal mine site. This stand could not be accessed for dating, but it appeared to be no older than the 1930's.
1926 (134)	Association of Pl, Sw and Aw trees along the Yellowhead Highway. This stand was sampled and dated as part of the 1996 fire history study of Camp One Area.
1926 (116)	Mixed stand of Se, Pl and Fa trees between Mystery Lakes and Mount Drinnan. Several small pockets of Se escaped this fire, but they could not all be dated. Most of them appeared to be dating from 1887 (id 91).
1925 (108)	Pl and Se stand in Sphinx Valley. This fire burned at different intensities leaving significant numbers of scattered and pockets of trees from the 1887 burn (id 91). Fire boundaries are therefore generalized to accommodate the patchy nature of this burn, and also because the darkish air photos are difficult to correctly interpret.
1908 (117)	Small burn along the north slopes of Drinnan Creek nearby the boundary of the Provincial Corridor.
1905 (110)	Small Pl stand on the southeast facing slopes of the headwaters of South Drinnan Creek. No fire evidence was found to support this fire date. It is possible that this stand is part of the 1887 burn (id 91), and simply experienced a longer post-fire regeneration lapse time.
1894(	Pine stand on the est side of Highway 40 across from the Cardinal River Coal

93) Mine. Several recent burns (1887, 1894, 1930) occurred in this area, and as a result, boundaries among all these pine stands of recent age are difficult to identify. Further, only one plot could be taken, leaving the extent of this burn obscure. The fire date is based on a release found on a remnant Sw tree among the pines. Post-fire regeneration tree ages date from 1912 to 1915, an indication of a rather slow recruitment process.

1894 (101) Pine stand on the north slopes of Mary Gregg Lake. This stand could not be accessed due to mining, but it looked similar to stand id 93, which is a few kilometres to the east.

1887 (91) Large burn extending from Folding Mountain to Cadomin. The true extent of this fire is unknown as it extends beyond the southeast boundary of the study area. Very few releases and scars were found to help date this burn, but fire evidence discovered indicate a burning date occurring between 1886 and 1895. Post-fire regeneration tree ages also support adequately the 1887 date.

1880 (106) Small patch of Se trees along a side creek off Sphinx Creek.

1880 (114) Patch of Pl straddling a forested low summit. This stand escaped the 1887 (id 91) burn.

1880 (132) Large, homogeneous stand of mixed Pl and Sw trees covering the slopes of Drystone Creek. The very restricted access of this basin did not favour sampling in the valley bottom. Plots had to be located on the highest slopes on one of Folding Mountain ridges. This limitation may have affected the accuracy of the stand date and prevented field crews from finding other possible burns that could not be identified on the air photos.

1875 (115) Scattered patches of a mixed stand of Pl and Sw trees located along the east side of Folding Mountain Creek and along Drinnan Creek. These stands survived the 1887 fire (id 91). Due to the short interval between these two burns, stands are difficult to discern. In general, the 1875 stands possess a greater number of spruce trees.

1875 Two strips of spruce trees in the 1887 burn (id 91) east of Folding Mountain Creek. These stands could not be sampled, but were believed to be part of the

(122) 1875 fire (id 115).

1870 (99) Mixed stand of pine and spruce trees on each side of Sphinx Creek. Stand boundaries with the 1887 (id 91) and 1861 (id 98) burns are subjective. No data was collected on the east side of Hwy 40, consequently, the stand age for this side of the highway may be inaccurate. Judging by the 1950 air photos and surrounding burns, the date of this stand should range between 1860 and 1890.

1861 (98) Pl stand on each side of Berry=s Creek. Boundaries with the 1870 (id 99) and 1685 (id 95) stands were arbitrarily delineated. Extra plots are thus encouraged to improve the fire mapping. However, the entire stand is located on the Greg River Resources mine site, rendering access more difficult.

1850 (133) Pine stand at the base of Folding Mountain near the Yellowhead Highway. Stand boundaries with the 1880 (id 132) and 1670 (id 131) stands are arbitrary.

>1840 (100) This stand could not be visited due to mining. Based on the 1950 air photos, this stand appears to have regenerated no later than the 1840's.

1840 (123) Multi-aged strip of Se trees close to treeline on the east side of Folding Mountain.

>1840 (124) Several patches of spruce trees scattered between Mystery Lake and Folding Mountain could not be visited. Therefore their stand origin date is unknown. According to the 1950 air photos, they are likely to have originated prior to 1840.

1797 (119) Strip of big size spruce along the valley bottom of Drinnan Creek, just east of Mystery Lake.

1790 (104) Spruce stand at the headwaters of Berry=s Creek.

1780 (105) Small spruce stand between Sphinx and Berry=s Creek.

1780 This stand straddles the Provincial Corridor boundary just east of Folding

(128) Mountain. Tree age data from the 1996 fire history study (Warden Creek Area) were used to age this stand.

<1780 (129) Four patches of spruce remnants at treeline of the eastern slopes of Folding Mountain could not be visited. Based on the 1950 air photos, these stands look older than the surrounding stand, which dates from 1780 (id 128).

1780 (130) Spruce stand along the Provincial Corridor boundary to the north and west of Drinnan Creek. This stand could not be visited, but it looks similar to the 1780 stand (id 128) to the north.

1755 (96) Scattered patches of Se remnants along the northeast facing slopes of Luscar and Loyland Mountains survived the 1917 fire (id 51).

1755 (103) Small patch of Sw remnants along the east side of the railroad north of Cadomin. A few trees show releases occurring in 1975-76. Possibly another burn occurred in the late 1970's, but no post-fire regeneration trees representing this possible burn were sampled.

1745 (120) Strip of Se trees along Folding Mountain Creek, just north of Mystery Lake.

1735 (118) Patch of Se and Fa trees to the southeast of Mystery Lake.

1730 (113) Multi-aged spruce stand at the headwaters of a no name creek just east of Mount Drinnan.

1720 (112) Multi-aged spruce stand at the headwaters of a no name creek between Mount Drinnan and Slide Mountain.

1700 (111) Multi-aged stand of mixed Se and Fa trees at the headwaters of South Drinnan Creek.

1700 (125) Multi-aged stand of mixed Se and Pl trees at the headwaters of Folding Mountain Creek.

1685 Along the south slopes of Luscar Creek, this is the oldest patch of remnants that

(95) survived in the valley bottom. The boundary with the 1861 fire (id 98) is arbitrary due to the mine disturbance. If undisturbed forests still remain on the mine site, additional plots are recommended to increase the accuracy of the mapping.

1685 (121) Strip of Se trees to the east of Folding Mountain Creek. The delineation of the bottom part of this stand was unclear due to the topography and shadow effect.

1670 (126) Strip of Se and Fa remnants at the headwaters of Folding Mountain Creek.

1670 (127) Three patches of spruce remnants at treeline along the southern slopes of Folding Mountain. These stands are assigned a similar age as stand id 126, but could not be visited.

1670 (131) Large multi-aged spruce stand along the eastern slopes of Folding Mountain Range and just south of the Yellowhead Highway. Fire history data collected in 1996 were used in combination with this year=s data.

1640 (109) Very small patch of Se remnants along the shores of South Drinnan Creek.

1620 (97) Fairly large Se stand at the headwaters of the Gregg River, just above the Cardinal River Coal mine site.

1620 (107) Multi-aged Se stand located at the very headwaters of Sphinx Creek. Largest trees were too rotten and dangerous to fell. This implies that this stand could easily be older.

Table 7. Stand origin date statistics for ME4 - Hwy 16 to Cadomin*.

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
>1980	102	no data	93 air photos, GRRL		

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1930	92	1931 - 1956	2nd O/5, E (1928)	3	10 / 12
>1930	94	no data	air photos		
1926	134	no data	96 fire history study, Camp One Area, std id 85.		5 / 8
1926	116	1901 - 1947	R, E, U	3	14 / 15
1925	108	1929 - 1949	R, O/5, E	3	15 / 15
1908	117	1882 - 1917	S, R, U	1	3 / 4
1905	110	1908 - 1928	O/5, E	1	4 / 4
1894	101	no data	stand id 93		
1894	93	1912 - 1915	R, E	1	4 / 3
1887	91	1887 - 1968	R, S, E	31	114 / 117
1880	106	1880 - 1893	O/5, E	1	4 / 4
1880	114	1880 - 1888	O, E	1	4 / 4
1880	132	1881 - 1868	O/5, E, U (96-97 data)	4	8 / 16
1875	115	1867 - 1928	O/5, E, U	8	24 / 28
1875	122	no data	stand id 115		
1870	99	1870 - 1904	O, E, U	2	8 / 8
1861	98	1863 - 1891	S, R, E, U	2	10 / 9
1850	133	1853 - 1880	O/5, E, U (96 data)	2	8 / 15
<1840	124	no data	air photos		
>1840	100	no data	air photos		
1840	123	1841 - 1890	O/5, E, U	1	2 / 4
1797	119	1806 - 1885	S, R, E, U	1	3 / 4
1790	104	1793 - 1842	2nd O/5, E, U (1669)	3	4 / 12

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1780	105	1783 - 1869	O/5, U, E	1	2 / 5
1780	128	no data	96 fire history study, Warden Creek Area std id 93		
<1780	129	no data	air photos		
1780	130	no data	stand id 128		
1755	96	1759 - 1772	2nd O/5, E (1709)	1	3 / 4
1755	103	1755 - 1802	O, E, U	1	2 / 4
1745	120	1749 - 1771	O/5, E, U	1	2 / 3
1735	118	1737 - 1770	O/5, E, U	1	2 / 4
1730	113	1733 - 1794	O/5, E, U	1	2 / 4
1720	112	1723 - 1843	O/5, U	1	1 / 4
1700	111	1701 - 1862	O/5, U, E	2	2 / 10
1700	125	1704 - 1847	O/5, U, E	2	3 / 8
1685	121	1685 - 1719	O, E, U	1	3 / 4
1685	95	1685 - 1789	O, U	1	1 / 4
1670	127	no data	stand id 126		
1670	131	1673 - 1868	O/5, U (96-97 data)	4	2 / 16
1670	126	1670 - 1722	O, U	1	1 / 4
1640	109	1644 - 1819	O/5, U	1	1 / 4
1620	107	1624 - 1846	O/5, U	1	1 / 5
1620	97	1623 - 1822	O/5, E, U	1	3 / 6

* For explanation of how to read this table, please refer to sections 2.10 and 3.1.

Table 8. Field statistics, list of fire scars and release for ME4 - Hwy 16 to Cadomin.

Statistics	Scars	Releases
92 plots 390 trees 9 trees with one scar 24 trees with a release 1 tree with two releases	1941, 1935x2, 1898, 1887, 1861, 1797,	1976, 1975, 1942, 1928, 1926, 1922, 1917, 1914, 1908, 1895, 1894, 1890, 1887x2, 1886, 1882, 1975, 1867, 1860, 1857, 1841, 1840, 1838, 1837, 1831, 1788, 1797

3.4.2 Cadomin to Cardinal Divide

One extensive burn covered more than 80% of the McLeod Valley in the early 1900's. In general, the Aold≅ forest appears to be younger than the one south of the Cardinal Divide. Due to coal mining, this area has also been more heavily disturbed than the region south of the Cardinal Divide. Thus, it should not be precluded that anthropogenic fires may have largely contributed to shaping the forest mosaic of this region.

The area located between Cadomin Mountain - Whitehorse Creek and the Cardinal Divide has also experienced quite a few fires in the mid 1800's. However, the magnitude of their extent is unknown due to the last large fire of 1917, which erased most fire evidence.

Significantly older stands, ranging in date from 1560 to 1780, are found at higher elevations, close to treeline and at headwaters of side creeks.

Note: The following information should be read in conjunction with Table 7 and with the stand origin map for this study area found in Appendix D.

1917 (51)	Extensive fire that covered the entire McLeod Valley. The configuration of fire boundaries indicate that the fire travelled in a southeasterly fashion, likely taking its source on the slopes of Leyland Mountain, just west of the Hamlet of Cadomin. The fire died out at the Cardinal Divide and along the slopes of Red Cap Mountain below the Grave Flats fire lookout. Post-fire regeneration tree species is dominated by Pl, but at higher elevations, notably along the slopes of Prospect, Cheviot and Tripoli Mountains, Se trees prevail.
>1890 (88)	Undated stand on the northeast side of Cadomin Mountain. Only a small portion of this stand falls into the Provincial Corridor, most of it is on the Weldwood FMA.
1877 (85)	Very small patch of Se remnants on the northwest slopes of Cadomin Mountain. This stand survived the 1917 fire (id 51).
1860 (73)	Scattered small patches of Se remnants on the east side of the Forestry Trunk Road across from Cheviot Creek.

1850(78)	The true extent of this burn is unknown but evidence shows that it encroached into the 1720 stand (id 72) east of Thornton Creek and north of the Cardinal Divide.
<1840 (79)	Patches of Se remnants along treeline of the east slopes of Nikanassin Range. No data was collected for these patches due to a combination of restricted access and limited time.
<1840 (80)	Two small patches of spruce just north of Prospect Creek. Limited access precluded sampling either stands.
<1840 (86)	Four undated patches of spruce at the headwaters and to the east of Little Mackenzie Creek.
1830 (84)	Large Se stand covering the Harlequin Valley and the headwaters of Whitehorse Creek. On the south facing slopes of Whitehorse Creek, across from Harlequin Creek, there is evidence of passive crown fire activity from the 1917 fire (id 51), for a distance of about 4 km.
1795 (90)	Two small Se stands at the headwaters of two side creeks to the south of Leyland and Luscar Mountains. Only the one below Luscar Mountain was sampled.
1780 (71)	Small patches of Se remnants just northeast of the Cardinal Divide.
1770 (83)	Scattered patches of Se remnants at the headwaters of the northern fork of Drummond Creek.
1765 (82)	Two patches of Se remnants at the headwaters of Prospect Creek and above an abandoned mine.
1750 (81)	Scattered patches of Se remnants at the headwaters of Drummond Creek.
1720 (72)	Large patch of Se trees just north of the Cardinal Divide and running along the slopes of Tripoli Mountain.
1715	Small patch of Se trees at treeline on the south facing slopes of Cadomin

(77) Mountain.

1700 (74) Strip of Se remnants across from Cheviot Creek.

1645 (75) Small patch of Sw remnants along Mackenzie Creek just east of the Nikanassin Range.

1625 (87) Strip of gigantic spruce trees at the headwaters of a side creek off Little Mackenzie Creek. Based on the 1950 air photos, a strip of similar forest runs along the treeline of the northeast slopes of Cadomin Mountain.

1560 (76) Strip of stunted Se and Fa trees to the east of Cadomin Mountain.

1505 (89) Se stand located at the headwaters of a side creek to the north of Whitehorse Creek. It is the oldest stand found between Whitehorse Creek and the Cardinal Divide. The common boundary with the 1830 stand (id 84) is arbitrary.

Table 9. Stand origin date statistics for ME4 - Cadomin to Cardinal Divide*.

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1917	51	1916 - 1952	R, E	24	79 / 88
>1890	88	no data			
1877	85	1881	R, 2nd O (1820)	1	2 / 2
1860	73	1860 - 1889	O, E, U	1	3 / 4
1850	78	1852 - 1867	O/5, E	1	4 / 4
<1840	79	no data			
<1840	80	no data			
<1840	86	no data			
			2nd O/5, U		

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1830	84	1834 - 1921	(1820)	4	5 / 17
1795	90	1796 - 1821	O/5, E	1	2 / 3
1780	71	1782 - 1850	2nd O/5, E, U (1725)	2	4 / 6
1770	83	1771 - 1867	O/5, E, U	1	2 / 4
1765	82	1767 - 1775	O/5, E	1	3 / 3
1750	81	1751 - 1814	O/5, U, E	1	2 / 5
1720	72	1721 - 1797	O/5, E, U	2	5 / 8
1715	77	1718 - 1880	O/5, U	1	1 / 4
1700	74	1704 - 1791	O/5, U	1	1 / 4
1645	75	1647 - 1743	O/5, E, U	1	2 / 4
1625	87	1628 - 1829	O/5, U	1	1 / 4
1560	76	1564 - 1697	O/5, E, U	1	2 / 4
1505	89	1509 - 1651	O/5, U, E	1	2 / 6

* For explanation of how to read this table, please refer to sections 2.10 and 3.1.

Table 10. Field statistics, list of fire scars and release for ME4 - Cadomin to Cardinal Divide.

Statistics	Scars	Releases
37 plots 53 trees 1 trees with one scar 16 trees with a release 1 tree with two releases	1914	1962, 1957, 1955, 1947, 1937, 1925, 1923, 1922x2, 1921, 1919, 1918, 1917x3, 1910, 1907, 1893, 1877, 1730

3.5 PROVINCIAL CORRIDOR: LOWER E4

This portion of the Corridor was previously known as FMU E11. It includes the landscape south of the Cardinal Divide, including the slopes of Red Cap Mountain, and tapers off to the north shore of the Southesk River. It also includes a section of the Weldwood FMA, which was categorized as an old age gap on the original stand origin map produced in the 1960's. The boundaries of this Aold age gap≅ are defined to the west, north and east by the Provincial Corridor, and to the south by the Alexis Band Land Settlement. In that regard, no plots were collected on that land settlement, resulting in a gap on this year=s stand origin map. The landscape of LE4 is covered by the 1:50,000 topographical maps 83C/14, 83C/11, 83C/10 and 83C/15.

Stand origin summary

In general, this area is composed of old growth forest, especially at the headwaters of all major creek systems. Stand origin dates range from 1540 to 1830, and 200 to 300 year old stands are not uncommon. As a result of the old nature of this landscape, delineation of stand boundaries was difficult at times.

Most stands do not present any surficial traces of fire evidence and, as a result, stand dates are generally based on the oldest tree found. Overall, a very low number of fire scars exist and they are usually located along recent burns (post 1880). Releases are more common but are often not concordant with any tree ages. This implies that stand dates do not necessarily reflect the exact year of origin, and that they could be much older than the calculated dates. A lot of stands are also in a succession stage and hence, present a multi-aged aspect. Interestingly, 275 to 430 year old pure lodgepole pine stands can be found with no evidence of spruce succession. Their stand dynamics consist of a pine succession taking place in gaps formed by downed veterans.

While mapping this region, an interesting fact presented itself. A very small area, between Nomad and Ruby Creeks and in border of the Alexis Band Land Settlement, seems to have a much shorter fire cycle that the remainder of the area. Evidence was found that seven fires have overlapped this area since 1665. Fires occurred in 1665, 1725, 1765, 1847, 1859, 1897 and 1917. Scars and releases can be found for all 1800 and 1900's fires. The most recent fire, and possibly previous ones, started next to a small lake in proximity of Ruby Creek. It would be interesting to conduct a small study to find out why this area tends to burn so often. Are lightning strikes more attracted to this sector? Was this a well travelled route by early

explorers and aboriginals who had a camp fire by the lake?

Overall, this whole region is not favourable to burning. It shows evidence of only seven fires since the 1880's. Two of these fires, including the largest, came from outside the study area.

Note: The following information should be read in conjunction with Table 11 and with the stand origin map for this study area found in Appendix D.

1917 (51) Large fire that burned most of the McLeod Valley (ME4). It spread south along the slopes of Redcap Mountain, jumped the Cardinal Divide and burned a small section on its east side.

1917 (28) This fire, approximately 2500 ha in size, started between Nomad and Ruby Creeks, spread to the east and stopped at about 1 km before the Cardinal River. This fire burned overtop of an 1897 burn (id 29), but also left behind small patches of stands dating from 1847, 1859 (id 30), 1725 (id 31), 1765 (id 27), and 1665 (id 32). This is the only area of this unit that shows a higher fire frequency.

1915 (4) Recent burn in the most southern part of the Corridor. The fire came south of the Corridor, therefore its extent is unknown.

1903 (62) Small fire that was ignited just below the Grave Flats fire lookout, which wasn=t there at the time (erection date: 1927). The fire spread downhill to the east and north and died out at the bottom of the hill.

1898 (50) Young Se stand along the slopes of the Cardinal Divide. It appears that the fire was ignited along the north shore of the Cardinal River.

1897 (29) This fire is located between Nomad and Ruby Creeks, but most of it was erased by a subsequent fire dating from 1917 (id 28).

1897 (86) Tip of a recent burn that moved uphill on the east slopes of Redcap Mountain. No data was collected in this stand. Based on the 1950 air photos, this fire appears to be similar to the one (id 69) that burned in the Grave Flats area.

1897

(69) This fire slightly encroached on the study unit in the Grave Flats area.

1888 (5) Extensive burn around Neilson and Chimney Creeks that came east of the study boundary. As a result, its true extent is unknown but it appears to be quite large. Along the slopes of the headwaters of Neilson and Chimney Creeks, post-fire regeneration appears to be much slower (1930's and 1950's). Fire scars range between 1888 and 1895, with more scars dating from 1888. It is possible that this fire dates from 1889, as this was a very dry year when numerous fires were recorded in Alberta and North America.

1870 (60) Strip of Pl along the east shore of the Cardinal River, at the same level as the fire lookout.

1859 (30) Small patches of Se with scattered Pl trees by the Nomad Creek area.

1850 (57) Se stand along a south facing ridge between Russell and Nomad Creeks.

1835 (66) Strip of open, wet spruce trees on the east slopes of Redcap Mountain, below the fire lookout.

1830 (1) Three patches of Pl and Se trees along and north of the Southesk River. Boundaries with stands 1705 (id 3) and 1795 (id 2) are not well defined. Stands are multi-aged with tree dates ranging from 1732 to 1883. The majority of trees date between 1830 and 1850.

1820 (63) Mixed stand of Se and Fa along the east slopes of Redcap Mountain, below the fire lookout. The stand is multi-aged and its date of origin is based on the most common tree date that was found. A couple of additional plots would increase the accuracy of the date of origin.

1815 (45) Strip of Pl and Sw trees along the Forestry Trunk Road between Toma and Russell Creeks.

1810 (17) Three small patches of wet meadows partly filled with scattered Sw and a few Pl trees. These patches were detected in the 1780 (id 16) and 1790 (id 18) stands. These stands may represent ingrowth, or be part of the same disturbance as the

surrounding stands (recruitment process was slower due to site conditions).

1805 (9) Couple of patches of Se trees encroaching on the east side of the study area boundary, just northwest of the Southesk River.

1800 (14) Decayed, multi-aged Se stand with some Pl, located on the left fork of Chimney Creek.

1795 (2) Small even-aged patch of spruce. The boundary delineation with the 1705 stand (id 3) is arbitrary.

1795 (39) Two Se stands with some Pl trees located off the west side of Russell Creek.

1790 (18) Association of Se and Pl trees across Thistle Creek and straddling the boundary of the study unit.

1780 (65) Open Se stand along the Forestry Trunk Road and southeast of the fire lookout.

1780 (16) Se stand with some Pl, established between Thistle and Chimney Creeks.

1770 (49) Fairly large mixed stand of Se and Pl, extending from the Cardinal headwaters to the Cardinal Divide. Part of this stand was burned in 1898 (id 50).

1770 (55) Small patch of Pl trees along the south shore of the Cardinal River and along Russel Creek. Boundaries with the 1665 (id 58) and 1725 (id 31) stands are arbitrary.

1770 (20) Fairly extensive stand of mixed Se and Pl trees between Ruby and Thistle Creeks.

1770 (70) Small patch of an open Se remnant stand in the 1917 burn (id 51), below Redcap Mountain.

1765 Island remnants of evenly aged Se trees located in the 1917 burn (id 28),

(27)	between Mount Russel and Ruby Creek.
1750 (22)	Multi-aged open Pl and Se stand, northeast of Ruby Mountain.
1750 (64)	Small patches of open wet meadows filled in with scattered Sw and Pl trees.
1750 (13)	Small association of Se and Fa trees along the west fork of Chimney Creek.
1735 (59)	Large, decayed, pure Pl stand along the slopes of Redcap Mountain below the Grave Flats fire lookout. Strips of Se trees are found in creek draws, but their stand dates are similar to the surrounding pine stand.
1730 (15)	Patch of Se and Fa trees along Chimney Creek and straddling the LE4 boundary.
1730 (67)	Scattered patches of pure Pl remnants, and Se and Pl remnants, around Grave Flats.
1725 (31)	Three small patches of Pl remnants around a wet meadow off Nomad Creek.
1725 (19)	Very small patch of an open Pl stand on a slope above Thistle Creek. Clean understory with very few Se seedlings.
1720 (10)	Patch of mixed Se and Pl east of Chimney Creek, which survived the 1888 fire (id 5).
1720 (38)	Patch of Se trees on the east slopes of Mount Mackenzie.
1720 (25)	Small patch of Se trees along Ruby Creek, close to the headwaters.
1720	Small Se stand at the headwaters of the Cardinal River.

(48)

1710 Mixed stand of Se, Sb and Pl trees along the slopes of the Cardinal Divide.
(52)

1705 Strip of Se and Fa trees at treeline, north and south of Neilson Creek.
(11)

1705 Small strip of remnants at treeline, south of Neilson Creek. This stand was not
(12) sampled due to inaccessibility and was arbitrarily assigned the same date as stand 11, which is in the vicinity.

1705 Small stand of mixed Pl and Se just north of the Southesk River. Boundaries
(3) with the 1830 (id 1) and 1795 (id 2) stands are arbitrary.

1700 Very small patch of Se remnants below Redcap Mountain. This patch is one of
(53) the few that has survived the 1917 fire (id 51).

1700 Small patch of Se remnants along Chimney Creek.
(7)

1690 Association of Se and Fa trees extending from Russel to Toma Creeks. The
(42) boundary between this stand and the 1670 one (id 35), is arbitrary.

1685 Strip of spruce bordering the Cardinal River, northeast of Mount Mackenzie.
(40)

1680 Small association of Se and Pl remnants on the north shore of Ruby Creek.
(26)

1670 Strip of remnants by Chimney Creek. The boundary with the 1700 (7) stand is
(6) arbitrary.

1670 Large Se and Fa stand, with some Pl trees, located between Mount Mackenzie
(35) and Mount Russel. Scattered through this stand several small older patches dating from 1540 (id 46), 1565 (id 37), 1645 (id 36) and 1610 (id 34), were found. The boundary with the 1690 stand (id 42) is arbitrary.

1670 (54) Small patch of Sw trees along the north shore of the Cardinal River, below Redcap Mountain.

1665 (8) Patch of mixed Sw, Pl and Fb remnants east of Chimney Creek.

1665 (58) Small patch of dense Se trees close to a wet meadow in a side creek off the Cardinal River.

1665 (32) Small Se remnant stand along wet meadow off Nomad Creek.

1660 (21) Large multi-aged stand at the headwaters of Thistle Creek. Several plots were taken, but no consistency in tree age data exists. Dates range from 1662 to 1870, thus the stand date was based on the oldest tree collected.

1650 (56) Three open Se stands in proximity to a wet meadow along a side creek off the Cardinal River.

1650 (61) Strip of Se along a ridge of Redcap Mountain, northeast of the fire lookout.

1645 (36) Small patch of Pl and Se remnants east of Toma Creek.

1620 (43) Small Sb stand along the north shore of the Cardinal River by the junction with Toma Creek.

1620 (33) Narrow patch of Se remnants along the northeast ridge of Mount Russel.

1615 (41) Three small patches of an open Se and Pl stand, located in wet meadows of intermittent creeks just south of the Cardinal River.

1610 (34) Thin strip of Se and Fa trees at treeline of Mount Russel.

1605 (24) Multi-aged Se stand at the headwaters of Ruby Creek. Stand date is based on the oldest trees found.

1580 (47) Strip of Se remnants along the Cardinal River and north of Mount Mackenzie.

1575 (44) Small decayed stand of Se and Pl trees. This stand is located along the south shore of the Cardinal River, between Toma and Russel Creeks. It was not possible to determine the true extent of this stand, even with the help of air photos.

1565 (23) Small patch of Se trees near the headwaters of Ruby Creek.

1565 (37) Patch of Se trees on the east slopes of Mount Mackenzie.

1555 (68) Mixed stand of Se and Pl along the Forestry Trunk Road by Grave Flats area.

1540 (46) Small patch of Se and Fa remnants on the east slopes of Mount Mackenzie.

Table 11. Stand origin date statistics for LE4 - South of the Cardinal Divide*.

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1917	28	1916 - 1955	R, E, U	4	10 / 13
1917	51	1921 - 1936	R, E	8	33 / 31
1915	4	1920 - 1937	S, R, E	3	15 / 13
1903	62	1906 - 1909	S, R, E	1	6 / 4
1898	50	1911 - 1919	R, E	1	7 / 5
1897	29	1901 - 1945	R, E	2	12 / 8

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1897	69	1906 - 1907	S, R, E	1	8 / 4
1897	86	no data	stand id 69		
1888	5	1890 - 1953	S, R, E	10	42 / 49
1870	60	1872 - 1881	O/5, E	1	4 / 4
1859	30	1861 - 1884	R, E, U	2	9 / 9
1850	57	1850 - 1875	O, E, U	1	3 / 4
1835	66	1837 - 1923	O/5, U	1	1 / 4
1830	1	1732 - 1883	M/5, E, U	5	8 / 19
1820	63	1724 - 1835	M/5, E, U	2	4 / 8
1815	45	1819 - 1900	O/5, U	1	1 / 4
1810	17	1812 - 1884	O/5, E, U	1	2 / 4
1805	9	1808 - 1896	O/5, E, U	1	2 / 4
1800	14	1812 - 1886	O/5, U	1	1 / 4
1795	39	1797 - 1868	3rd O/5, E, U (1711, 1740)	2	4 / 9
1795	2	1798 - 1802	O/5, E	1	3 / 3
1790	18	1792 - 1823	O/5, E, U	2	4 / 8
1780	65	1783 - 1817	O/5, E, U	1	2 / 4
1780	16	1780 - 1818	O, E, U	1	2 / 4
1770	70	1773 - 1865	O/5, U, E	1	2 / 5
1770	20	1770 - 1833	2nd O, E, U (1705)	2	6 / 8
1770	55	1771 - 1773	O/5, E	1	2 / 2
1770	49	1773 - 1868	O/5, E, U	3	7 / 12
1765	27	1767 - 1834	O/5, E, U	2	5 / 8
1750	22	1754 - 1831	O/5, U	1	1 / 5
1750	64	1752 - 1764	O/5, E	1	4 / 4
1750	13	1751 - 1781	O/5, E	1	3 / 4

Stand Origin	Stand id	Range of ages	Criteria	# plots	# trees (representative / total)
1735	59	1736 - 1861	O/5, E, U	5	8 / 19
1730	67	1730 - 1755	O, E, U	3	10 / 11
1730	15	1730 - 1832	O, E, U	2	6 / 9
1725	31	1725 - 1867	2nd O, E, U (1679)	3	5 / 11
1725	19	1727 - 1754	O/5, E	1	3 / 4
1720	48	1723 - 1799	O/5, E, U	1	2 / 4
1720	25	1724 - 1778	O/5, E, U	1	2 / 4
1720	38	1691 - 1880	M/5, E, U	1	4 / 9
1720	10	1724 - 1899	0/5, U	1	1 / 4
1710	52	1712 - 1823	2nd O/5, E, U (1693)	2	2 / 4
1705	12	no data	stand id 11		
1705	3	1709 - 1771	O/5, E, U	1	2 / 4
1705	11	1707 - 1725	0/5, E	1	4 / 4
1700	7	1703 - 1740	O/5, U	1	1 / 4
1700	53	1701 - 1709	O/5, E	1	2 / 2
1690	42	1692 - 1780	3rd O/5, E, U (1620, 1657)	2	4 / 10
1685	40	1687 - 1786	O/5, E, U	2	4 / 8
1680	26	1680 - 1745	O, E	1	3 /4
1670	35	1673 - 1873	2nd O/5, U, E (1660)	5	4 / 20
1670	54	1674 - 1784	O/5, U	1	1 / 4
1670	6	1671 - 1901	O/5, E, U	1	3 / 4
1665	58	1669 - 1819	2nd O/5, E, U (1650)	4	6 / 16
1665	8	1665 - 1840	O, E, U	2	5 / 9
1665	32	1667 - 1747	O/5, E, U	1	2 / 4

1660	21	1662 - 1917	O/5, U	9	2 / 37
1650	61	1654 - 1724	O/5, U	1	1 / 3
1650	56	1650 - 1776	O, U	1	1 / 4
1645	36	1648 - 1788	O/5, U	1	1 / 6
1620	33	1624 - 1747	O/5, U	1	1 / 4
1620	43	1624 - 1698	O/5, U	1	1 / 4
1615	41	1617 - 1855	O/5, U	1	1 / 3
1610	34	1612 - 1880	O/5, E, U	1	2 / 5
1605	24	1608 - 1891	O/5, U	3	1 / 11
1580	47	1580 - 1864	O/5, U, E	1	2 / 6
1575	44	1579 - 1659	O/5, E, U	1	2 / 4
1565	23	1567 - 1667	O/5, E, U	1	2 / 4
1565	37	1568 - 1617	O/5, E, U	1	2 / 4
1555	68	1558 - 1808	O/5, U	1	1 / 4
1540	46	1542 - 1672	O/5, U	1	1 / 4

* For explanation of how to read this table, please refer to sections 2.10 and 3.1.

Table 12. Field statistics, list of fire scars and release for LE4 - South of the Cardinal Divide.

Statistics	Scars	Releases
142 plots 577 trees 19 trees with one scar 102 trees with a release 15 trees with two releases 2 tree with three releases	1945, 1931, 1919, 1917, 1915x2, 1914x2, 1912, 1908, 1901x2, 1897, 1891, 1888x2, 1887, 1806	1973, 1972, 1969, 1964, 1946, 1945, 1941, 1937x5, 1935, 1934x3, 1933, 1930, 1929, 1927x4, 1924, 1922, 1918x2, 1917x4, 1915, 1914x2, 1912, 1910, 1908x2, 1907x7, 1904x2, 1903x3, 1902x2, 1901x3, 1900, 1898x4, 1897x6, 1895x2, 1894, 1892, 1891, 1888x2, 1887x2, 1884, 1882x2, 1881, 1879x2, 1878x2, 1877x3, 1874, 1867x5, 1864x2, 1859, 1858, 1857x4, 1851, 1850, 1847x3, 1839, 1837x3, 1834, 1831, 1830x2, 1828, 1827x3, 1824, 1823, 1819, 1917, 1797x2, 1787x2, 1784x2, 1782, 1777, 1765,

	1757, 1756, 1752, 1747, 1741, 1737x2, 1724

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APPENDIX A

Field sheet sample

FIRE HISTORY FIELD SHEET

Date: _____ Plot #:

Unit: _____ Watershed:
Location:

UTM: _____ Aspect: _____Slope: _____ Elevation:

Human disturbance:

FOREST STAND DESCRIPTION:

Comp.:

Duff:_____ Deadfall:

Fire evidence:

Understory:

Trees	*Species*	*Age*	***S**cars / **R**eleases*

Notes:

Field Team:

APPENDIX B

Field notes

For a digital copy of this large dataset please contact

Foothills Model Forest
Box 6330
Hinton, Alberta
T7V 1X6

APPENDIX C

Stand origin maps