AN ABSTRACT OF THE THESIS OF

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The fire regimes of a 9,000 hectare study area on the east side of the Southern Oregon Cascades are described. Fire regime parameters included are frequency, extent, and predictability of fire return interval. Severity of two fires is mapped by type of evidence. Changes in fire regime due to fire suppression are assessed by analysis of the cumulative distribution. The study area spans a range of elevation that includes high frequency, low severity fire regimes (in the ponderosa pine/white fir zone) to low frequency, high severity fire regimes (in the mountain hemlock zone). The relationships between topography, and frequency and extent are modeled with multiple linear regressions. The fire history reconstructed from scar evidence is compared to the reconstruction from cohort evidence. Regressions are developed predicting fire frequency in three vegetative zones.

Scar-based frequency and cohort-based frequency are predicted comparably by the same set of topographic variables (elevation, solar radiation, and slope). Variability of fire return interval is predicted by slope, aspect and their interaction. Extent of fire is predicted by aspect. Exposure is most predictive of fire frequency in the white fir

zone. Elevation and slope are most predictive in the red fir zone. Slope position is most predictive of fire frequency in the mountain hemlock zone. Over the 9000 ha study area, fire extent shows a change in fire regime due to fire suppression better than fire frequency shows the change. Data on the effects of fire suppression will be used to develop watershed management plans, silvicultural treatments and prescribed and natural fire plans for the RNA and the adjacent Sky Lakes and Mountain Lakes Wilderness Areas.

Fire Regime Parameters and their Relationships with Topography in the East Side of the Southern Oregon Cascade Range.

by

John S. Foster

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I understand that my thesis will become part of the permanent collection of Oregon State University libraries. My Signature below authorizes release of my thesis to any reader upon request.

John S. Foster, Author

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Contribution of Authors

Dr. David Wallin was involved in the design, analysis, interpretation and writing of the manuscript. Dr. Phillip Sollins was also involved in the interpretation and writing of the manuscript.

Table of Contents

APPENDIX: Table of Contents

List of Figures

List of Tables

APPENDIX: List of Tables

Fire Regime Parameters and their Relationships with Topography in the East Oregon Cascade Range.

INTRODUCTION

The disturbance regime and the range of ecosystem conditions characterize the natural variability of a landscape. The range of ecosystem conditions is the mixture of vegetation patches on a landscape, while processes such as fire change those states from one to another (Swanson, et al., 1993; Wallin, et al., 1996). Fire is important in the vegetation dynamics of many ecosystems for its potential range of frequency, extent, and severity. The integrated effect of fire on a landscape, its fire regime, determines the patterns of stand structure and composition (Chappell and Agee, 1996; McNeil and Zobel, 1980; Pitcher, 1987; Romme 1982; Romme, 1981), while influencing processes such as animal habitat development (Anderson et al., 1987; McCune, 1983; Reeves et al., 1995; Veblen, 1994), nutrient cycling (Kauffman et al., 1993; Sprugel, 1985), and sedimentation (Swanson, 1981). Within the past eighty years, fire exclusion has dramatically altered the fire regimes in many areas of North America. To better understand the recent changes in fire regimes due to fire exclusion, it is necessary to know more about the fire regimes of the past, and how they varied spatially over the physical environment (Agee et al., 1989; Sprugel, 1985; Sprugel, 1991; Swanson et al., 1993).

Disturbance regimes are generally described by their frequency, severity, and extent (Figure 1) (Agee, 1994; White and Pickett, 1985). Specific occurrences of a disturbance vary in these three dimensions, or parameters, and the resultant cloud of occurrences represents the disturbance regime. More particularly, a fire regime integrates the three characteristics above, in addition to seasonality and predictability. The average frequency determines the average age of the patches of vegetation in the landscape. Species in the landscape have evolved with that average frequency of fire, but also with that predictability, or variability of frequency. If the average frequency of fire changes, then structure will change and composition may also shift. Likewise, if the variability of frequency changes drastically, species composition could shift if certain species can not reach reproductive age. Severity refers to ecological impact of fire and is related to fireline intensity [the rate of heat release along a unit length of fire line (Alexander, 1982)] in many ecosystems. Extent reflects the spatial patchiness and the influence of different gradients. Seasonality determines fuel moisture and fire resistance of certain species. Therefore changes in seasonality influence species composition strongly, just as changes in severity influence composition (Brown, et al., 1991). There are many synergistic relationships among these parameters and between other processes and conditions in the ecosystem.

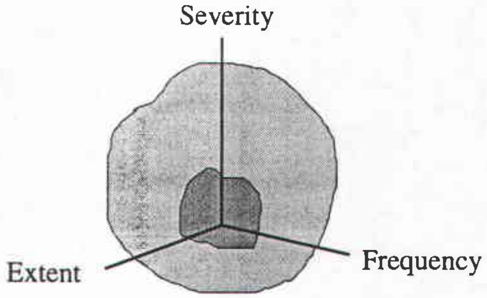

Figure 1. Hypothetical fire regime on three axes. The dark patch at center is an area of higher probability of occurrence, with outliers occurring on all axes. Fires are variable in these parameters, and each regime parameter distribution can be described by its average and other statistical moments (Swanson, et al., 1993).

Many fire regime parameters are derived from quantifiable events or states, and therefore can be represented by a mathematical frequency distribution (Johnson and Van Wagner, 1985). For example, mean frequency is calculated from the set of fire occurrences in a given point or area. Standard deviation, skew and kurtosis can be calculated from the temporal distribution of those occurrences. Likewise, for most fire regime parameters, it should be possible to calculate the mathematical average, standard deviation, and other statistical moments of the distributions. With fire regime parameters quantified in such a way, fire regime research moves away from the categorical evaluation of disturbance and the detailed mapping of fires, toward an evaluation that allows in-depth differentiation of regimes across temporal and spatial scales.

Fire regime parameters are quantified in many ways. Fire recurrence can be quantified in one of three ways: (1) point or composite return intervals [mean time between disturbances, or Mean Fire Return Interval (MFRI)], (2) frequency [number of events per time period, the inverse of MFRI], and (3) rotation period, or fire cycle [the time required to burn an area equivalent to some specified area] (White and Pickett, 1985). Variability of fire recurrence is usually stated merely as the range of fire frequency, but it can also be calculated as the variance (or standard deviation) of the *intervals* between fires. Fire severity has been quantified ecologically as the proportion of basal area replaced by a fire event (Weisberg, in press). However, fire severity is usually expressed as a categorical variable (Chappell and Agee, 1996). Extent of a fire is usually mapped around sites with any fire evidence and delimited using suspected geomorphic or topographic fire breaks (Agee, 1991; Renkin and Despain, 1992). Mapping the extent of historical fire is problematical because there is patchiness of high and low severity burns within a single fire. An index of extent could be calculated as the average of the extents of the set of fires that have been recorded at a given point. Likewise, variability of fire extent could be calculated as the variance (or standard deviation) of the set of fire extents for a given point. The season of the year a fire burns, its seasonality, is not readily quantified, but it can be categorized by the location of a fire scar in the annual ring, whether it is in the early-wood or the late-wood. These quantified parameters allow a more in-depth study of fire regimes and how they change through time and space.

Fire regimes are often viewed as static, but they are highly variable spatially and temporally. Climate change through geologic time has brought about substantial changes in fire regimes (Millspaugh and Whitlock, 1995; Johnson and Larsen, 1991; Clark, 1989; Swetnam, 1993). Most recently, fire regimes have changed due to the dual policies of fire exclusion and fire suppression in many parts of North America. These changes in fire regimes have had dramatic effects on forest structure, composition, fuel loads and fire hazard (Clark, 1989; Clark, 1990; Cwynar, 1987; Hall, 1980). A change in fire frequency will likely change fire severity due to a change in fuel levels (Bergeron and Brisson, 1990) and will likely influence fire extent also (Blais, 1983; Brown, 1991) in ecosystems where decomposition is slower than net primary productivity (Kauffman, personal communication).

Vegetation, climate, and topography determine fire regimes. This relationship can be extended from the conceptual model of the 'fire behavior triangle' of: (1) fuel, (2) weather and (3) topography, which governs individual fire behavior (Rothermel, 1983). Fuels are the available plant biomass. A site's long-term growth potential and the elapsed time since the last fire determine fuel volume. For some ecosystems, fuels may consist of the annual accumulation of herbaceous fuels, while for other ecosystems, fine or coarse woody debris are the important components of the fuel load. Climate affects a fire regime through the general wind patterns, temperature, precipitation, and humidity during both the fire season and the growing season leading up to the fire. Climate influences the probability, location and variability of ignitions in fuel beds that are conditioned by recent weather (Granstrom et al., 1993). Fire regimes are often unique to a local topography due to the distribution of cool, moist locations or exposed, dry locations. Topographic features also help define a fire regime. Different topographic aspects may be drier or cooler. Steep slopes are likely to have shallow soils. High elevations have a different climate than low elevations. Indeed, there are numerous interactions between these three components. In summary, fuels are influenced by climate and topography, and local climate is influenced by topography.

The objectives of this study were to describe the fire regimes of a study area on the east side of the southern Cascade Range in Oregon, and to assess the influence of topography on the frequency and extent of fires within and among plant communities. This study area is near the northern limit of the ranges of both Shasta red fir (*Abies magnifica* var. *shastensis*) and white fir (*Abies concolor*). Key questions include: (1) are the fire regimes for these plant communities similar to those elsewhere in their range, and (2) to what extent has fire exclusion changed the fire regime in these communities? A further goal was to compare the use of two parallel datasets for the description of fire frequency. The first dataset, the scar data, is more likely to detect low severity fires that merely scar trees rather than kill them. The second dataset, the cohort data, is derived from stand structure and composition data within sample plots. Fires that result in the establishment of a cohort of trees are considered more severe than those that only cause scars. Scar data were used to determine the years of stand-replacing and partial stand-replacing fires in the cohort dataset.

STUDY AREA

The study area is located on the east side of the southern Oregon Cascade Range centered at latitude 42.6° north and 122.13° east. The 9000 hectare study area includes the Nannie Creek and Threemile Creek basins in addition to the Cherry Creek Research Natural Area (RNA) (Figure 2). These watersheds are about 27 km south of Crater Lake National Park. The elevation of the study site ranges from 1300 m at the Klamath Lake basin, up to about 2075 m at the Cascade crest in Sky Lakes Wilderness. The upper elevations include glaciated flats, while the lower elevations are more incised and have steeper slopes. Annual temperature averages are 7 C (44 F) at Chiloquin, Or and 3 C (38 F) at Crater Lake NP. Annual precipitation averages 55 cm (22") at Chiloquin, and 167 cm (66") at CLNP. Snowfall averages 162 cm (64") and 1257 cm (495") respectively. All climate data reflects the period 1961 to 1990 (Oregon Climate Service, 1993). Aspects are predominately east-facing, with some north and south aspects; there are very few west-facing aspects. The study area's climate is characterized by dry, hot summers and wet, moderately cold winters. The fire season is usually from late July through mid September. Plant communities in the RNA and adjacent watersheds have been classified into three zones covering an environmental gradient from warm and dry to cool and moist (Franklin and Dyrness, 1973). The white fir (*Abies concolor*) zone occurs at the lowest elevations of the study area. In some regions this vegetation complex is labeled 'mixed conifer', but in this study I will use the term

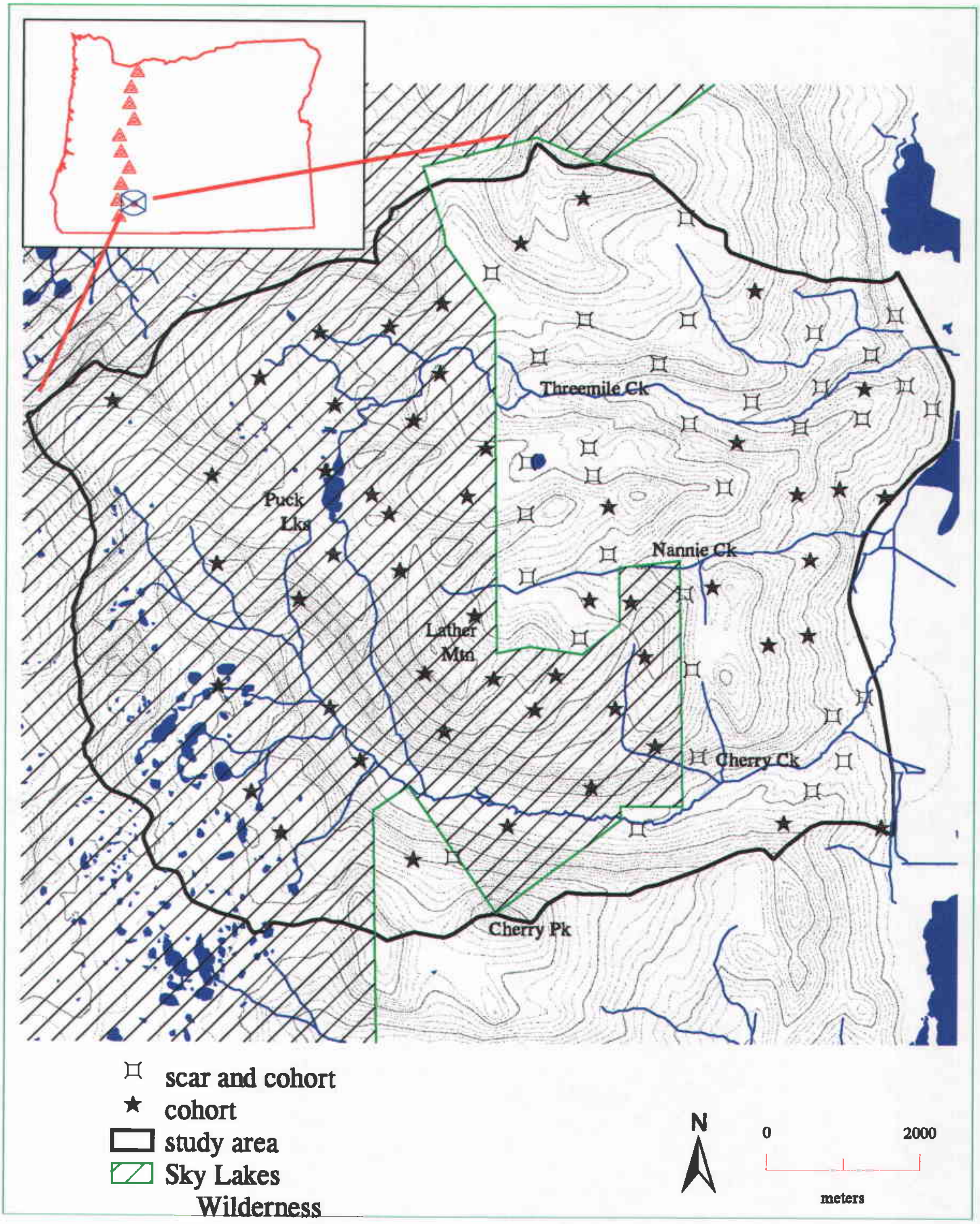

Figure 2. Plot Locations in the Cherry Creek Study Area.
Plot locations are marked by the type of evidence found at each plot. The Sky Lakes Wilderness area is in the high elevations in the west. The flat area in the east is the Klamath Basin. Most of the plots in the low elevations yielded scar evidence in addition to cohort-based evidence.

white fir. Ponderosa pine (*Pinus ponderosa*), Douglas-fir (*Pseudotsuga menziesii*), sugar pine (*Pinus lambertiana*), and incense cedar (*Calocedrus decurrens*) occur as sub-dominants. Just below the white fir zone and outside the study area are sporadic patches of ponderosa pine and bitterbrush (*Purshia tridentata*). At middle elevations, the red fir (*Abies magnifica* var. *shastensis*) zone occurs and sub-dominants include species from the zones above and below. The mountain hemlock (*Tsuga mertensiana*) zone occurs at highest elevations, and it is dominated by mountain hemlock, and with sporadic occurrences of white pine (*Pinus monticola*) and subalpine fir (*Abies lasiocarpa*). In cool, moist locations at middle and high elevations, small stands of lodgepole pine (*Pinus contorta* var. *latifolia*) occur. Stands or individuals of Engelman spruce (*Picea engelmanii*) may occur at any elevation in cool, moist locations. These final two stand types are not categorized as vegetation zones, since their distribution is sporadic.

Human use of the region has changed much over time. Until the middle of the 19th century, the study area was occupied by the Klamath and Modoc native Americans who may have burned wildlands regularly, since it is known that other tribes in the region did (Johannessen, 1971). In the 1850's anglo-european settlers entered the region, especially in the area around Klamath Falls, Oregon, forty kilometers to the southeast. By the 1870's ranchers were herding livestock in some parts of the higher elevations of the Cascade Range. In other parts of the Cascade Range, there is some evidence that these early stockmen set fire to the high country meadows to increase forage and to facilitate travel through the forests (Burke, 1979; Pyne, 1982). However, in the late 1890s Leiberg surveyed this study area and reported that there were few meadows of interest to stockmen (Leiberg, 1900), suggesting that stockmen fires were probably not very important in this study area. During the first decade of the 20th century, the running of stock in mountain meadows declined precipitously (Burke, 1979). In 1910, a federal policy concerning fire exclusion and fire suppression was established, but the study area probably did not see significant fire exclusion efforts until the 1930's (personal communication, Tim Sexton). Fire suppression and exclusion did not become particularly effective until after World War II, with the onset of intensive logging and advances in equipment and techniques.

METHODS

Sampling Design

Sample plots in the study area were stratified by topographic condition and distributed across patches of historic vegetation. Topographic variables were stratified as 3 elevation classes, 3 slope classes and 2 aspect classes. However, the flat slope gradient strata resulted in three fewer strata than the maximum of 18 (Table 1) (Figure 3). These classes were defined to assure systematic sampling of the study area, and to split the study area into approximately equal groups according to individual topographic variables. These three variables were chosen for stratification due to their presumed impact on fire regime parameters. The elevation range (1300m. to 2075m.) was split at 1675m and 1825m to approximate the elevations of the three major plant series represented on this landscape. Slope gradient was divided into flat (<6%), moderate (6%-20%), and steep (>20%) slopes. Aspect was divided into northeast and southwest facing slopes on the assumption that solar radiation is greater on southwest slopes than on slopes facing due south.

Table 1. Field sampling biases. Field sampling was biased to over-sample the low elevation zone and under-sample the high elevation zone. Below, the percentage of the study area (Area) in each zone is compared to the percent of plots in that zone. Sub-totals sum across rows and down columns.

	Elevation Classes:						
	High		Middle		Low		Sub-totals
Slope and Aspect:	Area %	Plot %	Area %	Plot %	Area %	Plot %	Area %
Steep South	8	6	6	3	14	15	28
Moderate South	9	9	9	10	9	10	27
Flat	3	2	2	2	2	1	7
Moderate North	12	6	5	5	3	2	19
Steep North	9	8	4	7	6	12	20
Sub-total	41	31	27	28	33	41	

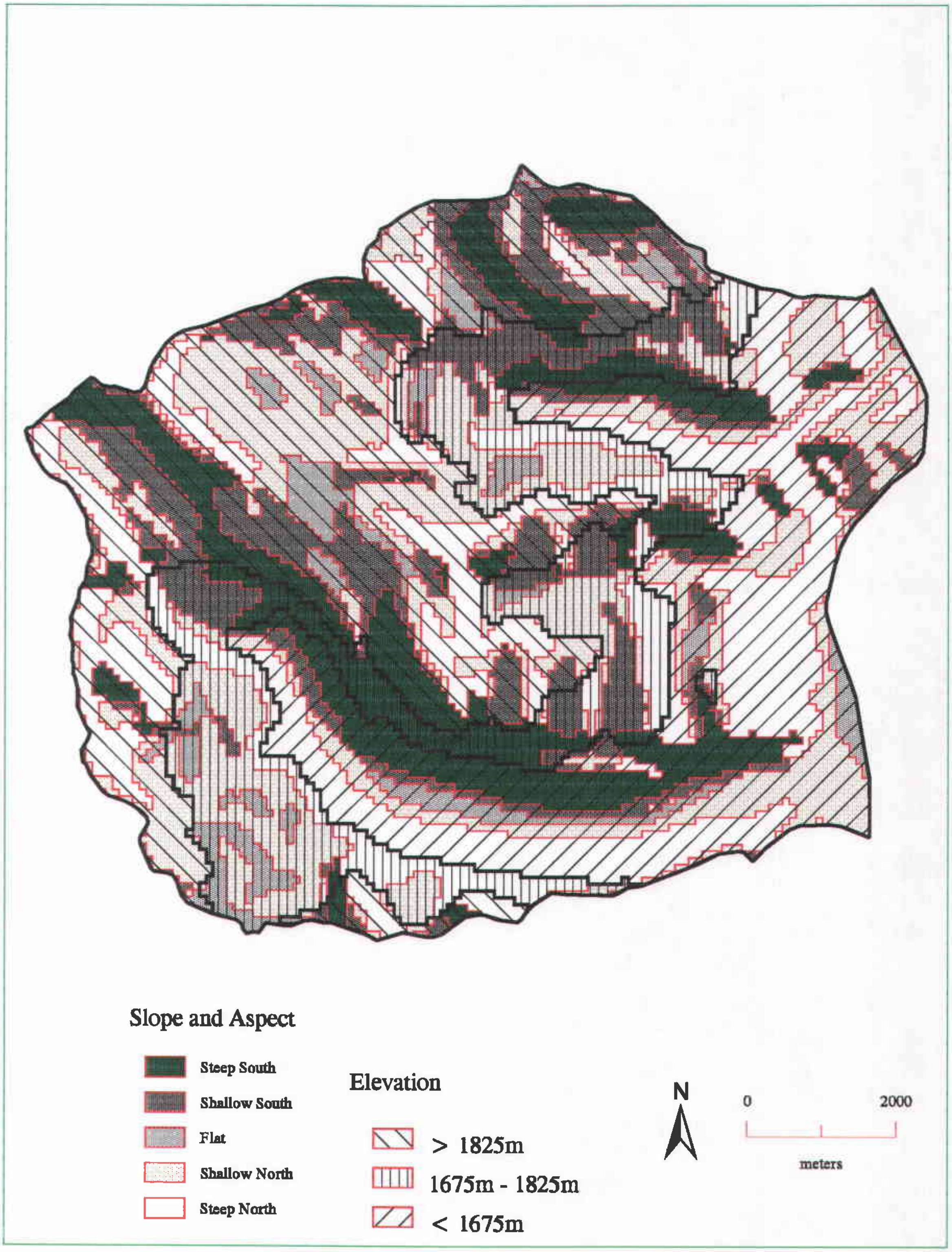

Figure 3. Topographic Classes.
The topographic stratification was based on elevation (3 classes), aspect (2 classes), and slope (3 classes).

In addition, the sampling was distributed over stands of vegetation interpreted from the earliest aerial photographs available. Photographs from a 1940 flight were interpreted by personnel at the Klamath Ranger District, Winema National Forest to create a map showing patches of 5 canopy closure classes and 4 stem diameter classes (Figure 4) (Sarah Malaby, personal communication). These patches may have been established by stand replacing events such as fire, so there was interest in sampling at least these pathes, especially in the mountain hemlock zone where stands of similar diameter classes are likely to indicate stand-replacing fires (Teensma, 1987). However, in the white fir zone, patch size was large and multiple sampling occurred within individual patches.

The patches of stand structure and composition described above were sampled with circular field plots of 0.2 ha. It was hoped that this plot size would capture the full range of diameter classes present in the stand (Lorimer, 1985). These plots were placed in clearcuts where a clearcut occurred within the required topographic conditions. Stumps allow easy age calculations and identification of scars. A chainsaw was used to remove wedges from stumps and live trees to look for fire scars (Arno and Sneck, 1977). Removal of wedges was not permitted within the Sky Lakes Wilderness, thus no scar data were available from plots in that area. Data from eighteen plots were not included in the statistical analysis since their fire record extended only to 1838 or more recently. Plots with a fire chronology shorter than to 1838 were judged to be insufficient for the regression analysis. However,

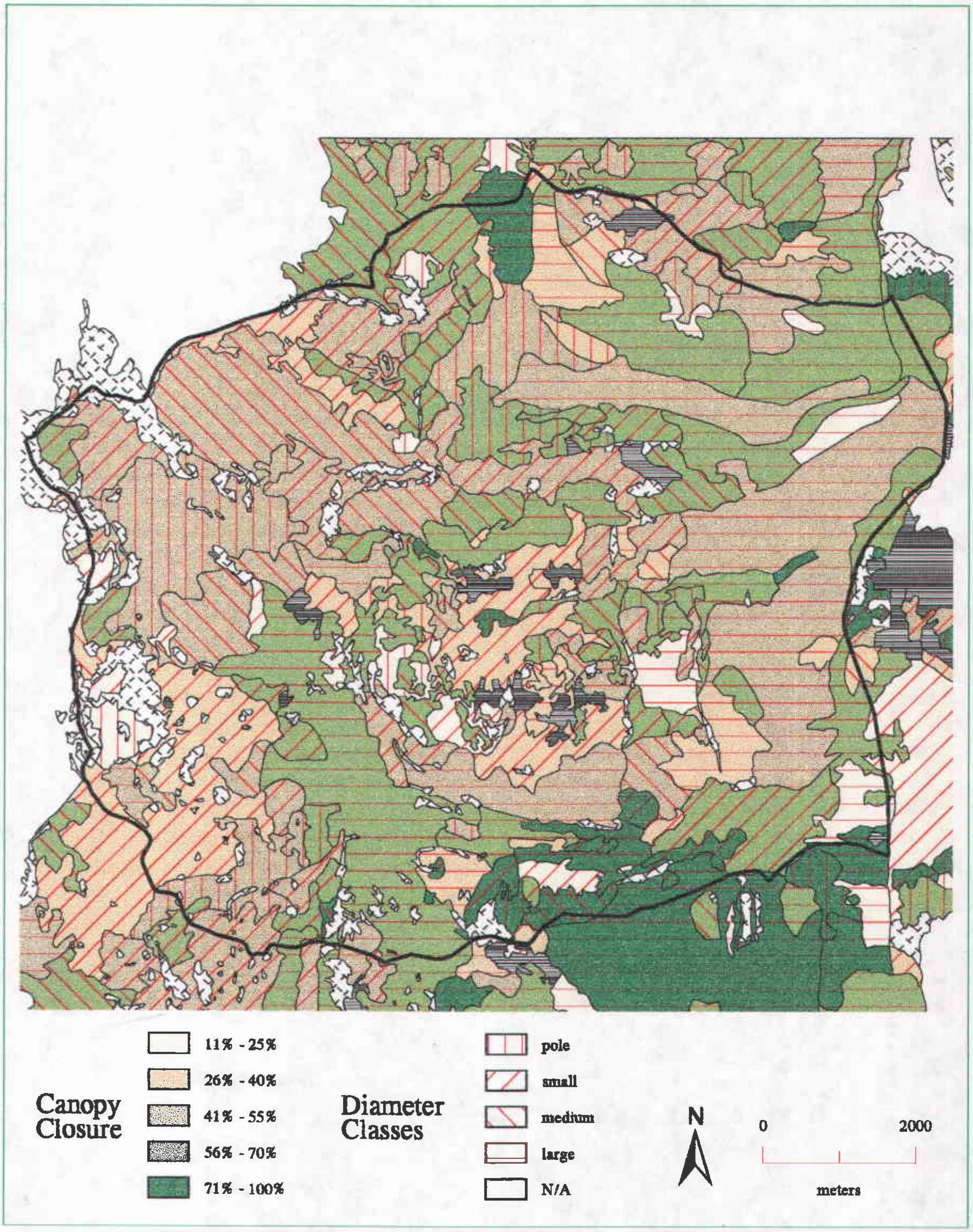

Figure 4. Historical Vegetation.
Aerial Photgraphs from 1940 were used to map canopy closure and stem diameter classes. Plots were distributed into unique patches with preference given to stands with larger diameter classes.

data from these eighteen plots were used in mapping the extent of fires. The study area was sampled at a lower density in the high elevation stratum due to the larger size, lower frequency and higher severity of fires as interpreted from air photos (Teensma, 1987). Likewise, the sampling of tree ages within plots was increased where a complex fire history was apparent from examination of the wedges.

Field and Laboratory Methods

Within each field sampling plot, representative trees and stumps of large diameter class, seral species and/or stand dominant species were aged (Barrett et al., 1991). Rings on stump-faces were counted in the field to determine tree origin dates (Agee, 1991; Morrison and Swanson, 1990). Live trees were cored as close to the ground as practical. At each plot, no more than about 3 ha. of the area where the topographic condition (Figure 3) and the vegetation patch (Figure 4) intersect was scouted for individual trees or stumps with numerous fire scars that would provide detailed fire-year information (Arno and Sneck, 1977; Taylor, 1993). Variables recorded at each plot were elevation, aspect, slope gradient, number of trees, snags and stumps in 10cm diameter classes (greater than 10cm DBH), and number of scarred stems. Plant association was determined from a key (Hopkins, 1979), and plots were grouped into plant zone by the tree species element in the plant association name. One lodgepole pine series plot was grouped with the mountain hemlock zone in the analysis since this stand was surrounded on all sides by the mountain hemlock series. Variables recorded for each tree or stump were species, diameter class, stump or coring height, scar years, prominent suppression or release years, live/dead, scarred/not-scarred, scar-position, scar-radius, and percent of circumference of scars. Laboratory work included mounting, sanding and counting cores with a dissecting microscope for age determination. Cores were corrected for age to coring height (Morrison and Swanson, 1990) and distance from pith; stumps were corrected for age of harvest and age to stump height.

Fire Regime Reconstruction

Fire regime parameters of the study area were calculated using different subsets of the data (Table 2). Two parallel fire frequency values were developed, one from scar evidence on wedges and one from cohort evidence from tree-origin dates. MFRI was not calculated at each plot since numerous plots did not include two or more intervals to be averaged. However, for those plots that did yield two or more intervals, I calculated the standard deviation of the intervals. All parameters were calculated for the entire study area. Frequency was also calculated, from cohort data, for each plant zone.

Table 2. Fire regime parameters used as response variables in analyses. The continuous type variables were analyzed with regressions. The limitations listed in the table explain the reduction in number of plots.

Variable	Type	Items	Analysis	Description	Limitations
Cohort Freq.	Cont.	85 plots	Reg.	# of events / time	---
Scar Freq.	Cont.	35 plots	Reg.	# of events / time	Not all plots yielded wedges
SD. of Intervals	Cont.	42 plots	Reg.	within-plot intervals	Plots with 2 or more intervals
Extent	Cont.	39 plots	Reg.	avg. size index of fires	1700 – 1910
SD of Extent	Cont.	39 plots	Reg.	SD of extent index	Plots with 2 or more events
Severity	Cat.	2 maps	-	4 classes of evidence	Not quantified
Seasonality	Cat.	Table	-	6 classes of evidence	Not quantified

Separate rule sets were used to identify fire years from scarred wedges and to determine which fires established the observed cohorts. Fires were identified from cross-dated (Stokes and Smiley, 1968; Arno and Sneck, 1977) scars on wedges using the following rule set.

Rule Set 1:

1. Scars could be caused by fire, human, animal or mechanical damage. Second and subsequent scars on the same wedge were assumed to be fire scars since they were unlikely to have been caused by these other agents (Morrisson and Swanson, 1990; Agee, 1993; Arno and Sneck, 1977).
2. First scars were interpeted as fire scars when they occurred the same year as a second, or subsequent scar at another plot anywhere within the study area. Spatial proximity was not considered due to the

scattered location of lightning strikes, the stochastic pattern of trees that record fires, and the small size of the study area.

3. Prominent ring-width changes were identified as fire scars when these occurred within a year of a fire scar in a nearby plot (Agee, 1991, Agee, et al., 1990). 'Nearby' was on the same landform, e.g. on the same slope, watershed, or mountain (in that order of priority). Spatial proximity was considered in this definition since ring-width changes can be caused by other processes such as local competition or mechanical damage.

Rule set 1 identified fire years from scar evidence on wedges, while rule set 2 identified fire years from cohort evidence from the ages of cored trees and stumps. The exact year of a cohort-establishing fire was selected from the set of fire years established by rule set 1. Fire years were selected from the fire chronology of a 'nearby' plot where 'nearby' is as stated in the third rule of rule set 1. In stands of shade tolerant species, the presence of many trees of about the same age suggests that a stand-replacing event occurred prior to the origin year of the oldest tree in the stand. This holds true in the white fir series also, except that there is the additional presence of remnant trees (mostly ponderosa pine) which have survived recent fires. These remnant pines were interpreted to have been established by fires in the past that opened holes in the canopy that allowed the establishment of these shade intolerant species.

Rule set 2:

1. Due to the decline of the number of old trees in stands, single occurrences of seral species (Douglas-fir, ponderosa pine, or incense cedar) before 1800 were assumed to indicate a fire within the previous 15 years (Barrett, et al., 1991). Two occurrences of any combination of these species between 1800 and 1850 indicated a fire. Three occurrences of these species were required to indicate a fire between 1850 and 1910.
2. In the Shasta red fir and mountain hemlock zones, two occurrences of western white and/or lodgepole pine within a 40 year period indicated a fire within 15 years of the earlier tree. The forty year range was used in these plant zones due to the increased length of the regeneration pulse in more shade-tolerant species (Pitcher, 1987).

Composite fire chronologies were collated at each plot from the cohort dataset. Some plots yielded wedges in addition to tree origin dates. For each of these plots, a scar fire chronology was collated in addition to the cohort fire chronology. The cohort fire frequency was then calculated for each plot, and a scar fire frequency was calculated for those plots that yielded wedges. Plots were grouped by plant series before cohort frequencies from each zone were calculated. Scar fire-frequency and variability of interval were unavailable in the mountain hemlock zone due to lack of scars and lack of multiple fires per plot, respectively. Intervals were negatively skewed, but they were assumed to be normally distributed for the calculation of variability. In this study, cohort and scar frequencies for each plot were logarithm transformed to enable the use of least-square statistical tools.

Fire regime data was divided into three temporal eras. A Euroamerican pre-settlement era lasted up to 1850, corresponding roughly with the establishment of the nearby town of Klamath Falls. The Euroamerican settlement era spanned from 1850 to 1910. By 1910, not only had national policy regarding fire changed, but the local use of alpine meadows by ranchers had nearly stopped (Burke, 1979). The fire exclusion era lasted from 1910 to the present, although the decline in fire frequency became most noticeable after World War II. These eras were derived from knowledge of the history of the area and were tested for their fit with this fire history data using the FHX2 fire history software package (Grissino-Meyer, 1995).

Certain fire regime parameters could not be quantified well enough to allow statistical analysis. Since variance is a function of the mean in binomial distributions ($\sigma = 1/\rho$; where p = the mean), the use of the variance of fire frequency as a response variable gives results similar to those obtained from the analysis of fire frequency itself. However, if it is assumed that the *interval* distribution is normally distributed, variance and standard deviation of the intervals are independent of MFRI. Seasonality was available only for those plots that yielded fire scarred wedges. Fire severity is difficult or impossible to quantify for fire regimes of low intensity where stand boundaries do not represent fire edges (Swetnam and Dieterich, 1985). However, fire severity was mapped for two recent, large fires to show the patchiness of severity within a single fire.

A fire extent index was calculated from a fire chronology that combined both the scar dataset and the cohort dataset. The percentage of plots recording each fire year was averaged at each plot (2 or more fires per plot) to generate an index of average fire extent for each plot. Fires years before 1700 were excluded from the tabulation due to the small number of plots that recorded fires before that time (Figure 5). Fire years after 1910 were excluded due to the different fire regime in effect by that date. Fire years that were recorded in more than 14% of the plots were excluded from the tabulation since their ubiquity suggested fire behavior controlled by weather rather than by topography (Renkin and Despain, 1992). This fire extent index was not calculated for individual plant zones, nor for temporal eras. The variability of the fire extent index at each plot was also calculated for analysis.

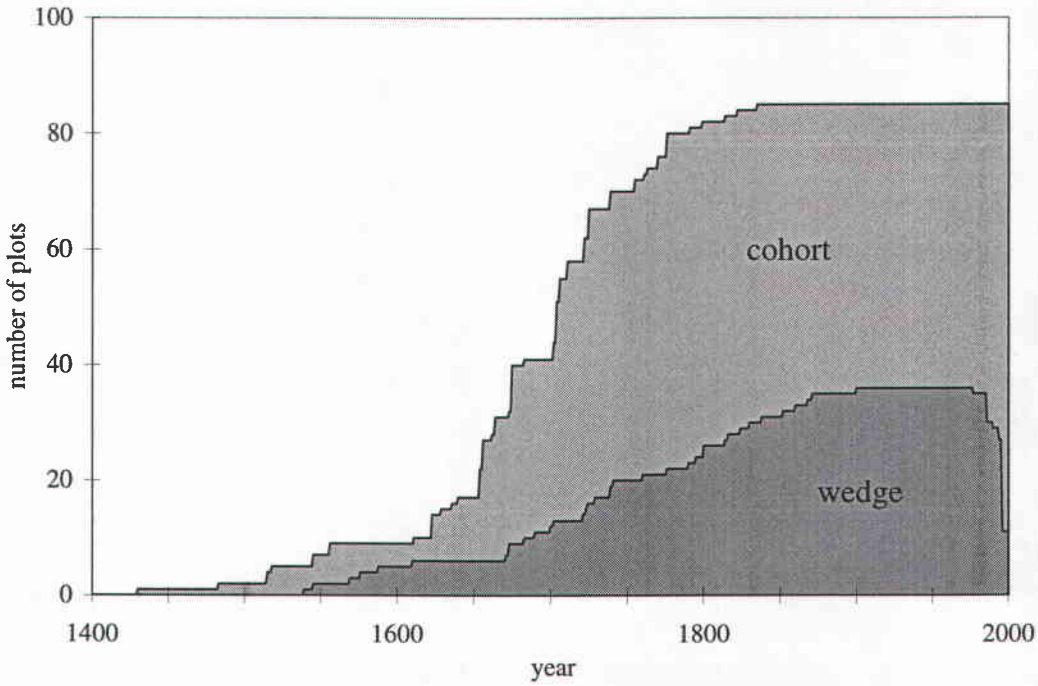

Figure 5. Number of plots sampled by year and type of evidence. Many plots yielded cohort evidence by 1650, but few plots yielded scar evidence before 1700. The first wedge dated to 1539, but the first observed scar was in 1629.

The above fire regime parameters (two dataset frequencies [cohort and scar], variability of intervals, fire frequencies [cohort] for three different plant zones, extent, and variability of extent) were used as response variables in the analysis (Table 1). Nine topographic variables were tested for their significance as predictor variables. Some of these variables were recorded in the field, while others were derived from manipulation of a 30m digital elevation model (DEM). Microposition was recorded in the field as locally [~ 0.5 ha] convex, concave or flat topography.

Aspect and slope were determined in the field with a compass and clinometer. Aspect was recorded in the field, then the cosine transformations of 10° shifts (36 variables: 10°, 20°, 30°, ...) were included in the stepwise selection set to allow the data to select the aspect of significance (Beers et al, 1966; Stage, 1976). For the aspect variable, a value of 1 denoted a NW aspect [330°], while -1 denoted a SW aspect [150°]; values of 0 were either SW or NE aspects. Plot locations were marked on USGS 7.5 minute maps. UTM coordinates from these maps were then projected onto the DEM, and elevation derived from the DEM values. All other variables were derived from the DEM. An index of exposure was calculated as the difference between the actual elevation of the plot and the averaged elevation of the surrounding area. Seven scales of this variable were included in the stepwise selection. The scales differed from a 90 m^2 to a 2 km^2 sized averaged area. For example, high features got a positive value since the actual elevation was higher than the averaged elevation of the surroundings. Featureless areas of smooth topography larger than 0.75 km^2 had zero values. Additional variables included Topographic Convergence Index (TCI), sum of summer month solar radiation and slope-position. TCI is an index of soil moisture that is calculated as the natural logarithm of the upslope area divided by the percent slope of each cell (Beven and Kirkby, 1979). Solar radiation was based on latitude, elevation, aspect, slope, and cloud cover but not topographic shading (Bonan, 1989; Nikolov and Zeller, 1992). Slope position was calculated in ARC/INFO as percent elevation between the nearest ridges and drainages. The relative elevation between ridge and valley bottom was used as the slope-position. Values near 100 are near the ridgeline, while values near zero are near the valley bottom.

Analysis Design

Models were initially constructed in SAS statistical software using stepwise selection with 0.05 entry and rejection p-values. These models were then modified to exclude the repetition of variables at more than one scale, and to include base variables where interaction terms were selected. Lastly, a correlation matrix of the response variables was generated to test for covariance between variables. The plot data were divided and analyzed in subgroups according to temporal era, plant zone and presence or absence of cross-dated wedges.

Correlations between response variables showed only a few significant relationships (Table 3). The correlation between elevation and solar radiation was weak but highly significant. Likewise, there was a strong and significant correlation between slope-position and exposure, but these two variables were not selected in the same regressions. There were no other significant correlations between independent variables.

Table 3. The correlations between variables in the same predictive model are not high. The Pearson Correlation Coefficient (PCC) between selected variables is listed in the topmost box. Below the PCC are the probability that the PCC is greater than rho (under Hypothesis: rho=0), and number of observations.

	Elevation	Slope	Slope-Pos.	Exposure	Solar Rad.
Elevation	1	-0.08032	0.04939	0.1273	0.33602
	0	0.4623	0.6515	0.2428	**0.0019**
	86	86	86	86	83
Slope	-0.08032	1	0.10356	0.09249	0.10965
	0.4623	0	0.3427	0.397	0.3237
	86	86	86	86	83
Slope-Position	0.04939	0.10356	1	0.75054	0.11873
	0.6515	0.3427	0	**0.0001**	0.285
	86	86	86	86	83
Exposure	0.1273	0.09249	0.75054	1	0.2455
	0.2428	0.397	**0.0001**	0	**0.0253**
	86	86	86	86	83
Solar	0.33602	0.10965	0.11873	0.2455	1
	0.0019	0.3237	0.285	**0.0253**	0
	83	83	83	83	86

RESULTS and DISCUSSION

Eighty five plots were used in the analysis. Thirty four plots were in the Sky Lakes Wilderness, fifty one were outside the wilderness. The scar dataset was derived from thirty five plots which yielded wedges for cross-dating fire years (Table 4).

Table 4. Distribution of plots. The number of plots in each plant zone, the number in the Sky Lakes Wilderness, and the number of plots that yielded wedges with fire scars are shown. Data are sorted by plant zone.

Plot Counts	Plant Zone	In Wilderness	Wedges Sampled
White Fir Zone	35	7	20
Red Fir Zone	36	14	15
Mtn. Hemlock Zone	14	13	0
Totals	85	34	35

The study area's oldest cohort established in 1430 as evidenced by two Douglas-fir trees. The oldest fire scar occurred in 1623 on a ponderosa pine. Within plots there were 1 to 8 cohorts, with an average of 2.8 cohorts per plot. The cohort dataset included 74 fires over a 566 year record. The cohort-based MFRI for the 9000 ha study area was 7.7 years (Figure 6). Of the thirty-five plots that yielded wedges, there were 1 to 14 fire scars per plot with an average of 5.3 fires recorded at each plot. The scar dataset from those plots that yielded wedges showed 86 fires over a

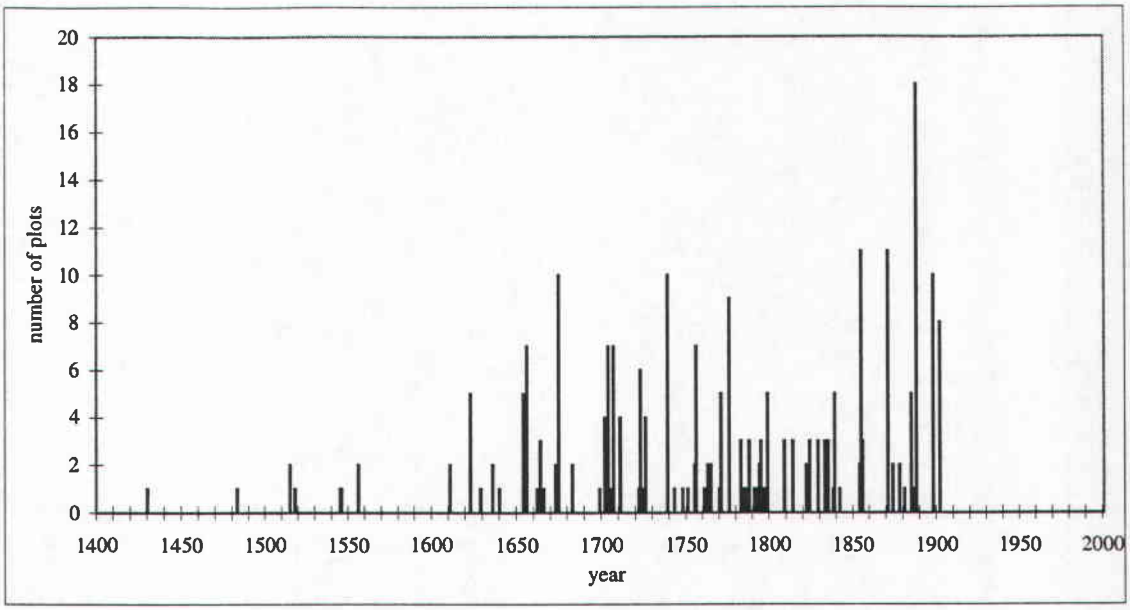

Figure 6. Number of plots showing cohort-based evidence of fire. Very few fires were detected before 1600, and no cohorts were detected that originated after 1902. The largest number of cohorts were established in 1888.

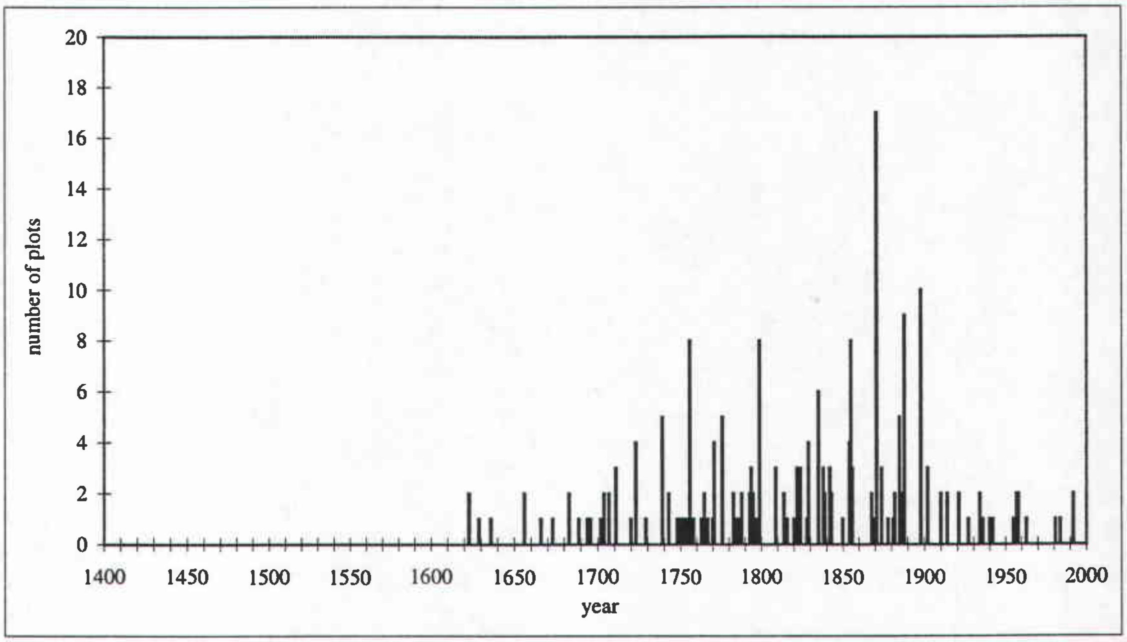

Figure 7. Number of plots showing scar-based evidence of fire. No plots yielded scars before 1629. Frequency was similar throughout the period, but the number of plots that recorded each fire decreased significantly in the 20th century.

373 year record (Figure 7) for a scar MFRI of 4.3 years. These results are for the entire study area and the entire period of data. These results, therefore, ignore the differences in fire regimes through temporal eras and across the landscape. Furthermore, the average cohort- and average scar-data per plot are low because intervals between fires are long in some stands (mountain hemlock). The scar dataset included more fires since it detected the lower severity fires that failed to establish cohorts.

Data Type Comparison

Scar-based and cohort-based regressions were compared in the thirty-five plots that yielded both scar and cohort evidence. Variability (standard deviation of within-plot fire return intervals) was regressed against topographic variables at those plots where there were more than three events (> 2 intervals). The model predicting scar frequency from cross-dated wedges (n=35) was: (On this and all following models, the standard errors of the coefficients, p-values, and adjusted r^2 are presented underneath in parentheses).

$$\{ freq_{scar} \mid elev., rad., slope\} = -3.11 - 1.50\times10^{-3}\,(elev) + 4.41\times10^{-3}\,(rad.) + 1.35\,(slope) \quad \text{Equation 1}$$

$$(0.667)\;(3.41\times10^{-4})\qquad(1.37\times10^{-3})\qquad(0.482)$$

$$(p < 0.0001,\ r^2 = 0.48)$$

Scar frequency calculated from wedges was primarily predicted by elevation, followed by solar radiation, and slope. Frequency increased as elevation decreased and as slope and solar radiation increased. The regression equations from the scar-and cohort-based models were compared at those plots that yielded both types of data. The model predicting cohort frequency (n=35) was:

$$\{ freq_{coh.} \mid elev., rad., slope\} = -3.23 - 1.47x10^{-3}\ (elev.) + 3.66x10^{-3}\ (rad.) + 1.03x\ (slope) \quad \text{Equation 2}$$
$$(0.578)\ (2.98x10^{-4}) \qquad (1.20x10^{-3}) \qquad (0.422)$$
$$(p < 0.0001,\ r^2 = 0.49)$$

The selected variables and the coefficient values suggest that the two equations predict similar processes.

Using cohort data for all sampled plots (n=85), the cohort-based frequency model was:

$$\{ freq_{cohort} \mid elev, expos., slope\} = -2.19 - 1.28x10^{-3}\ (elev) + 0.0109\ (exp.) + 0.890\ (slope) \quad \text{Equation 3}$$
$$(0.352)\ \ (2x10^{-4}) \qquad (0.00280) \qquad (0.319)$$
$$(p < 0.0001,\ r^2 = 0.42)$$

Frequency increased as elevation decreased and as exposure and slope increased (Figure 8).

Four topographic variables from the models above were key to predicting cohort-establishing fires across this landscape. The study area spans such a wide range of elevation that elevation was the most prominent of the selected variables (partial r^2 = 0.35) (Equation 3). Elevation influences the probability of lightning strikes, stand productivity and the moisture content of fuels. Wagtendonk (1991) found that ridges had more lightning strikes than lower elevations. Additionally, fuels at high elevations are both more sparse (due to reduced length of growing season) and more moist (due to cooler temperatures) than fuels at low elevations (Agee, 1991;

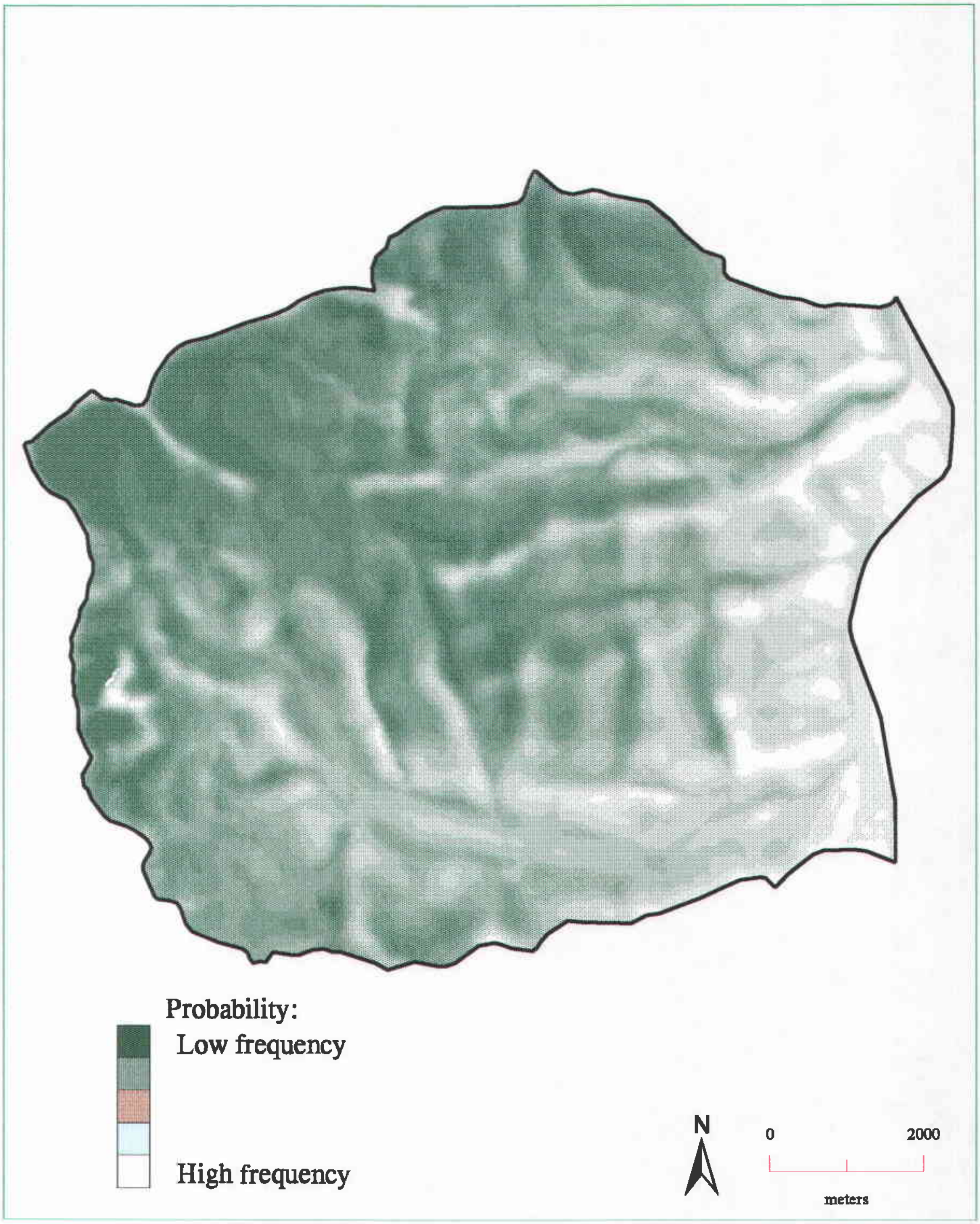

Figure 8. Predicted Fire Frequency.
Fire frequency was calculated across the whole study area. Pale areas have a higher frequency of fires that will be detected by cohort-based evidence than dark areas. The Cherry Ck. drainage is visible in the lower portion of the image. The dark area in the upper left is a high elevation plateau.

McNeil and Zobel, 1980). Solar radiation plays an important role in predicting the frequency of fires at these lower-elevation sites that yielded scarred wedges (Equations #1 and #2). The next most significant variables were exposure and slope, with partial r^2s of 0.08 and 0.04 (equation #3).

Solar radiation influences a site's fire regime in many ways, both before and during fires. Plant productivity (and thus fuel volume) is partly a function of solar radiation, in addition to the other factors such as soil, water, nutrients, etc. The high temperatures induced by solar radiation contribute to increased productivity in forests, whereas in deserts increased radiation decreases productivity. In this study area, non-shaded areas may have a higher rate of fuel accumulation than shaded areas. Additionally, sites in full sun are likely to be drier and hotter than shaded sites. Therefore, the areas that are more fire prone due to dry fuels are also the areas that generate more fuel. However, perhaps the dominant process relating solar radiation to fire frequency occurs during the fire season. Solar radiation controls daily temperature and humidity, and thus fuel moisture, thereby increasing the hazard of fire spread on sunny, hot slopes. Furthermore, a regime of frequent fires removes large woody fuels and favors the development of grassy and herbaceous fuels, which respond more quickly to solar drying (Clark, 1990).

The correlation between exposure and fire frequency could relate to wind patterns or fire behavior in dissected landscapes. Exposure increases on ridges and peaks and decreases in valleys and protected pockets. Fuels in high exposure locations probably dry more often and more thoroughly, which would favor the recurrence of wildfire. Dry fuels in high exposure locations would be more likely to burn and sustain a fire than the more moist fuels in low exposure locations, assuming ignitions are evenly distributed between the two locations (Wagtendonk, 1991). Concomitantly, low exposure locations maintain higher humidity levels due to reduced winds and higher soil moisture. Lastly, stream channels and lower hill-slopes are a recognized refuge from wildfire due to their higher soil moisture (Camp, 1995; Oliver and Larson, 1990; Romme and Knight, 1981).

The correlation between slope and fire frequency could relate to fuel moisture or fire behavior. Steep slopes often have lower soil moisture due to drainage, which results in low fuel moisture levels; lower soil moisture will increase fire frequency (McAlpine, et al., 1991; Renkin and Despain, 1992; White and Vankat, 1993; Williams et al., 1994). Also, steep slopes experience more wind, which would also tend to dry fuels. Likewise, fires travel faster up steep terrain than across level ground (Alexander, et al., 1984; Rothermel, 1983). The flame front pre-heats fuels, dries them, and allows the fuels to ignite more readily, thus creating conditions necessary for fire to spread (Van Wagner, 1988; McAlpine et al., 1991).

Variability of Frequency

The variability of the recurrence of fire is treated in two ways here: (1) as the range of years between fires in the scar- and cohort-based chronologies, and (2) as the standard deviation (SD) of the within-plot fire-return intervals. Variance of fire frequency is not quantified since variance is a function of the mean in binomial distributions. For the composite chronology of the 9000 ha. study area, there were 13 instances when cohorts were established in consecutive years (Figure 9). The longest period between cohorts was in the late 1700s, when 55 years passed between cohort-generating fires (only 9 plots recorded these fires). Within individual plots, the period between cohorts varied from 4 years to 279 years. The shortest period between fires in the cohort dataset was recorded when there was wedge data 1 km away to verify the occurrence of the next cohort. Scar data from the entire study area showed return intervals from one (seventeen instances) to 20 years. Within individual plots, the range was from 4 to 146 years between scars (Figure 10).

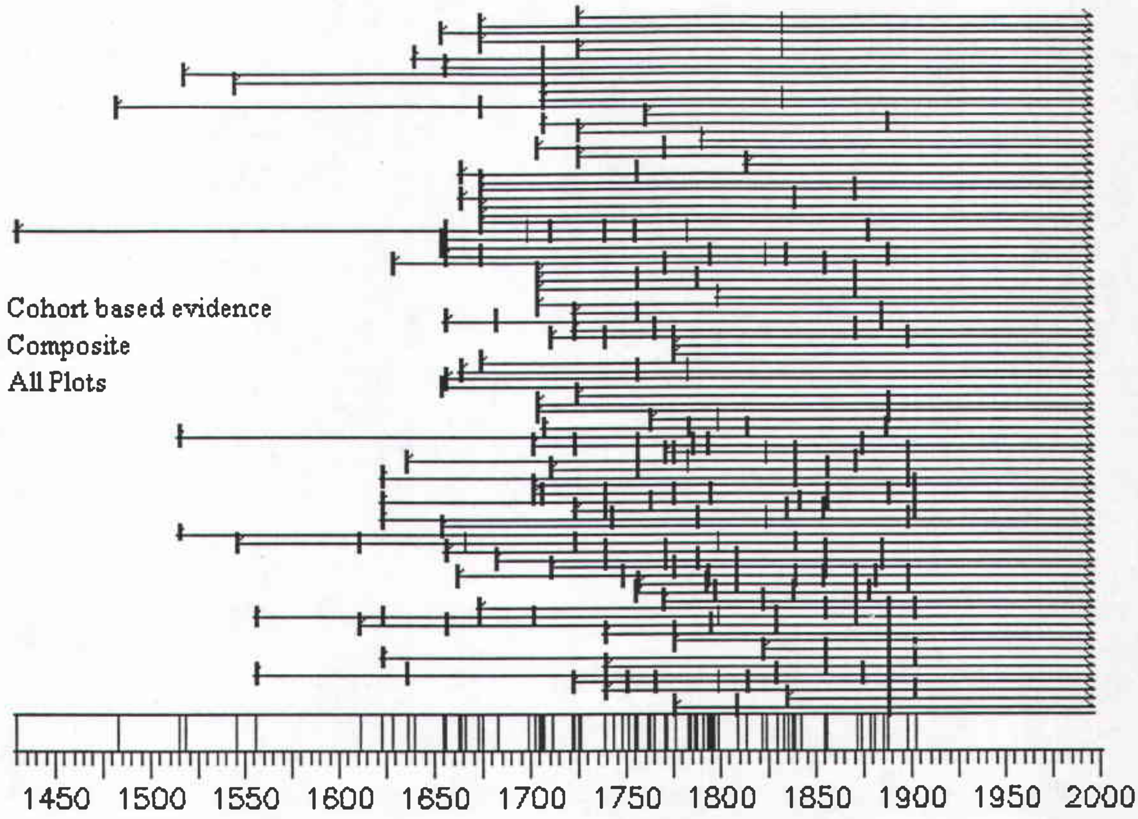

Figure 9. The cohort-based fire chronology. Cohort-based fire frequency of the study area was compiled from 85 plots. Each horizontal line represents a field plot. Each vertical mark on the line represents a fire. The solid vertical lines at the bottom of the figure show the composite fire frequency.

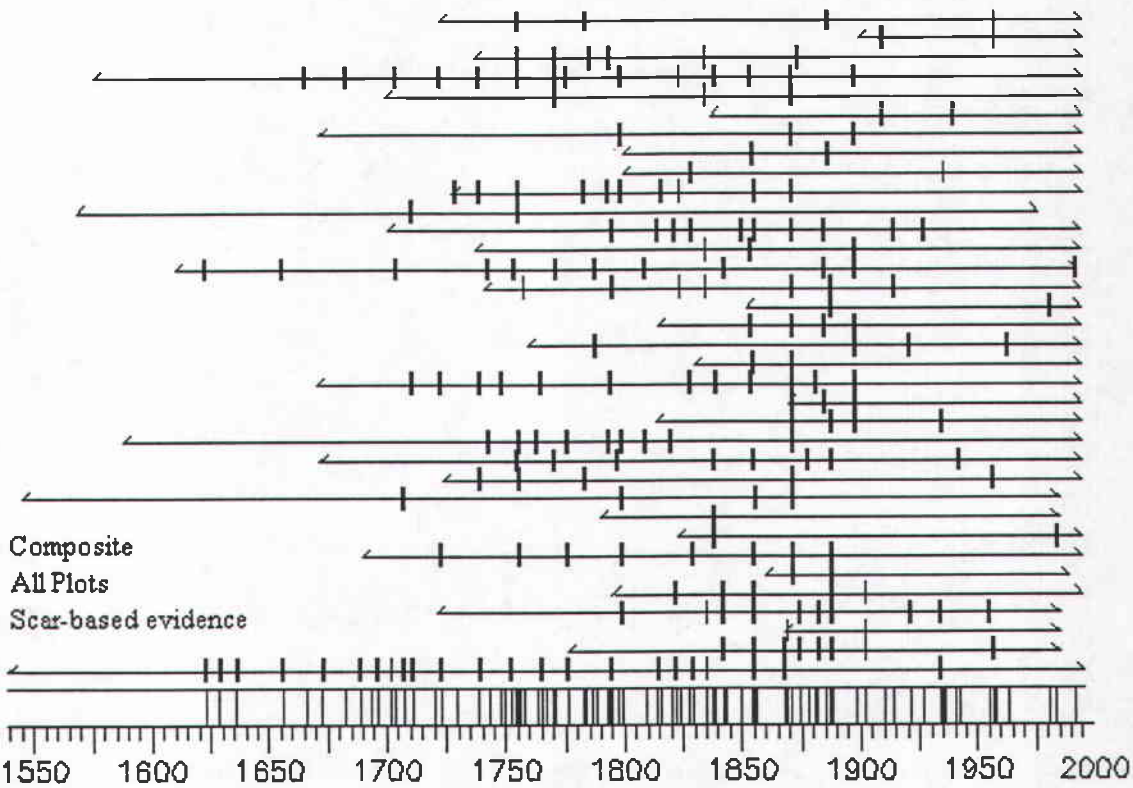

Figure 10. The scar-based fire chronology. Scar-based fire frequency of the study area was compiled from 36 plots. Each horizontal line represents a field plot. Each vertical mark on the line represents a fire. The solid vertical lines at the bottom of the figure show the composite fire frequency.

The model predicting the variability in the length of intervals within plots (n=42) was:

$$\{SD_{intv} \mid \text{slope}, asp_{330}, \text{slopeXasp}\} = \underset{(0.251)}{3.86} - \underset{(0.85)}{1.73}\,(\text{slope}) - \underset{(0.36)}{0.66}\,(asp_{330}) + \underset{(1.16)}{3.17}\,(\text{slopeXasp}) \quad \text{Equation 4}$$

$(p < 0.008$, adjusted $r^2 = 0.30)$

Fire-return intervals were more variable on flat, southeast facing slopes than on steep, northwest facing slopes (Figure 11). This combination of variables suggests

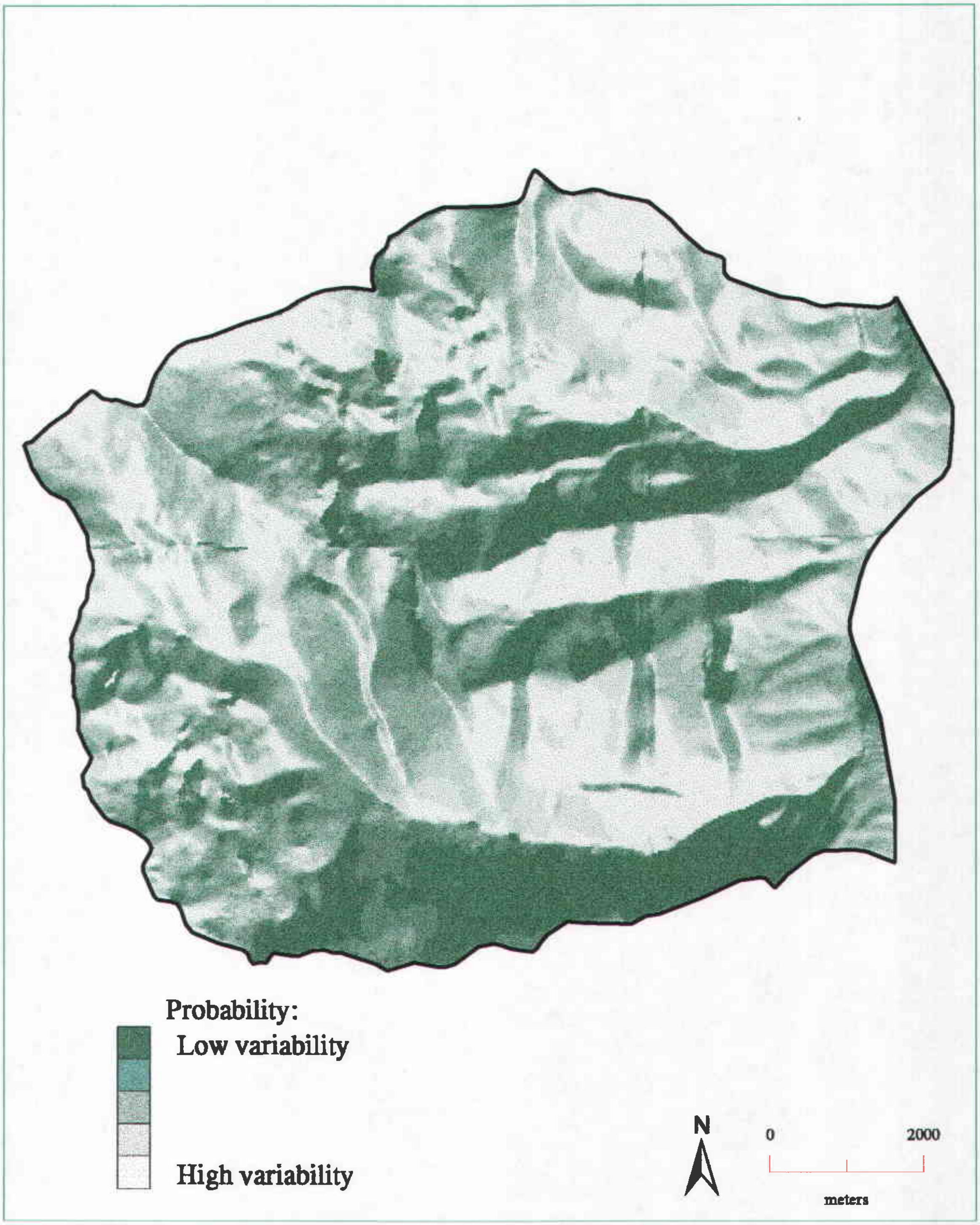

Figure 11. Predicted Standard Deviation of Fire Return Interval.
Variability of Fire Return Interval was interpolated across the whole study area. Dark areas have a more consistent interval between fires than pale areas.

that fuel moisture and fuel volume might be significant factors. Fire intervals varied least where there was a slow rate of fuel accumulation, where conditions were rarely suitable for fire spread, and where there was high vulnerability to ignitions downslope. Fire intervals were most variable where ignitions may have been sporadic. These conclusions must be tempered by the distribution of aspects, and therefore of sampling plots, in the study area. The low number of plots at northwest facing slopes decreased the accuracy of the variance for that subset of plots. However, there were numerous plots located on southeast facing slopes, which allows a more accurate determination of fire return-interval variability at these plots.

Changes through Time

The fire history evidence from this study area did not confirm the preliminary hypothesis of three fire regimes in the three selected temporal eras. Instead, the data suggested two fire regimes in effect during the length of record. The change in regime was only slightly apparent in an inspection of fire frequency by itself. However, a change in regime was apparent when frequency data was combined with extent data. If I assumed that each year of fire evidence indicated one fire, despite the number and location of plots that recorded it, then the graph of the cumulative number of fire-years through time shows a conservative trend of the change in regime. However, when I made the assumption that each plot that recorded a fire recorded a distinct fire, despite being the same year, then the graph of the cumulative number of plot-fires through time shows a more prominent change in regime

In the scar-based fire chronology, the graph of the cumulative number of fire-years through time shows a slight change in slope just before 1900. However, the graph of the cumulative number of plot-fires through time shows a prominent change in slope just before 1900, due to the decrease in extent of fires (Figure 12). Before about 1700, the number of plots available to record scars declined significantly (Figure 5). The cumulative distributions for the cohort dataset (Figure 13) showed no evidence of a change in fire regime in 1900, and sample numbers declined before 1700. The cohort dataset and my rule set detected no new cohorts after 1902. The FHX2 fire history software (Grissino-Mayer, 1995) found no significant difference in the area-wide composite fire return interval before and after 1850 ($p > 0.9$ for the t-test comparing the means, assuming that the variance of the intervals before and after are equal [$p > 0.26$ for the folded F-value comparing the variances]). However, there is a clear difference in the amount of fire evidence before and after 1900 (Figure 6 and Figure 7). These results are not contradictory since the fires between 1900 and 1995 were small in extent, and the composite fire frequency statistic was derived from all fires in the study area.

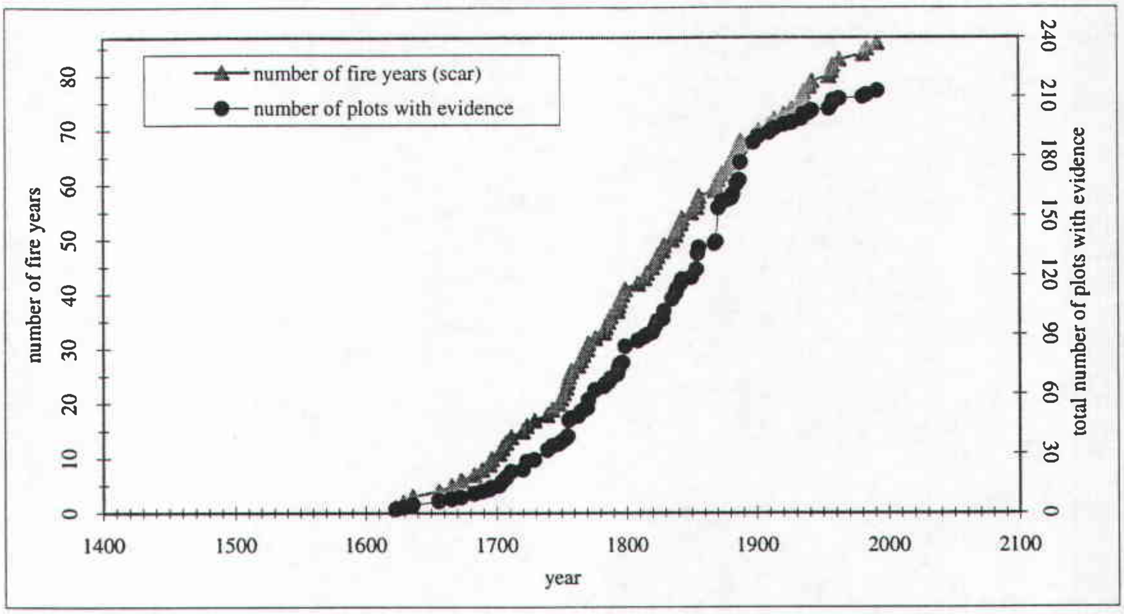

Figure 12. Cummulative number of fire years and number of plots with scar-based evidence. The changes in trend of the lines just before 1900 indicate a change in fire regime. The two lines reflect differing assumptions on counting fire evidence (see text).

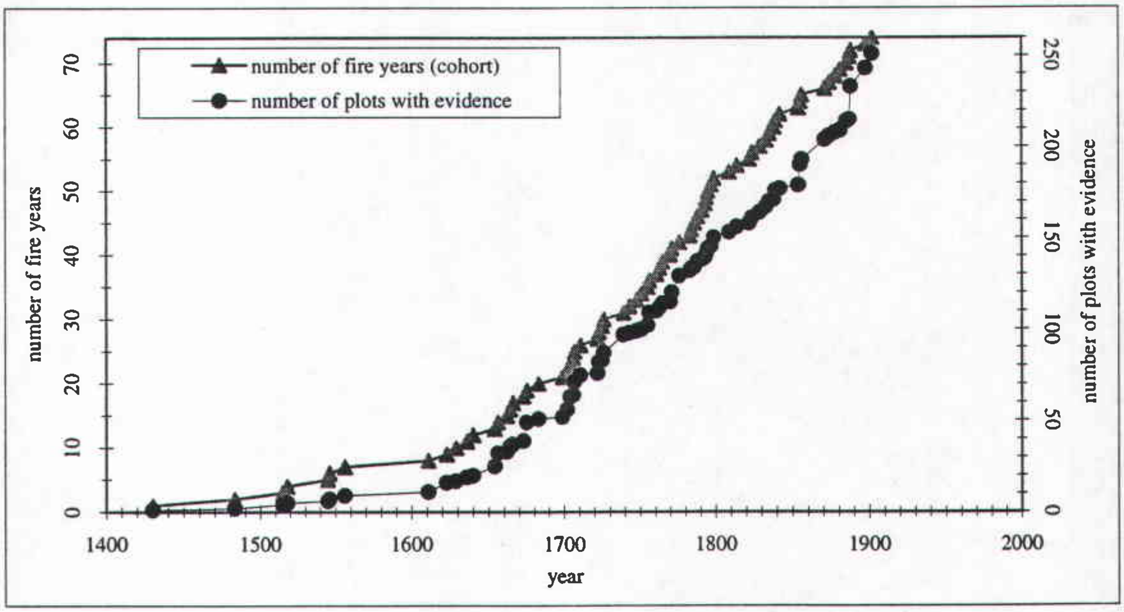

Figure 13. Cummulative number of fire years and number of plots showing cohort-based fire evidence. These lines do not change slope as much as the lines based on scar evidence (see Figure 12).

Plant Zones

The cohorts dataset was split into subsets by plant zones and regressions were derived from each plant zone to predict fire frequency from topographic variables. For the white fir zone, the model that predicts fire frequency of cohort-influencing fires was (n=35):

$$\{freq_{abco} \mid exposure\} = -3.836 + 0.0167\,(exposure) \qquad \text{Equation 5.}$$
$$(0.0789)\;(0.00493)$$
$$(p < 0.0019,\ r^2 = 0.23)$$

Within the white fir zone, fire frequency was predicted primarily by exposure. For the red fir zone, the model that predicted fire frequency of cohort-influencing fires was (n=36):

$$\{freq_{abma} \mid elevation, slope\} = -2.45 - 1.15\times10^{-3}\,(elevation) + 0.894\,(slope) \qquad \text{Equation 6.}$$
$$(0.923)\;(5.04\times10^{-4})\qquad(0.438)$$
$$(p < 0.0161,\ r^2 = 0.17)$$

Fire frequency in this zone was negatively associated with elevation and positively associated with slope. For the mountain hemlock zone, the model that predicted fire frequency of cohort-influencing fires was (n=14):

$$\{freq_{tsme} \mid slope\text{-}position\} = -4.73 + 0.00502\,(slope\text{-}position) \qquad \text{Equation 7.}$$
$$(0.0829)\;(0.00177)$$
$$(p < 0.0148,\ r^2 = 0.35)$$

Fire frequency in the mountain hemlock zone was best predicted by a plot's slope-position relative to ridges and valleys.

The results from the analysis of data for each plant zone (Equations 5-7) followed a pattern similar to that of the whole study area (Equation 3). Adjusted R^2s were reduced perhaps due to reduced sample sizes. As elevation increased through plant zones, the topographic variables also changed. In the white fir zone, exposure was the most prominent topographic influence on fire frequency (Equation 5). As exposure increased, fire frequency increased, suggesting that fuel moisture and wind were the strongest determinants of fire frequency in the white-fir systems. In the higher elevation red-fir zone, both elevation and slope drive the system (Equation 6). Fire frequency was higher at high slope positions. Slope position is the relative location between ridge and valley, and is similar to exposure (Table 2). In the study area, the red-fir zone spans mid to high elevations (1550m to 2000m), and is the most topographically diverse zone (Figure 3). At the highest elevations of the study area, slope position became an important determinant of fire frequency (Equation 7). This correlation could have been due to effects of soil moisture, increased lightning activity, or wind on conditions that affect fire spread. Although the mountain-hemlock zone is relatively flat compared to the red fir and white fir zones, there is sufficient variability in slope position to explain 35% of the variability in fire frequency.

Severity

Fire severity varied between fire years and within each fire. The type of fire evidence provided some information on fire severity. Single-aged cohorts suggested severe fires (Duncan and Stewart, 1991; Wills and Stuart, 1994). The presence of a few trees that survived the fire or a combination of cohort and scar evidence suggested moderate fires. Low severity fires were detectable only where they scarred trees. Yet lower severity events could have occurred but failed to leave evidence of any kind. To illustrate the patchiness of fire severity within single fire years, I mapped fire evidence for two fires that were detected in many locations. These maps used data from 107 locations, rather than merely the 85 plots that were used in the statistical analyses above. Evidence of the 1871 fire was found at 18 locations: 9 locations only as wedge scars, 1 location only as a cohort, and 8 locations as both wedge scars and cohorts (Figure 14). Likewise, evidence for the 1888 fire was found at 18 locations: 5 locations as only wedge scars, 9 as only cohorts, and 4 as both wedge scars and cohorts (Figure 15). The patchy distribution of fire evidence within a year shows the variability of fire severity. There were no examples of large fires that left evidence exclusively in contiguous plots. Instead, there were many examples of plots with evidence of severe fires adjacent to plots that showed no evidence whatsoever of fire for that year.

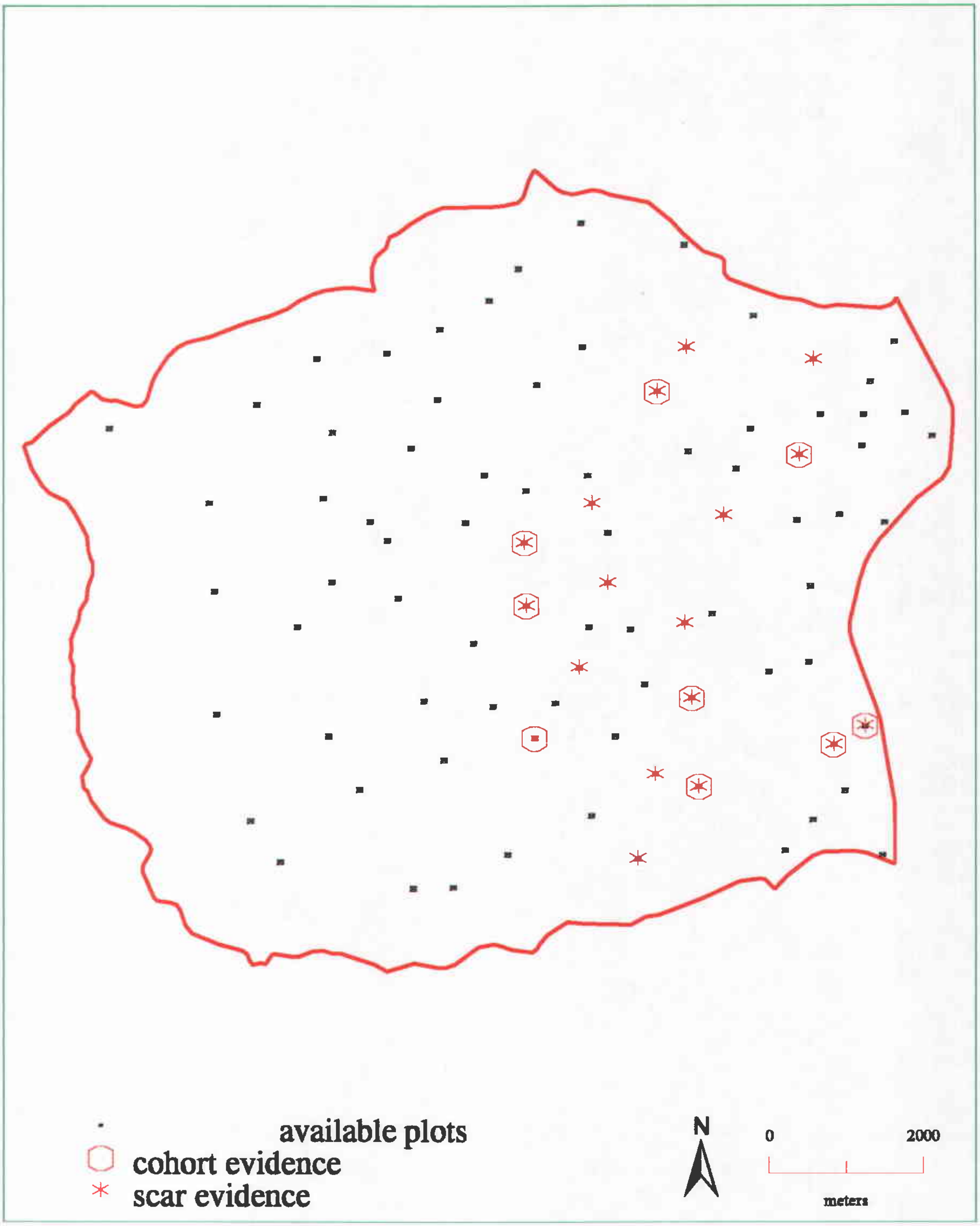

Figure 14. Evidence of the 1871 fire.
Plots where evidence of fire was found are marked by the type of evidence. Patchiness and variability of fire severity are indicated by the non-contiguous pattern of evidence across the landscape.

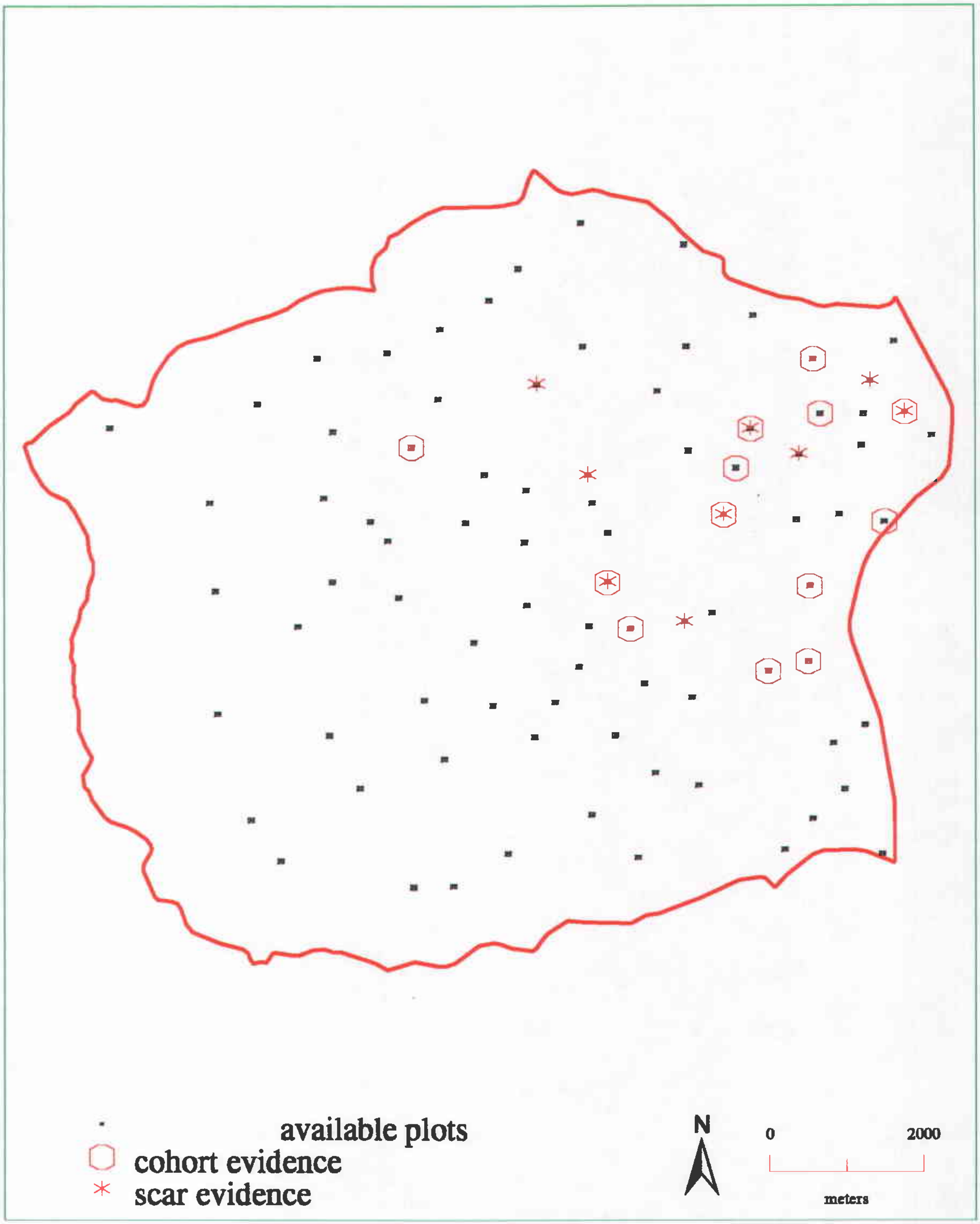

Figure 15. Evidence of the 1888 fire.
Plots where evidence of fire was found are marked by the type of evidence. Patchiness and variability of fire severity are indicated by the non-contiguous pattern of evidence across the landscape.

Extent

For the period from 1700 to the present, fire extent ranged from 1% to 28% of plots recording fire for any one year. This range has an average of 6.7 % of the available plots reporting each fire (Figure 16). Exclusion of large fires (> than 15% of plots recording) resulted in the exclusion of eight fires from the extent analysis (1704, 1723, 1739, 1776, 1855, 1871, 1888, and 1898). For each fire, the percentage of plots recording the fire was used as an index to the spatial extent of the fire. For each plot, I calculated the mean extent index for all fires that included the plot. I also calculated the standard deviation of the extent index for each plot. The regression predicting average index of extent of fires between 1700 and 1910 was (n=39):

$$\{extent \mid aspect_{330}\} = \underset{(0.373)}{7.065} + \underset{(0.493)}{1.50}\,(aspect_{330}) \quad \text{Equation 8.}$$

$(p < 0.0042,\ r^2 = 0.16)$

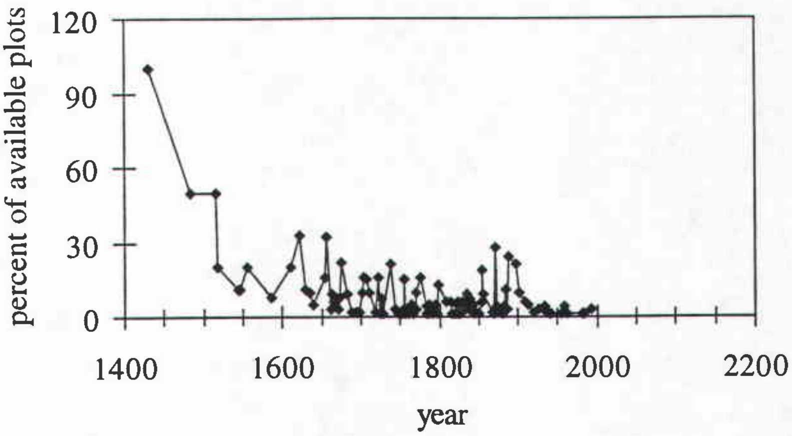

Figure 16. Percent of plots that record each fire in the combined scar and cohort chronology. About 1700 the variability of fire extent was no longer determined by the reduced availability of plots.

Fire extent was predicted by the transformed aspect of the plot (Figure 17). (Aspect in degrees was rotated to reflect NW to SE values.) The number of plots in each plant zone was too small to warrant calculating extent values by plant zone. Standard deviation of fire extent were also tested against the topographic variables. However, no topographic variables predicted these variables at the 0.05 or the 0.1 entry/rejection p-values.

Fire extent is correlated most closely with aspect (equation 8). Only in the largest fires were northwest aspects likely to burn. The study area has a high proportion of southeast aspects and a low proportion of northwest aspects (Figure 18). Furthermore, the numerous fires in the south and east were commonly small fires detectable only from fire-scarred trees. These southeast plots are at low elevation

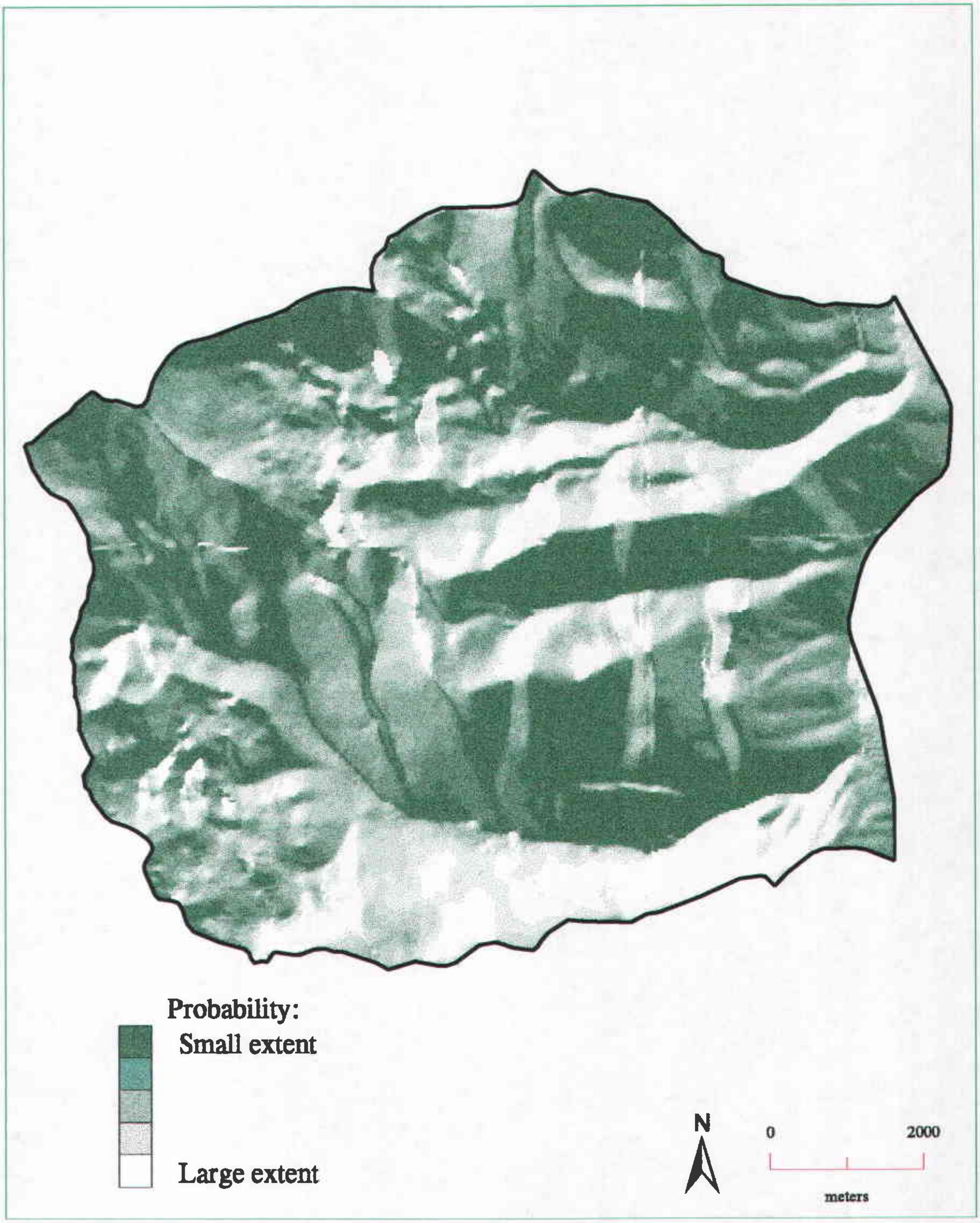

Figure 17. Predicted Probability of Extent.
Average extent of fires was predicted across the whole study area. Pale areas have larger extent fires than darker areas. Dark areas often have small fires when they experience fire.

and face the sun from early morning on, and therefore might become readily flammable more frequently. Dry flammable fuels are frequently abundant at these southeast locations, and burns are possible whenever fuels become sufficient to carry fire. Frequent fires maintain low fuel volumes, thus limiting the extent of fires. On northwest aspects, many years might pass before there is the combination of dry fuels and ignitions that would allow a fire, by which time fuel would be ample for an extensive fire.

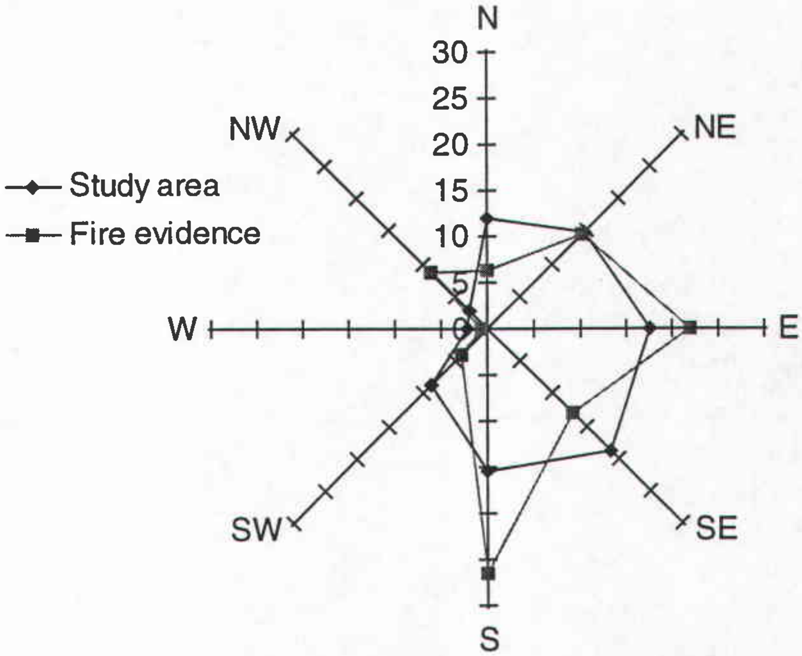

Figure 18. Percent of plots and study area in aspect classes. There are proportionally more S, SE and E aspects. Fire evidence was more likely to be detected in south and east aspects. The study area has very few west and northwest aspects.

CONCLUSIONS

Fire-scarred wedges provide spatially and temporally explicit measures of fire regimes with better resolution than that obtainable from cohort data. However, since the scarring of trees by fire does not recur randomly, scar data is less statistically rigorous than cohort-based data, which can be obtained at randomly selected or stratified locations (Johnson and Gutsell, 1994). For this reason, I based the statistical analysis of fire history parameters on cohort-based data. In this study, I statistically analyzed both cohort-based (stratified) and scar-based (non-random) data. Both data types detected fire at the stand level in this study design. Both types of data can be used to generate fire chronologies and extent maps. However, the two types of data probably detect fires of different severity. A severe fire destroys the affected trees rather than merely scarring them, and results in stand replacement. A less severe fire may not allow any regeneration in its wake, but would be more likely to leave scars on trees that survive the fire. Nonetheless, this study suggests that the same set of topographic variables predicts both types of fires (equations 1 and 2).

The similarity between predictive models suggests two things. First, the processes in this study area that relate topography to fire frequency operate similarly for both levels of severity. In other words, the severity of a fire is tied to factors besides topography, such as weather, biological factors, fuels, or species composition.

Second, the similarity in predictive models suggests that a stratified sampling design compares favorably with the opportunistic sampling provided by scarred trees. If the occurrence of scarred trees is tied to an unknown process or pattern, then the use of scarred trees in statistical analyses will yield unpredictable results. However, if tree scarring occurs randomly in relation to topography, then scarred trees may be useful in statistical analyses. Tree scarring is a function of certain known factors. Slope gradient can influence both the likelihood of scarring and where a tree is scarred. In addition, certain genera and species are more likely to survive scarring than others.

This study area spans a wide range of elevations and thus also spans a wide range of fire regimes. Fire regimes across such a diverse study area would be expected to be dissimilar, therefore discussion by plant zones is logical. The plant zones identified here are white fir, Shasta red fir, and mountain hemlock.

The white fir zone experiences the most frequent fires. It lies above the drier ponderosa pine and bitterbrush zone. The white-fir zone includes ponderosa pine, sugar pine, and Douglas-fir, which are considered to be fire-adapted species. White-fir abundance has increased in this zone in the wake of fire exclusion (McNeil and Zobel, 1980). Fire-frequency values in this study area are similar to fire return intervals reported in other studies in Central Oregon and in the white fir and mixed conifer types (Agee, 1991; Bork, 1985; McNeil and Zobel, 1980;

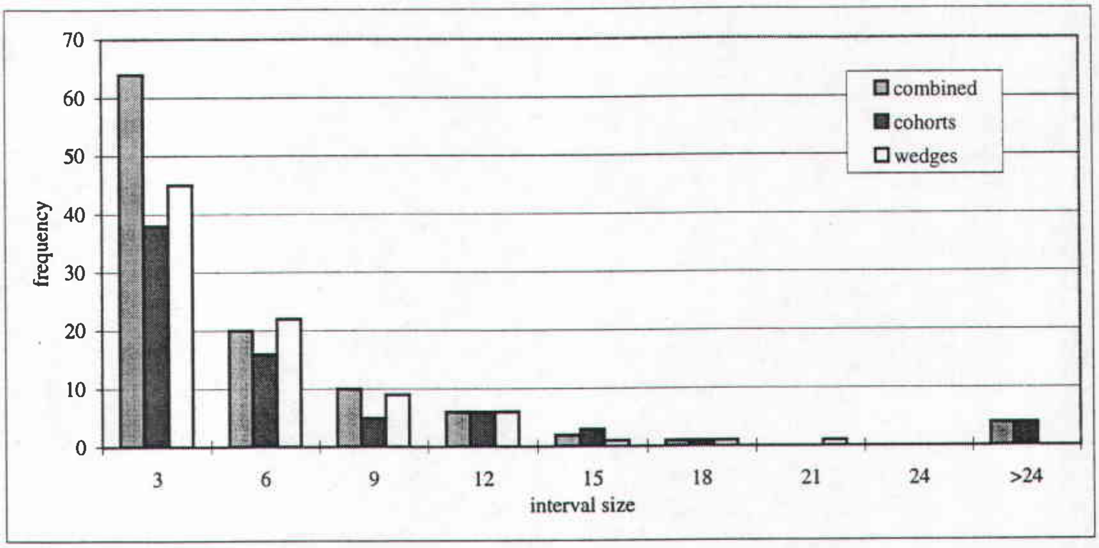

Figure 19. Frequency distribution of fire return intervals of the combined chronology, sorted by dataset. Scar-based intervals were skewed more to the left than cohort-based intervals.

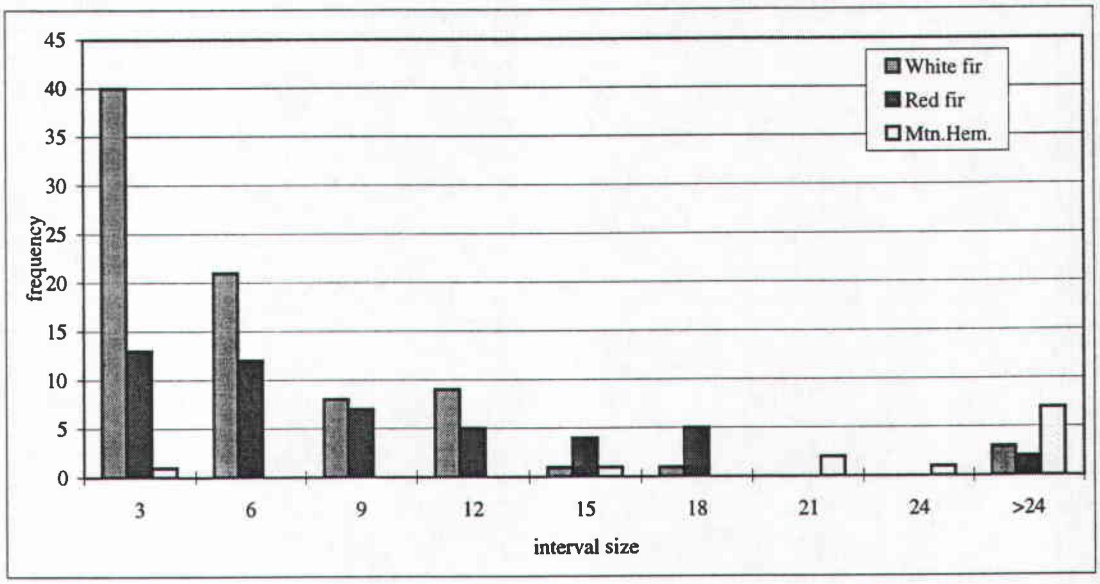

Figure 20. Frequency distribution of intervals of the combined chronology, grouped by plant zone. Intervals in the white fir zone were more skewed to the left than were red fir zone intervals. Mtn. hemlock intervals were much longer than fir intervals.

Weaver, 1959). Intervals longer than 100 years in the white fir zone during the pre-settlement era are not unknown (Figure 19 and Figure 20). This vegetative zone experienced a change from an MFRI of 29 years in the pre-settlement era to 15 years in the settlement era. The difference in MFRI between these two eras is not statistically significant. However, the exclusion and suppression era spans 80 years in which only three plots record fires. This reduction in the number of sites that show fire

represents a dramatic decrease in the amount of fire occurring in the white fir zone. The result of fire exclusion in the white fir zone is higher basal area of white fir and lower basal area of ponderosa pine and sugar pine (Parsons and Benedetti, 1979). The increased basal area can also result in increased competition for moisture and thus increased vulnerability to pathogens, and insects (Anderson, et al., 1998; McCune, 1983; Swetnam, et al., 1995).

The red fir zone, transitional between white fir and mountain hemlock zones, has a complex fire regime. Severe fires result in even-aged stands of red fir, while low-severity fires allow red fir to establish as clumps within stands of white fir or mixed conifers (Agee, 1990). Pre-exclusion MFRI for red fir range from 13 to 15 years in the southern Cascade Range of Northern California at Swain Mountain Experimental Forest, (Taylor, 1993), and up to 65 years at Sequoia National Park in the Sierra Nevada of Central California (Pitcher, 1987). Chappell and Agee (1996), working 10 km north of this study area, reported a MFRI of 39 years for the pre-exclusion era. There is little indication of an impact of fire exclusion in the red fir zone. The pre-settlement fire intervals are as long as those experienced currently. The greatest impact to the red fir zone occurred during the settlement era when the fire return interval was reduced to one-third its average at many sites.

Fire regimes in the mountain hemlock zone have not been studied extensively (Agee, 1993). Infrequent fires characterized these stands for numerous reasons. Conditions suitable for fire spread (low humidity, ignitions) are rare. And tree growth rates are slow in these cool, moist sites. The high-elevation sites in this study area mostly contained mountain hemlock although subalpine fir and western white pine were also present. The plant zone also includes pure stands of lodgepole pine. These plant groups commonly have fire return intervals longer than 100 years (Agee, 1990). More commonly, the fire cycle, or natural fire rotation [NFR] (the amount of time needed before an area the size of the study area has burned) is reported. Simon (1991) reported NFR of 450 years for mountain hemlock and 472 years for subalpine fir stands. NFRs longer than 1000 years have also been reported for these systems (Dickman and Cook, 1989).

There is insufficient evidence to calculate fire cycle in this study area, since a study area significantly larger than the area of an average fire is needed to insure a representative sample of fires (Baker, 1989). My data suggest one recent fire in the mountain hemlock zone that was detected in 6 of the 14 plots; this fire is nearly half as large as the zone in which it occurs. Also, this data include only 12 years that show evidence of fire in the mountain hemlock zone. This list of fire years was generated via the rule set for cohorts described above, and a different rule set would likely have detected a different number of fires. It is possible that some of the 'fires' that this rule set detected were either extended regeneration of trees after large scale disturbances, or the regeneration of trees in gaps that occurred as a natural process. As a result, my study provided little evidence for an impact from fire exclusion and suppression in the twentieth century in the mountain hemlock zone. These sites experience infrequent fire and the current exclusion period is still within the bounds of the natural fire regime.

My attempt to relate fire regime variability to topography was limited partially by the processes of wildfire. Fires, though constrained by topography, are driven mainly by immediate weather conditions, which are less influenced by topography than forest productivity. Fire is also constrained by fuel loading, which is a function of soil nutrition, climate, and other characteristics, such as time since fire, that are not necessarily related to topography.

The results of my study will be useful to managers and researchers. Locations, by their topographic characteristics, can be assigned a fire return probability. Likewise, knowledge of fire return intervals improves the ability of managers to prescribe many forest management activities. Under ecosystem management, these activities would emulate the ecosystem conditions and disturbance regime within the range of natural variability (Swanson et al., 1993). Increased knowledge of fire frequency and the temporal and spatial variability of that disturbance will allow the development of management plans that diverge less from natural conditions. Silvicultural prescriptions and fire prescriptions could be designed to include the range of frequency and extent that have occurred in the past, before the marked changes in disturbance regime brought on by Anglo-european settlement.

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APPENDICES

APPENDIX A: Choice and Limitations of Response Variables

Three different values are used to report fire frequency, depending on the type of data. In some regions, disturbance is an extremely binary process, such as in boreal forests where any fire is likely to be very severe. In these regions, the recurrence of fire can be effectively quantified by the (1) fire rotation, or natural fire rotation (Hemstrom and Franklin, 1982). This value describes the amount of time required to burn an area the size of a stated study area. Some patches within the area of interest will have burned numerous times, while other patches in the area will not have burned at all. In areas with a more variable fire severity, two other values are used to quantify fire: (2) mean fire return interval and (3) fire frequency. Mean fire return interval [MFRI] is the average number of years between fire occurrences. The size of the detection area must be indicated, since more fires are likely to be detected as the area of study increases. Area of detection ranges from point sources of single trees up to thousands of hectares. Similarly, fire frequency is the number of events per unit time, and also requires a known area of detection. Mathematically, fire frequency is the inverse of MFRI, although slight variations appear with small sample sizes.

Statistical analyses depend on the type of frequency distribution of the data. Normal distributions of continuous data can use least square tools such as F-tests and R^2. However, non-normal distributions require tranformation of the data before the use of least-sum tools. In this study, I have transformed binomial data to a continuous variable. Fire frequency is the binomial response of the number of fire years in a given number of trial years [length of the fire regime era]. For example, at a detection area of one plot, and for the period of interest of the settlement era [1850-1910], there might be zero fires (0/60) [zero successes in 60 years of one trial per year]. The transformation of this binomial response to a continuous variable requires the addition of 1 to both the numerator and denominator before a log transformation (log[{0+1}/{60+1}]). The transformed variable is considered to be continuous and can be used with least sum statistical tools.

In my study, I elected not to use MFRI for the statistical analyses since this would result in the loss of many plots of meaningful data. Interval data, by definition, requires two fires. Where there are numerous fires, MFRI can be calculated as the average of the set of intervals. Likewise, other statistics of the mathematical distribution of intervals can be calculated, such as variance, skew and kurtosis. However, many of my study plots had very few fires and thus few intervals. The use of fire frequency allowed the inclusion of these plots of data. Reporting zero fires during an era allows the use of the data where there are no intervals.

Other statistical moments (variance, skew and kurtosis) are more meaningful with normally distributed data. Indeed, skew and kurtosis describe a given data set in reference to a normal distribution. Variance in a normal distribution is calculated as the sum of the squared deviations from the mean divided by n-1, and is independent from the mean. However, for non-normal distributions, variance is derived in other ways. For binomial distributions, the variance is calculated as p(1-p), where p is the proportion, or mean. Thus, in binomial distributions, variance is a function of the mean, and analyses using the variance as the response in predictive regressions should not be expected to give significantly different results from regressions using the mean as the response. Fire predictability is essentially the variance of fire frequency.

The values for frequency and MFRI from this dataset are strongly correlated, since they are the inverse of each other (Table). However, the values are not strictly linear due to the loss of intervals at the beginning and end of the eras of interest. For example, during a 100 year period, there might be 10 fires, which results in a frequency of 10/100 or 0.1. However, MFRI averages only the 9 intervals that fell within the period, so MFRI will vary depending on whether those 10 intervals sum to 100 years or to a lesser number of years. Similarly, the SD of intervals is correlated with MFRI (Avg. of Intv.) and frequency (Table).

Table. The Pearson Correlation Coefficient (PCC) between response variables. The PPC between selected response variables is listed in the topmost box. Below the PCC, the probability that the PCC is greater than rho (under Hypothesis: rho=0) is listed. Number of observations for all variables is 36.

	INTVL SD	INTVL AVG.	ln(INT. SD)	ln(INT. AVG.)	ln(FREQ)
INTERVAL SD	1	0.74297	0.84418	0.71216	-0.56254
	0	0.0001	0.0001	0.0001	0.0004
INTERVAL AVG.	0.74297	1	0.56165	0.95895	-0.80335
	0.0001	0	0.0004	0.0001	0.0001
ln(INT. SD)	0.84418	0.56165	1	0.56409	-0.42104
	0.0001	0.0004	0	0.0003	0.0106
ln(INT. AVG.)	0.71216	0.95895	0.56409	1	-0.8351
	0.0001	0.0001	0.0003	0	0.0001
ln(FREQUENCY)	-0.56254	-0.80335	-0.42104	-0.8351	1
	0.0004	0.0001	0.0106	0.0001	0

APPENDIX B. Other Fire Regime Parameters

B.1. Summary Statistics of Intervals within Plant Zones

In the above thesis, I analyzed frequency data for fire regimes, grouping plots by plant series and temporal era. Here, I present a summary description of the *interval* data from the above datasets (Table B.1). There were not enough fires detected in all temporal eras, nor enough plot data in each plant zone to average MFRI for each era within each plant zone, so no analyses occurred on interval data. However, descriptive statistics were produced for the within-plot intervals from the combined cohort- and scar-based datasets. MFRI for each plot was tabulated and then averaged with the other plots in the plant zone. Statistics for each era describe the averaged MFRI for each plant zone. Statistics from the mountain-hemlock zone are absent for the settlement and exclusion eras since there were no intervals in that zone during these eras.

Table B.1. Descriptive statistics for MFRI. MFRI was calculated at each plot before the plots were grouped into plant zones and temporal eras. BOR is 'beginning of record'. 'Number of plots' is the number of plots that yielded intervals in the given era. No data is available in the Mtn. Hemlock zone for two eras, since no intervals were detected in that zone during these eras.

Temporal Era	Plant Zone	All plots	white fir	red fir	mt. hm.
all-time	Average of plot MFRI.	80	57	83	151
[BOR-1996]	Range of plot MFRI.	15-279	15-279	32-196	67-192
	Number of Intervals per plot	4.6	6.4	3.3	1
pre-settlement era	Average of plot MFRI.	40	44	71	143
[BOR-1850]	Range of plot MFRI.	11-216	11-216	33-175	44-192
	Number of Intervals per plot	3.4	5	2.1	1
settlement era	Average of plot MFRI.	20	20.1	18.6	-
[1850-1910]	Range of plot MFRI.	9-42	9-42	13-33	-
	Number of Intervals per plot	1.9	2	1.5	-
exclusion era	Average of plot MFRI.	27.8	15	40	-
[1910-1996]	Range of plot MFRI.	13-48	13-21	30-48	-
	Number of Intervals per plot	1.2	1.5	1	-
	number of plots	5	2	3	0

B.2. Descriptive Statistics for Seasonality

Seasonality results were mixed. Forty three percent of the fire years recorded by wedges were assigned to a season. Within a fire year, location of fire scars within a tree ring differed from plot to plot. This difference could be due to one fire that burned slowly through the study area, and scarred trees at different plots at different seasons of the year. Alternatively, the difference could be due to short-lived fires that scarred trees in plots at different elevations, thus scarring trees that were experiencing different apparent seasons due to the difference in elevation. Lastly, the attribution of season to the location of a scar in a wedge involves some element of subjectivity. Usually, for any one year, half the wedge samples could not have season attributed to the scar (Table B.2).

Table B.2. Fire scars occurred in all seasons. Fire scars were interpreted from the location of the scar within the annual ring. However, the majority of scars occurred in the later seasons, corresponding with the dry season in south central Oregon.

	Number	Percent
with season	92	43%
undetermined season	121	57%
Dormant Season fires	14	15%
Early earlywood fires	3	3%
Middle earlywood fires	11	12%
Late earlywood fires	37	40%
Latewood fires	27	29%

For those scars that were attributable to a specific season, the majority occurred late in the season. Scar evidence increased through the growing season. 69% of scars occurred in late-earlywood and latewood. 84% of fires occurred during the late-earlywood, latewood, and dormant seasons. These portions of the annual ring are likely developed in the late summer, and this pattern of seasonality of fires coincides with the dry season in south central Oregon. The fewest fires were recorded in the early earlywood, which corresponds to the early spring. Fires are rare in this region before June. Specific determination of which months correspond to which locations in the annual ring would require additional research and analysis of live materials.

APPENDIX C. Data.

C.1. Master Tree Ring Chronology

I generated a master chronology of ring widths for this project. The chronology was generated with the help of the International Tree Ring Database software (Holmes, 1992). I measured ring widths of 42 long-lived *Pinus ponderosa* cores and wedges using the ITRDB program medir. When measureing wedges, I selected a section of the wedge face that was away from the scarred section. The cross-dating was verified using the program cofecha. Each ring width series was processed and averaged with others to generate the master ring chronology. The master chronology from this study was cross-referenced with a nearby chronology to verify the temporal position of the chronology.

Processing consisted of removing low-frequency variance by applying a cubic smoothing spline with a 50 % cutoff of 32 years. Each series value was divided by the corresponding value of the spline curve, leaving a series without long waves or trend, and with a mean of one. Next, autoregressive modeling removed the persistence of the series and made the series more closely conform to Pearson's correlation assumption that the values were serially independent. Lastly, a log transformation was applied to the value after a constant was added. The transform has the effect of weighting more equally the proportional differences in ring width. These three steps simulated the visual examination by humans of a ring width series for cross-dating. In short the values in the master ring-width chronology are derived from the averaged, normalized ring widths for each year. Consult the ITRDB program library or a more in-depth description of the process.

This table is the master series in normalized form; the mean is zero, SD is one. The 'value' column shows each year's deviation from the mean. The 'relative value' shows that deviation graphically. Capital letters reflect values that are greater than the series mean, while small letters reflect values that are smaller than the mean. The @ symbol denotes a value that is within one quarter SD of the mean. A letter 'a' or 'A' denotes a value that is one-quarter to one-half SD from the mean, etc. The 'count' column shows how many individual series were used in the calculation of the mean for that year. Please note that the year 1790 has one less count than the years on either side. This is due to a missing ring having been detected in one of the series, thus one less value is available to contribute to the mean for that year.

Seventeen cores contributed to the series, which spanned from 1682 to 1996 for a span of 315 years. Series intercorrelation was 0.491 and average mean sensitivity was 0.235.

year	**value**	**count**	**rel. value**	**year**	**value**	**count**	**rel. value**	**year**	**value**	**count**	**rel. value**
1682	1.4	1	---------F	1688	-0.12	2	----@	1694	0.377	3	------B
1683	-2.14	2	i	1689	-1.09	2	-d	1695	1.577	3	----------F
1684	-0.95	2	-d	1690	-2.7	2	k	1696	-0.88	3	--d
1685	1.916	2	----------H	1691	-0.17	3	----a	1697	0.057	3	-----@
1686	1.203	2	---------E	1692	1.76	3	----------G	1698	-1.47	3	f
1687	0.969	2	--------D	1693	-0.25	3	----a	1699	1.404	3	---------F

year	value	count	rel. value
1700	2.023	3	----------H
1701	-2.03	3	h
1702	-0.69	3	--c
1703	-0.28	3	----a
1704	1.759	3	----------G
1705	-0.82	3	--c
1706	-0.72	3	--c
1707	-0.01	4	-----@
1708	-0.09	5	----@
1709	-1.6	5	f
1710	1.187	5	---------E
1711	-0.11	5	----@
1712	1.498	5	----------F
1713	-1.42	5	-f
1714	-1.35	5	-e
1715	0.563	5	-------B
1716	1.58	5	----------F
1717	0.527	5	-------B
1718	-0.63	5	--b
1719	-0.99	5	-d
1720	0.577	5	-------B
1721	0.139	5	-----A
1722	-0.33	5	---a
1723	0.702	5	--------C
1724	-0.44	5	---b
1725	-0.05	5	-----@
1726	1.114	5	---------D
1727	0.675	5	--------C
1728	-0.94	5	-d
1729	-1.01	5	-d
1730	0.134	5	-----A
1731	1.366	5	---------E
1732	1.014	5	---------D
1733	1.917	5	----------H
1734	0.257	5	------A
1735	0.405	5	-------B
1736	-0.5	5	---b
1737	0.774	6	--------C
1738	0.816	6	--------C
1739	-1.39	6	-f
1740	-1.87	6	g
1741	-2.61	6	j
1742	-1.54	6	f
1743	-0.82	6	--c
1744	0.366	6	------A
1745	0.289	6	------A
1746	0.387	7	-------B
1747	1.088	7	---------D
1748	0.528	7	-------B
1749	0.487	7	-------B
1750	1.588	7	----------F
1751	1.635	7	----------G
1752	0.907	7	--------D
1753	0.033	7	-----@
1754	-1.77	7	g
1755	-0.15	7	----a
1756	-1.35	7	-e
1757	-1.44	7	-f
1758	-0.64	7	--c
1759	-1.18	7	-e
1760	-0.8	7	--c
1761	0.948	7	--------D
1762	0.422	7	-------B
1763	0.767	7	--------C
1764	-0.51	7	---b
1765	0.958	7	--------D
1766	0.831	7	--------C
1767	0.205	7	------A
1768	0.148	7	------A
1769	-0.5	7	---b
1770	1.772	7	----------G
1771	0.267	7	------A
1772	0.549	7	-------B
1773	1.092	7	---------D
1774	-0.6	7	---b
1775	0.054	7	-----@
1776	-0.17	7	----a
1777	-0.8	7	--c
1778	0.025	7	-----@
1779	-0.72	7	--c
1780	-0.87	7	--c
1781	-1.4	8	-f
1782	-0.53	9	---b
1783	0.396	9	-------B
1784	1.222	9	---------E
1785	0.146	9	------A
1786	0.834	10	--------C
1787	-0.93	10	--d
1788	0.046	10	-----@
1789	0.199	10	------A
1790	-0.71	9	--c
1791	1.822	10	----------G
1792	0.252	10	------A
1793	-0.19	10	----a
1794	-0.25	10	----a
1795	-0.01	11	-----@
1796	-0.95	11	-d
1797	-1.09	11	-d
1798	-0.2	11	----a
1799	-0.5	11	---b
1800	1.37	12	---------E
1801	-0.72	12	--c
1802	-0.09	12	----@
1803	0.879	12	--------D
1804	0.375	12	------A
1805	1.726	12	----------G
1806	0.134	12	-----A
1807	-0.82	12	--c
1808	0.404	12	-------B
1809	0.673	12	--------C
1810	-2.23	12	i
1811	-1.14	12	-e
1812	0.894	12	--------D
1813	-1.43	12	-f
1814	1.704	12	----------G
1815	1.486	12	----------F
1816	0.027	13	-----@
1817	-0.13	13	----a
1818	0.794	13	--------C
1819	0.042	13	-----@
1820	-0.35	13	---a
1821	-0.47	13	---b
1822	1.447	13	----------F
1823	-0.64	13	--c
1824	-0.67	14	--c
1825	0.674	14	--------C
1826	0.215	14	------A
1827	-1.23	14	-e
1828	0.753	14	--------C
1829	1.25	14	---------E
1830	-0.7	14	--c
1831	-1.91	14	h
1832	-0.57	14	---b
1833	-0.77	14	--c
1834	0.307	15	------A
1835	0.463	15	-------B
1836	-0.44	15	---b
1837	0.5	15	-------B
1838	1.217	15	---------E
1839	0.665	15	--------C
1840	-2.24	15	i
1841	0.74	15	--------C
1842	-0.88	15	--d
1843	0.851	15	--------C
1844	-0.38	15	---b
1845	0.277	15	------A
1846	0.012	15	-----@
1847	-0.13	15	----a
1848	-0.17	15	----a
1849	-1.19	15	-e

year	value	count	rel. value	year	value	count	rel. value	year	value	count	rel. value
1850	-0.4	15	---b	1900	1.614	16	----------F	1950	-1.49	16	f
1851	0.628	16	-------C	1901	0.537	16	-------B	1951	-0.77	16	--c
1852	-0.1	16	----@	1902	0.183	16	------A	1952	-0.9	16	--d
1853	-0.56	16	---b	1903	0.294	16	------A	1953	-1.25	16	-e
1854	0.415	16	-------B	1904	1.07	16	---------D	1954	1.278	16	---------E
1855	1.467	16	----------F	1905	0.651	16	--------C	1955	0.246	16	------A
1856	-0.77	16	--c	1906	-0.85	16	--c	1956	-0.4	16	---b
1857	0.292	16	------A	1907	0.016	16	-----@	1957	-0.43	16	---b
1858	-0.1	16	----@	1908	0.651	16	--------C	1958	1.003	16	---------D
1859	-0.9	16	--d	1909	0.151	16	------A	1959	0.513	16	-------B
1860	0.989	16	---------D	1910	-1.63	16	g	1960	-0.44	16	---b
1861	1.658	16	----------G	1911	-1.49	16	f	1961	-0.83	16	--c
1862	0.007	16	-----@	1912	1.326	16	---------E	1962	-0.44	16	---b
1863	0.548	16	-------B	1913	2.305	16	----------I	1963	0.796	16	--------C
1864	0.132	16	-----A	1914	0.961	16	--------D	1964	0.429	16	-------B
1865	-0.88	16	--d	1915	0.479	16	-------B	1965	0.335	16	------A
1866	-0.09	16	----@	1916	0.053	16	-----@	1966	1.003	16	---------D
1867	-1.54	16	f	1917	-0.3	16	----a	1967	-0.52	16	---b
1868	-0.08	16	----@	1918	-1.77	16	g	1968	-0.34	16	---a
1869	-0.07	16	-----@	1919	0.816	16	--------C	1969	0.848	16	--------C
1870	-0.57	16	---b	1920	0.636	16	-------C	1970	0.446	16	-------B
1871	-1.79	16	g	1921	0.931	16	--------D	1971	-0.89	16	--d
1872	-1.58	16	f	1922	-1.23	16	-e	1972	-0.04	16	-----@
1873	-0.16	16	----a	1923	0.71	16	--------C	1973	-1.24	16	-e
1874	-0.14	16	----a	1924	-0.66	16	--c	1974	-0.62	16	--b
1875	1.004	16	---------D	1925	0.615	16	-------B	1975	-0.76	16	--c
1876	0.883	16	--------D	1926	0.754	16	--------C	1976	0.284	16	------A
1877	2.234	16	----------I	1927	-0.86	16	--c	1977	-1.41	16	-f
1878	0.682	16	--------C	1928	1.137	16	---------E	1978	0.359	16	------A
1879	0.747	16	--------C	1929	-1.12	16	-d	1979	0.137	16	-----A
1880	-0.38	16	---b	1930	-0.45	16	---b	1980	-0.12	16	----@
1881	1.592	16	----------F	1931	0	16	-----@	1981	0.441	16	-------B
1882	0.096	16	-----@	1932	-1.65	16	g	1982	-0.34	16	---a
1883	-1.6	16	f	1933	-1.82	16	g	1983	1.246	16	---------E
1884	-0.18	16	----a	1934	0.785	16	--------C	1984	1.307	15	---------E
1885	1.559	16	----------F	1935	-1.28	16	-e	1985	-0.32	15	----a
1886	-0.87	16	--c	1936	-0.79	16	--c	1986	0.538	15	-------B
1887	-1.12	16	-d	1937	-0.66	16	--c	1987	0.591	14	-------B
1888	0.478	16	-------B	1938	0.33	16	------A	1988	-0.32	14	----a
1889	-0.4	16	---b	1939	-0.02	16	-----@	1989	-1.98	14	h
1890	-2.9	16	l	1940	-0.19	16	----a	1990	2.004	13	----------H
1891	-0.3	16	----a	1941	1.299	16	---------E	1991	0.269	13	------A
1892	-0.04	16	-----@	1942	2.221	16	----------I	1992	-0.14	11	----a
1893	0.126	16	-----A	1943	1.478	16	----------F	1993	-1.05	11	-d
1894	1.315	16	---------E	1944	1.206	16	---------E	1994	-0.22	10	----a
1895	0.081	16	-----@	1945	0.443	16	-------B	1995	0.139	8	-----A
1896	-0.92	16	--d	1946	0.112	16	-----@	1996	-0.57	2	---b
1897	0.242	16	------A	1947	1.58	16	----------F				
1898	-0.62	16	--b	1948	0.146	16	------A				
1899	-2.17	16	i	1949	-1.42	16	-f				

C.2a. Plot Data.

The following table shows the field and laboratory data for each sample plot. Plot number 202 was the final full plot of data sampled. The extra plot numbers were in stands of recent stand-replacing fires for which I wished to determine the year of establishment. These plots lack stand structure data and scar surveys. The following items are listed for each sample plot. The table lists the identification label ('plot'), Universal Transverse Meridian coordinates in zone 10 ('utm east', 'utm north'), and plant association ('PA') (Hopkins, 1979), date of field sampling ('date'), and the USGS topographic quadrangle map ('quad') on which the plot can be found. The aerial photo frame numbers ('photo') are listed for USDA-F flights in 1979 (616020 rolls 2879 and 2779) and 1988 (616150A rolls 488 and 588) in addition to the distance ('dist', in meters) and azimuth ('azim', in degrees) that was taken to arrive at plot center. The final column shows which plots were used in the regression analysis ('users').

plot	utm_E	utm_N	PA	date	qaud	photo	dist	azim	users
100	575144	4721022	CW-C2-15	6/20/95	Mare's Tail	588-230	250	272	yes
101	573900	4718760	CW-C2-15	6/21/95	Crystal Springs	588-232	500	248	yes
102	574580	4720590	CW-H1-12	6/21/95	Mare's Tail	588-230	300	304	yes
103	574690	4721429	CW-C2-15	6/22/95	Mare's Tail	588-229	200	156	yes
104	574040	4721005	CW-C2-15	6/22/95	Mare's Tail	588-229	250	222	yes
105	571360	4711790	CR-S3-11	6/23/95	Pelican Butte	588-173	350	175	no
106	571760	4711625	CW-C2-15	6/23/95	Pelican Butte	588-173	250	272	no
107	573210	4711490	CW-C2-15	6/23/95	Pelican Butte	588-173	250	52	no
108	571230	4713170	CW-H1-12	6/24/95	Pelican Butte	588-175	500	143	no
109	573595	4721964	CR-S3-11	6/24/95	Mare's Tail	588-229	400	270	no
110	573167	4722286	CR-S3-11	6/24/95	Mare's Tail	588-184	450	113	yes
111	574875	4719595	CW-M1-11	6/25/95	Mare's Tail	588-231	300	16	yes
112	574285	4719690	CW-H1-12	6/25/95	Mare's Tail	588-231	250	78	yes
113	574384	4719989	CW-C2-15	6/25/95	Mare's Tail	588-231	200	312	no
114	573130	4720805	CW-C2-15	7/8/95	Mare's Tail	588-183	400	11	yes
115	572310	4719040	CW-H1-12	7/8/95	Crystal Springs	588-181	200	96	no
116	573880	4717780	CW-H1-12	7/9/95	Crystal Springs	588-233	300	283	yes

plot	utm_E	utm_N	PA	date	qaud	photo	dist	azim	users
117	573360	4717650	CW-C2-15	7/9/95	Crystal Springs	588-233	200	69	yes
118	573730	4719620	CW-C2-15	7/9/95	Mare's Tail	588-230	250	176	yes
119	571260	4718810	CR-S3-11	7/10/95	Pelican Butte	488-183	350	244	yes
120	571560	4718200	CR-S1-12	7/10/95	Pelican Butte	488-183	750	252	yes
121	573760	4720475	CW-H1-12	7/11/95	Mare's Tail	588-230	350	133	yes
122	570195	4720800	CL-S4-14	7/11/95	Devil's Pk.	488-180	250	90	no
123	570090	4721850	CL-S4-14	7/12/95	Devil's Pk.	488-180	300	216	no
124	569720	4722490	CR-S1-12	7/13/95	Devil's Pk.	488-180	500	221	yes
125	572125	4722775	CL-S4-14	7/19/95	Mare's Tail	588-185	250	40	no
126	572940	4720295	CW-H1-12	7/20/95	Mare's Tail	588-183	200	29	yes
127	571910	4721300	CW-H1-12	7/20/95	Mare's Tail	588-183	550	221	yes
128	568710	4720570	CM-S1-11	7/21/95	Devil's Pk.	488-141	100	295	yes
129	569050	4721190	CM-S1-11	7/21/95	Devil's Pk.	488-141	700	159	yes
130	568540	4718610	CR-S1-12	7/22/95	Pelican Butte	488-138	1400	211	yes
131	569520	4718025	CR-S1-12	7/22/95	Pelican Butte	488-138	500	161	yes
132	569705	4718130	CR-S1-12	7/22/95	Pelican Butte	488-138	700	56	no
133	572290	4721880	CR-S3-11	7/23/95	Mare's Tail	588-185	500	307	yes
134	569660	4720210	CR-S1-12	7/23/95	Devil's Pk.	488-141	400	307	yes
135	570340	4721390	CW-C2-15	7/24/95	Devil's Pk.	488-142	350	332	yes
136	569415	4719585	CM-S1-11	7/24/95	Devil's Pk.	488-140	1400	218	yes
137	569770	4717200	CR-S1-12	7/25/95	Pelican Butte	488-138	700	291	yes
138	568870	4717270	CR-S3-11	7/25/95	Pelican Butte	488-138	700	283	yes
139	574205	4716705	CW-C2-15	7/26/95	Crystal Springs	588-234	1000	231	yes
140	572260	4718290	CR-S3-11	8/4/95	Crystal Springs	588-180	850	283	yes
141	572360	4717305	CR-S3-11	8/5/95	Crystal Springs	588-180	500	327	yes
142	572625	4718405	CR-S3-11	8/5/95	Crystal Springs	588-180	650	32	yes
143	572448	4716160	CW-H1-12	8/6/95	Crystal Springs	588-177	500	349	yes
144	571750	4715755	CW-H1-12	8/6/95	Crystal Springs	588-177	400	325	no
145	571660	4715216	CW-M1-11	8/7/95	Pelican Butte	588-177	150	304	yes
146	571050	4715780	CW-H1-12	8/7/95	Pelican Butte	488-186	500	360	yes
147	569960	4715270	CW-M1-11	8/8/95	Pelican Butte	488-186	400	103	yes
148	569250	4714845	CR-S3-11	8/9/95	Pelican Butte	488-135	850	47	yes
149	570780	4714070	CR-S3-11	8/9/95	Pelican Butte	488-187	600	75	yes
150	570580	4717240	CR-G1-11	8/10/95	Pelican Butte	488-185	350	247	yes
151	570670	4717060	CR-S3-11	8/10/95	Pelican Butte	488-185	650	153	no
152	570310	4716790	CR-S3-11	8/11/95	Pelican Butte	488-185	100	360	yes
153	568730	4714831	CR-S3-11	8/18/95	Pelican Butte	2579-221	-	-	yes
154	567560	4719905	CM-S1-11	8/18/95	Devil's Pk.	2579-217	250	249	yes
155	568495	4715250	CW-M1-11	8/17/95	Pelican Butte	2579-221	-	-	no
156	566695	4721130	CM-S1-11	8/19/95	Devil's Pk.	2779-152	500	360	yes
157	567475	4721720	CM-S1-11	8/19/95	Devil's Pk.	2579-215	500	64	yes
158	567678	4720766	CM-S1-11	8/20/95	Devil's Pk.	2579-216	350	75	yes
159	568390	4721800	CM-S1-11	8/20/95	Devil's Pk.	2579-215	250	352	yes
160	568170	4719600	CM-S1-11	8/21/95	Devil's Pk.	2579-217	200	25	yes
161	568395	4719350	CM-S1-11	8/21/95	Devil's Pk.	2579-217	300	180	yes
162	570205	4718510	CR-S1-12	8/21/95	Pelican Butte	488-183	500	329	yes
163	573940	4715720	CW-H1-12	8/22/95	Crystal Springs	588-235	350	188	yes
164	570200	4720010	CL-S4-14	8/27/95	Devil's Pk.	488-182	125	250	yes
165	571000	4720205	CR-S1-12	8/27/95	Devil's Pk.	488-182	474	228	yes
166	571610	4720180	CR-G1-11	8/28/95	Devil's Pk.	588-183	650	245	no
167	572780	4719685	CR-S3-11	8/28/95	Mare's Tail	588-182	-	-	yes
168	567630	4716810	CW-M1-11	8/29/95	Pelican Butte	2579-220	250	177	yes
169	568030	4716120	CW-M1-11	8/29/95	Pelican Butte	2579-220	300	199	yes
170	569130	4716500	CW-H1-12	8/30/95	Pelican Butte	488-136	350	46	yes

plot	utm_E	utm_N	PA	date	qaud	photo	dist	azim	users
171	575495	4720720	CW-C2-15	8/31/95	Mare's Tail	588-230	100	41	yes
172	574790	4715190	CW-H1-12	9/1/95	Crystal Springs	588-235	450	130	yes
173	566995	4715170	CR-S1-12	9/29/95	Pelican Butte	2779-146	300	104	yes
174	566610	4715705	CR-S1-12	9/30/95	Pelican Butte	2779-147	450	288	yes
175	566170	4717090	CM-S1-11	10/1/95	Pelican Butte	2779-148	500	55	yes
176	573946	4721712	CW-H1-12	6/28/96	Mare's Tail	588-229	250	242	yes
177	574605	4721000	CW-H1-12	6/30/96	Mare's Tail	588-230	200	124	yes
178	573570	4715320	CW-C2-15	7/1/96	Crystal Springs	588-177	200	204	yes
179	574355	4716112	CW-H1-12	7/9/96	Crystal Springs	588-234	100	348	yes
180	574620	4716950	CW-M1-11	7/10/96	Crystal Springs	588-233	270	90	yes
181	572310	4720520	CR-S3-11	7/11/96	Mare's Tail	588-183	200	234	yes
182	571095	4721000	CW-M1-11	7/11/96	Devil's Pk.	488-180	475	203	no
183	570890	4717710	CR-S1-12	7/12/96	Pelican Butte	488-183	300	164	yes
184	571020	4718230	CR-S1-12	7/12/96	Pelican Butte	488-183	300	264	yes
185	571061	4719840	CR-S1-12	7/13/96	Devil's Pk.	488-182	550	270	yes
186	572260	4723210	CR-G1-11	7/21/96	Mare's Tail	588-185	400	266	yes
187	570180	4719330	CR-G1-11	7/22/96	Devil's Pk.	488-183	200	125	yes
188	571264	4719452	CR-G1-11	7/22/96	Devil's Pk.	488-183	200	235	yes
189	571885	4716320	CW-C2-15	8/6/96	Crystal Springs	588-178	500	263	yes
190	574905	4713857	CW-C2-15	8/7/96	Crystal Springs	588-237	300	260	yes
191	574473	4712149	CW-C2-15	8/7/96	Crystal Springs	588-238	250	158	no
192	570100	4722900	CR-G1-11	8/8/96	Devil's Pk.	488-179	-	-	yes
193	570916	4723493	CR-G1-11	8/9/96	Devil's Pk.	488-179	250	306	yes
194	567220	4718230	CW-H1-12	8/15/96	Pelican Butte	2579-218	1350	87	yes
195	566148	4718690	CR-S1-12	8/15/96	Pelican Butte	2779-149	1300	270	yes
196	571360	4716810	CR-S3-11	8/16/96	Pelican Butte	488-185	600	244	yes
197	569080	4722110	CR-S1-12	9/13/96	Devil's Pk.	488-143	450	200	yes
198	570940	4721880	CW-H1-12	9/13/96	Devil's Pk.	488-180	250	216	yes
199	567671	4718810	CM-S1-11	9/14/96	Pelican Butte	2579-218	600	178	yes
200	566075	4719840	CR-S1-12	9/14/96	Devil's Pk.	2779-151	225	272	yes
201	570930	4722573	CR-G1-11	9/21/96	Devil's Pk.	488-179	400	198	no
202	564775	4720820	CM-S1-11	9/22/96	Devil's Pk.	2879-8	275	101	yes
205	569585	4714506	CR-S3-11	9/22/96		-	-	-	no
206	570581	4718452	CR-S1-12	9/22/96		-	-	-	no
207	572408	4718622	CR-S3-11	9/22/96		-	-	-	no
302	570265	4716507	CW-H1-12	9/12/96		-	-	-	no
303	570382	4716084	CW-H1-12	9/12/96		-	-	-	no

C.2b. Plot Data (continued).

This table includes stem counts and topographic variables for each plot. The total number of trees for which an age of origin was determined ('stems'), and the number of these that were live trees ('live'), or stumps ('stumps'). Also, the number of slabs ('slab') and increment cores ('cores') returned to the lab for analysis are listed. The final items are the aspect in degrees ('aspect'), and slope gradient in percent rise ('slope') as determined in the field. Elevation in meters ('elev'), solar radiation ('rad'), exposure ('expos') and slope position in percent ('slp-pos') were calculated from the Digital Elevation Model.

plot	stems	live	stump	slab	core	aspect	slope	elev	rad	expos	slp-pos
100	13	0	13	4	0	90	26	1396	391	28.04	100
101	11	0	11	0	0	121	13	1475	399	26.20	97
102	10	0	10	1	0	140	25	1467	412	17.66	74
103	20	0	20	4	0	166	38	1430	445	35.14	72
104	13	0	13	7	0	145	35	1433	414	-23.76	19
105	9	0	9	0	0	4	16	1553	-	-	-
106	11	0	11	0	0	22	18	1568	-	-	-
107	6	6	0	0	6	68	36	1445	-	-	-
108	13	0	13	0	0	109	22	1675	-	-	-
109	10	10	0	0	10	97	45	1614	-	-	-
110	9	0	9	0	0	125	18	1742	417	1.20	100
111	20	5	15	0	5	177	12	1280	406	-7.31	7
112	7	7	0	0	7	67	36	1380	379	-16.85	15
113	12	0	12	0	0	121	19	1416	-	-	-
114	11	11	0	2	11	182	26	1538	453	-12.74	28
115	9	7	2	0	7	146	10	1642	-	-	-
116	11	0	11	0	0	87	25	1407	380	4.06	81
117	18	0	18	0	0	37	28	1549	351	0.92	23
118	9	0	9	0	0	164	24	1531	431	5.79	41
119	11	0	11	1	0	144	20	1763	435	-3.24	26
120	14	11	3	0	11	281	10	1772	392	-0.49	64
121	14	6	8	2	7	335	32	1494	310	-9.85	35
122	7	7	0	0	8	49	4	1678	-	-	-
123	11	4	6	2	4	180	15	1817	-	-	-
124	19	15	4	1	15	194	12	1858	428	-7.40	18
125	8	8	0	1	8	87	5	1844	-	-	-
126	14	11	3	0	12	40	30	1560	321	-19.85	22

plot	stems	live	stump	slab	core	aspect	slope	elev	rad	expos	slp-pos
127	10	10	0	1	9	185	38	1670	459	5.18	45
128	11	11	0	0	11	72	38	1819	374	-35.21	11
129	7	7	0	0	7	130	20	1804	413	9.04	93
130	12	12	0	0	13	280	17	1978	404	3.08	59
131	11	11	0	0	12	80	17	1917	401	6.19	39
132	11	11	0	0	11	88	49	1866	-	-	-
133	19	8	11	2	9	184	12	1772	435	-8.65	13
134	12	11	1	0	11	107	12	1818	330	12.51	80
135	10	10	0	3	12	178	50	1735	466	7.90	60
136	11	11	0	0	12	357	13	1841	385	-5.49	8
137	18	18	0	0	19	140	20	1940	434	2.91	49
138	12	12	0	0	19	240	55	1997	466	28.51	79
139	15	14	1	5	20	82	36	1377	375	22.06	100
140	8	8	0	2	8	40	19	1691	342	11.17	40
141	16	7	9	3	6	95	29	1672	393	-18.03	15
142	9	3	6	1	3	301	25	1630	383	-4.34	62
143	14	14	0	3	17	131	40	1505	450	6.67	29
144	12	12	0	0	11	138	30	1469	-	-	-
145	11	11	0	2	8	24	9	1408	363	-27.41	1
146	15	15	0	0	18	173	40	1569	464	20.42	62
147	12	12	0	0	10	22	10	1452	378	-19.77	0
148	10	10	0	2	9	35	37	1667	326	14.24	43
149	15	1	14	0	1	95	9	1750	-	-6.08	41
150	11	10	1	0	10	123	24	1882	434	2.28	49
151	7	7	0	0	7	129	29	1838	-	-	-
152	16	14	2	0	15	127	25	1874	430	28.79	93
153	15	0	15	0	0	40	55	1693	315	-0.83	4
154	14	14	0	0	14	82	3	1971	416	-0.31	23
155	16	0	16	0	0	54	45	1579	-	-	-
156	11	11	0	0	11	4	14	1980	407	-2.86	22
157	9	9	0	1	9	132	15	1916	430	-12.59	10
158	8	8	0	0	8	25	12	1918	385	-8.58	0
159	13	13	0	0	13	221	6	1870	429	-14.43	4
160	13	13	0	0	13	25	8	1978	389	5.88	88
161	10	10	0	0	10	51	8	1991	374	23.38	98
162	12	1	11	4	1	179	11	1808	421	-11.69	5
163	16	0	16	3	0	342	27	1381	341	-6.46	57
164	12	12	0	1	12	95	0	1789	409	-10.50	5
165	14	14	0	2	16	28	6	1757	371	-1.81	15
166	12	12	0	0	12	80	9	1764	-	-	-
167	15	0	15	5	0	101	17	1770	386	40.22	98
168	11	11	0	0	11	230	7	1511	410	-26.84	3
169	19	19	0	0	19	115	15	1495	387	-21.01	2
170	12	9	3	2	9	204	50	1776	469	11.10	93
171	19	9	10	1	9	62	18	1307	380	-3.19	25
172	18	0	18	0	0	103	14	1314	-	6.14	72
173	10	10	0	0	10	90	14	1766	409	-2.98	38
174	10	10	0	0	10	80	5	1779	390	5.27	98
175	11	11	0	0	11	99	8	1795	390	3.05	0
176	14	0	14	5	0	102	18	1514	408	-6.09	52

plot	stems	live	stump	slab	core	aspect	slope	elev	rad	expos	slp-pos
177	13	9	4	1	9	33	21	1415	331	-1.64	46
178	12	7	5	0	7	358	36	1446	333	-17.58	22
179	9	0	9	1	0	112	12	1346	383	7.53	75
180	12	7	5	3	7	60	5	1298	378	-3.63	80
181	15	10	5	2	11	16	43	1564	327	-31.16	13
182	10	10	0	1	11	178	9	1611	-	-	-
183	12	2	10	2	3	156	26	1848	344	-0.24	74
184	14	0	14	0	0	38	16	1786	372	1.18	3
185	9	9	0	3	9	20	35	1773	360	-30.49	14
186	28	10	18	3	10	184	9	1866	429	-1.49	12
187	11	11	0	1	10	332	35	1889	316	7.32	72
188	18	0	18	0	0	127	22	1851	442	8.76	82
189	11	11	0	3	12	171	48	1634	459	6.45	45
190	18	0	18	2	0	100	18	1283	-	-12.03	6
191	13	0	13	1	0	196	12	1298	-	-	-
192	15	0	15	0	0	156	27	2016	466	35.23	94
193	8	8	0	1	8	175	33	2011	467	-3.44	49
194	11	11	0	0	11	224	48	1740	456	-13.95	33
195	6	6	0	0	6	173	43	1813	445	3.57	37
196	8	8	0	0	8	112	29	1721	421	-16.40	11
197	8	8	0	0	9	150	43	1866	403	-9.65	22
198	10	0	10	1	0	180	31	1817	458	-0.16	25
199	7	7	0	0	7	93	1	1943	425	-5.13	26
200	7	7	0	0	7	203	23	2041	457	1.58	54
201	7	7	0	0	7	161	19	1972	-	-	-
202	6	6	0	0	6	203	23	2127	461	-6.17	53
205	-	-	-	-	4	349	45	1768	-	-	-
206	-	-	-	-	5	53	5	1789	-	-	-
207	-	-	-	-	5	45	11	1607	-	-	-
302	-	-	-	1	0	170	37	1814	-	-	-
303	-	-	-	1	0	178	23	1690	446	30.15	65

C.2c. Plot Data (continued).

This table lists the variables used in the regression analysis. 'Length' is the year of the earliest evidence that the plot yielded. This year is always a tree origin year, or the year of a fire suspected to have occurred in the plot. The number of fires determined from scars on wedges ('scar') and from cohorts ('cohort') detected in the plot between the year of origin of the plot and 1910 (the period of interest in the regression analysis). These two values were used to calculate the frequency of fire at each plot. Extent ('extent') and its standard deviation ('ext-sd') are indices and thus without units. The number of fires at each plot that were used in the calculation of the extent variables is shown next ('count'). The number of fires value is the sum of the wedge and cohort fires that were between 1700 and 1910 that were detected in less than 14% of the available plots. Mean fire return interval ('MFRI') standard deviation of fire intervals ('FRI-sd'), and the Weibull ('Weibull') mean interval are listed in year units.

plot	length	scar	cohort	extent	ext-sd	count	MFRI	FRI-sd	Weibull
100	1776	9	3	5.167	2.714	9	15.75	11.11	14.2
101	1835	2	2	-	-	-	53.00	-	-
102	1739	3	2	5.500	6.364	3	81.50	68.59	-
103	1723	12	6	5.875	3.643	12	15.09	7.91	14.32
104	1556	25	5	6.417	3.942	17	13.83	12.49	11.99
105	-	-	-	-	-	-	-	-	-
106	-	-	-	-	-	-	-	-	-
107	-	-	-	-	-	-	-	-	-
108	-	-	-	-	-	-	-	-	-
109	-	-	-	-	-	-	-	-	-
110	1763	2	2	8.500	6.364	2	36.00	-	-
111	1739	3	3	-	-	-	74.50	58.69	-
112	1623	2	2	-	-	-	279.00	-	-
113	-	-	-	-	-	-	-	-	-
114	1822	5	4	6.667	2.887	5	20.00	9.20	21.35
115	-	-	-	-	-	-	-	-	-

plot	length	scar	cohort	extent	ext-sd	count	MFRI	FRI-sd	Weibull
116	1776	2	2	-	-	-	112.00	-	-
117	1739	5	3	-	-	-	74.50	53.03	36.29
118	1611	5	4	5.500	0.707	3	72.67	57.71	59.19
119	1704	3	2	-	-	-	92.00	106.07	-
120	1704	2	2	-	-	-	184.00	-	-
121	1556	13	7	11.000	3.916	10	30.18	15.46	28.98
122	-	-	-	-	-	-	-	-	-
123	-	-	-	-	-	-	-	-	-
124	1725	2	1	2.000	1.414	2	113.00	-	-
125	-	-	-	-	-	-	-	-	-
126	1673	4	4	-	-	-	76.33	92.00	52.34
127	1707	6	3	9.000	5.099	6	32.80	18.31	43.38
128	1707	2	2	-	-	-	181.00	-	-
129	1761	1	1	-	-	-	-	-	-
130	1654	1	1	-	-	-	-	-	-
131	1656	1	1	-	-	-	-	-	-
132	-	-	-	-	-	-	-	-	-
133	1664	5	3	9.500	7.778	5	51.75	35.00	47.49
134	1675	1	1	-	-	-	-	-	-
135	1755	7	4	2.400	0.894	7	22.17	11.00	26.93
136	1483	2	2	-	-	-	192.00	-	-
137	1776	1	1	-	-	-	-	-	-
138	1776	1	1	-	-	-	-	-	-
139	1743	10	5	6.286	5.529	11	17.22	14.11	19.69
140	1711	6	4	-	-	-	37.40	33.81	31.28
141	1723	5	3	8.000	4.243	5	43.75	43.62	34.56
142	1656	4	4	-	-	-	76.33	74.47	63.44
143	1662	13	8	4.375	3.292	12	19.67	11.87	18.4
144	-	-	-	-	-	-	-	-	-
145	1711	4	3	-	-	-	53.33	33.08	50.26
146	1683	8	6	8.000	2.944	7	40.40	25.03	27.45
147	1656	5	5	10.500	0.707	4	57.25	30.32	55.87
148	1723	5	3	10.333	5.033	5	43.75	36.67	38.04
149	1704	1	1	-	-	-	-	-	-
150	1799	2	1	-	-	-	-	-	-
151	-	-	-	-	-	-	-	-	-
152	1704	2	2	-	-	-	167.00	-	-
153	1704	5	3	10.000	7.071	5	42.00	14.14	49.62
154	1707	2	2	9.000	8.485	2	126.00	-	-
155	-	-	-	-	-	-	-	-	-
156	1707	1	1	-	-	-	-	-	-
157	1545	2	2	-	-	-	162.00	-	-
158	1518	2	2	-	-	-	189.00	-	-
159	1656	1	1	-	-	-	-	-	-
160	1640	2	2	-	-	-	67.00	-	-
161	1726	2	2	5.000	2.828	2	107.00	-	-
162	1704	5	2	8.500	3.536	5	48.50	67.69	30.19
163	1546	7	6	10.000	4.243	4	58.67	11.88	59.48
164	1675	2	1	-	-	-	181.00	-	-
165	1629	4	3	-	-	-	86.33	54.54	81.95
166	-	-	-	-	-	-	-	-	-
167	1656	8	6	5.250	3.304	6	33.14	24.07	29.85
168	1515	1	1	-	-	-	-	-	-
169	1654	1	1	-	-	-	-	-	-

plot	length	scar	cohort	extent	ext-sd	count	MFRI	FRI-sd	Weibull
170	1623	12	5	5.625	3.462	11	25.00	13.03	21.13
171	1723	6	5	8.333	2.082	6	35.80	36.66	26.31
172	1623	9	4	6.000	2.646	8	77.67	63.01	25.22
173	1654	1	1	-	-	-	-	-	-
174	1654	1	1	-	-	-	-	-	-
175	1654	1	1	-	-	-	-	-	-
176	1702	11	7	6.625	3.249	11	15.50	11.01	16.98
177	1702	2	2	10.000	0.000	2	200.00	-	-
178	1623	5	3	-	-	-	137.50	111.02	40.81
179	1711	5	4	11.333	3.215	5	62.33	32.65	54.23
180	1636	15	4	6.375	5.449	14	23.82	24.48	15.69
181	1430	9	8	5.000	3.162	6	56.00	70.02	40.64
182	-	-	-	-	-	-	-	-	-
183	1675	4	1	-	-	-	74.33	48.54	69.96
184	1675	3	1	-	-	-	-	-	-
185	1675	2	1	-	-	-	196.00	-	-
186	1664	3	2	6.500	0.707	3	123.00	73.54	-
187	1675	4	2	9.500	0.707	3	65.33	30.02	65.04
188	1675	3	1	-	-	-	-	-	-
189	1666	14	5	9.500	3.834	12	17.85	5.54	19.94
190	1702	11	6	7.571	4.791	11	24.57	13.04	19.91
191	-	-	-	-	-	-	-	-	-
192	1664	3	2	-	-	-	92.00	-	-
193	1814	2	1	6.000	0.000	2	96.00	-	-
194	1515	1	1	-	-	-	-	-	-
195	1726	1	1	-	-	-	-	-	-
196	1704	2	2	-	-	-	67.00	-	-
197	1791	1	1	-	-	-	-	-	-
198	1707	5	4	8.000	6.633	5	45.00	20.93	44.4
199	1675	2	2	-	-	-	158.00	-	-
200	1726	1	1	-	-	-	-	-	-
201	-	-	-	-	-	-	-	-	-
202	1726	1	1	-	-	-	-	-	-
205	-	-	-	-	-	-	-	-	-
206	-	-	-	-	-	-	-	-	-
207	-	-	-	-	-	-	-	-	-
302	-	-	-	-	-	-	-	-	-
303	1683	12	.	5.286	4.923	10	-	-	19.14

C.3. Tree Age Data.

The following is a combination of field data and data derived in the laboratory for each of the increment cores used in determining cohorts established by fires. For each increment core ('label'), the location ('loc') of the tree is indicated ('p' = inside the 0.2 ha. plot, 'r' = outside the plot, in the nearby stand). 'Code' shows how tree age was determined (from stump 's'; or live tree 't'). Live trees were processed in the lab for age determination, while stumps were counted in the field. The species ('spec'), diameter at breast height ('DBH') for live trees, height ('hght') and diameter ('diam') at counting height (stump face or coring) were recorded. The age of stumps counted in the field ('field') is shown with an accuracy rating ('acc') where: '1' = within 1 year; '2' = within 2 yrs.; '3' = within 3-5 yrs.; '4' = within 5-10 yrs.; '5' = within 11-20 yrs.; and '6' greater than 20yrs off. For increment cores, I recorded a minimum age ('min') and an estimated age ('est') of each core. I indicated whether all ages were to the pith or not ('pith'). I recorded the radius to the third ring ('3_R') and the radius to the 40th ring ('40_R') for all samples to calculate growth rates. For stumps and other non-living material, I included the number of years since harvest determined from Forest Service records and field information ('act').

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
100	1	p	s	abco		40	80	95	1			-	7	28	10
100	2	p	s	abco		35	42	77	1			-	3	12	10
100	3	p	s	abco		30	38	86	2			pith	3	9	10
100	4	p	s	abco		45	53	83	2			pith	7	10	10
100	5	p	s	abco		47		73	2			pith	6	12	10
100	6	r	s	pipo		40	115					-			10
100	7	r	s	abco		65	125	188	4			pith	4	19	10
100	8	r	s	abco		85	89	84	2			pith	9	21	10

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
100	9	r	s	pipo		35	70	170	4			pith	7	19	10
100	10	r	s	abco		35		86	3			pith	6	9	10
100	11	r	s	abco		38		109	2			pith		33	10
100	12	r	s	abco		40		64	3			pith		26	10
100	13	r	s	pipo		70		167	3			pith	6	11	10
100	20	r	s	pipo		35	65	195	4			pith	2	4	10
101	1	p	s	abma		30	50	86	2			pith	5	15	9
101	2	p	s	abco		40	57	94	2			pith	6	16	9
101	3	p	s	abco		60	47	87	1			pith	5	11	9
101	4	p	s	abco		52	30	70	2			pith	6	15	9
101	5	p	s	abco		27	50	78	2			pith	7	18	9
101	6	p	s	abco		15	55	84	3			pith		21	9
101	7	p	s	pipo		33	53	94	2			pith	5	22	9
101	8	p	s	pipo		35	61	96	2			pith	12	22	9
101	9	r	s	abco		36	50	77	1			pith	6	16	9
101	10	r	s	abco		85	110	144	4			pith	7	17	9
101	11	r	s	pipo		50	64	145	5			pith	6	26	9
102	1	p	s	abco		30	46	62	1			pith	5	18	10
102	2	p	s	abco		40	52	67	1			pith	6	24	10
102	3	p	s	abco		35	48	70	1			pith	6	19	10
102	4	p	s	abco		45	40	59	3			pith	8	19	10
102	5	p	s	abco		15	17	63	2			pith	3	7	10
102	6	p	s	abco		30	37	58	2			pith	6	18	10
102	7	p	s	abco		40	60	82	1			pith	5	18	10
102	8	p	s	psme		55	61	77	2			pith	6	23	10
102	9	r	s	cade		40	85	237	5			pith			10
102	10	r	s	abco		30	60	78	2			pith	6	25	10
103	1	p	s	cade		90	150					-			9
103	2	p	s	psme		70	48	78	2			pith	6	13	9
103	3	p	s	pipo				231	5			pith	7	20	9
103	4	p	s	pipo		40	71	211	5			pith	12	27	9
103	5	p	s	abco		60	75	150	2			pith	4	13	9
103	6	p	s	pipo		57	70	163	3			pith	6	15	9
103	7	p	s	cade		61	85	224	3			pith	6	15	9
103	8	r	s	cade		52	113	265	5			pith			9
103	9	r	s	pipo				146	4			pith	6	13	9
103	10	r	s	abma								-			9
103	11	r	s	psme		34	62	162	3			pith		24	9
103	12	r	s	psme		84	84	149	2			pith	6	13	9
103	13	r	s	cade		89	86	234	3			pith	6	14	9
103	14	r	s	pipo		85	85	209	4			pith	5	20	9
103	15	r	s	pipo		50	60					-			9
103	16	p	s	pipo		60	60	165	3			pith	13	8	9
103	17	p	s	pipo		61	60	179	3			pith	6	10	9
103	18	p	s	pipo		60	80	187	3			pith	11	17	9
103	19	p	s	abco		55	85	195	2			pith	8	15	9
103	20	p	s	abco		55	70	169	2			pith	6	9	9
104	1	p	s	psme		55	68	102	3			pith	6	30	7
104	2	p	s	psme		90	48	104	1			pith	7	22	7
104	3	p	s	psme		60	50	103	3			pith	7	21	7
104	4	p	s	pipo		47	80	337	5			pith	10	22	7
104	5	p	s	abma		50	45	78	1			pith	6	13	7
104	6	p	s	abco		65	87	114	1			pith	8	22	7
104	7	p	s	abma		32	35	82	2			pith	8	13	7

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
104	8	p	s	abco		40	47	96	1			pith	3	20	7
104	9	p	s	psme		60	61	150	2			pith	5	17	7
104	10	p	s	abma		38	34	88	2			pith	7	15	7
104	11	p	s	abco		52	48	104	2			pith	5	14	7
104	12	p	s	abco		39	43	110	2			pith	5	11	7
104	13	p	s	abco		35	75	89	2			pith	5	26	7
105	1	p	s	psme		40	108	284	3			pith	3	6	-
105	2	p	s	psme		60	115	266	5			pith	3	9	-
105	3	p	s	unkn		70	95	103	2			pith	5	16	-
105	4	p	s	unkn		60	91					-			-
105	5	p	s	unkn		55	101	207	5			pith	5	8	-
105	6	p	s	unkn		70	100					-			-
105	7	p	s	abco		72	100	240	3			pith		16	-
105	8	p	s	abco		39	70					-			-
105	9	p	s	abco		60	97	164	3			pith	9	22	-
106	1	p	s	abma		75	82	125	3			pith	8	24	-
106	2	p	s	unkn		60	95	130	2			pith	4	13	-
106	3	p	s	unkn		45	75	150	2			pith	6	17	-
106	4	p	s	abma		55	61	113	2			pith	14	21	-
106	5	p	s	abma		70	89	119	2			pith	11	20	-
106	6	p	s	unkn		42	95	147	2			pith	6	20	-
106	7	p	s	abma		43	76	129	2			pith	4	19	-
106	8	p	s	unkn		68	53	115	2			pith	5	16	-
106	9	r	s	abco		80	77	141	1			pith	14	20	-
106	10	r	s	unkn		65	58	143	2			pith	5	14	-
106	11	r	s	unkn		75	68	138	3			pith		20	-
107	1	p	t	abco		35	55	87				pith			0
107	2	p	t	abco		32	55	78				pith			0
107	3	p	t	abco		37	23	65				pith			0
107	4	p	t	abco		32	29	70				pith			0
107	5	p	t	abco		21	46	87				pith			0
107	6	p	t	abco		20	39	69				pith			0
108	1	p	s	abco		35	85					-			-
108	2	p	s	abco		50	108	205	5			pith	6	8	-
108	3	p	s	abco		50	92	174	3			pith	10	12	-
108	4	p	s	abma		35	41	114	4			pith	6	8	-
108	5	p	s	abma		35	42	105	3			pith		12	-
108	6	p	s	abco		56	59	137	2			pith	7	9	-
108	7	p	s	abco		63	63	129	2			pith	5	13	-
108	8	p	s	pipo		37	81	209	3			pith	7	14	-
108	9	r	s	abco		45	105					-			-
108	10	r	s	pipo		40	81	205	6			pith	5	8	-
108	11	r	s	abco		44	57	155	2			pith	4	11	-
108	12	r	s	abco		65	70	140	2			pith	6	14	-
108	13	p	s	psme		40	115					-			-
109	1	p	t	abma		41	45	87	1	84	84	pith	3	7.6	0
109	2	p	t	abco		20	46	89	2	82	89	pith	3	5.5	0
109	3	p	t	abma		44	63	72	2	70	76	pith	5	12.5	0
109	4	p	t	abco		16	15	60	2	60	65	pith	4	6.6	0
109	5	p	t	abco		50			2	73	75	pith	9	17	0
109	6	p	t	abco		18	28	85	2	80	90	pith	2	6.8	0
109	7	p	t	abma		30	45	65	2	61	70	pith	10	13	0
109	8	p	t	abco		15	53	78	3	73	90	pith		8.5	0
109	9	p	t	abma		30	51		2	65	70	pith	12	12	0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
109	12	p	t	abma		15	39		2	70	77	pith	5	9	0
110	1	p	s	abma		40	137	219	2			pith	16	22	7
110	2	p	s	abma		55	89	176	2			pith	12	12	7
110	3	p	s	pipo		65	105	185	4			pith	14	24	7
110	4	p	s	abco		35	64	167	3			pith	4	9	7
110	5	p	s	abma		40	125	168	3			pith	10	16	7
110	6	p	s	abma		40	40	97	3			pith	5	5	7
110	7	p	s	abma		26	58	117	3			pith	3	4	7
110	8	p	s	abma		28	42	183	3			pith	5	4	7
110	9	r	s	abco		37	67	92	2			pith	8	24	7
111	1	p	s	cade		40	85					-	2	8	6
111	2	p	s	psme		45	65	97	3			pith	8	14	6
111	3	p	s	psme		60	65	118	2			pith	6	13	6
111	4	p	t	psme		95	57	92	3	90	91	pith	5	11	0
111	5	p	t	psme		45	51	96	3	94	94	pith	4	8.6	0
111	6	p	t	psme		45	48			70	95	pith			0
111	7	r	s	abco		54	50	101	2			pith	10	13	6
111	8	r	s	abco		12	55	82	4			pith	4	9	6
111	9	r	s	abco		45	85	155	3			pith	6	10	6
111	10	r	s	psme		70	45	75	4			pith	10	18	6
111	11	r	s	abco		40	60	75	2			pith	7	19	6
111	12	r	s	abco		26	53	84	2			pith	6	18	6
111	13	r	s	pipo		50	124	245	3			pith	4	10	6
111	14	r	s	psme		54	64	112	2			pith	10	22	6
111	15	r	s	psme		53	57	101	2			pith	6	20	6
111	16	r	s	abco		32	63	84	2			pith	6	19	6
111	17	r	s	abco		35	25	83	2			pith	7	11	6
111	18	r	s	psme		15	30	80	2			pith	6	15	6
111	19	r	t	psme		31	52	83		81	87	pith	13	12	0
111	20	r	t	psme		24	26	89	1	94	95	pith	2	6.7	0
112	1	p	t	psme		22	58	92		82	84	pith	9	10.5	0
112	2	p	t	abco		8	49	87		77	77	pith	3	7.6	0
112	3	p	t	abco		28	37	77		75	83	pith		7.5	0
112	4	p	t	abco		14	23	81		86	90	pith		4.1	0
112	5	p	t	abco		35	76	89		78	87	pith		17	0
112	6	p	t	pipo		85	105	370	6			pith			0
112	7	p	t	abco		35	44	70		68	88	pith			0
113	1	p	s	abco		50	47	83	1			pith	8	24	4
113	2	p	s	abco		45	50	84	2			pith	8	19	4
113	3	p	s	pipo		35	42	84	2			pith	8	17	4
113	4	p	s	pipo		45	26	89	2			pith	10	15	4
113	5	p	s	pila		48	93	92	3			pith	17		4
113	6	p	s	abco		25	44	94	2			pith	5	34	4
113	7	p	s	pipo		23	58	88	3			pith	9	13	4
113	8	p	s	abma		8	27	78	3			pith	6	25	4
113	9	p	s	abco		33	69	80	2			pith	7	30	4
113	10	p	s	abco		37	49	85	2			pith	10	16	4
113	11	p	s	pipo		30	49	93	3			pith	12	21	4
113	12	p	s	pipo		85	200					-			4
114	1	p	t	pipo		30	61	89	4	85	91	pith	6	10	0
114	2	p	t	pipo		35	46	89	2	83	88	pith	7	8	0
114	3	p	t	pipo		40	51	78	2	77	88	pith	3	5.3	0
114	4	p	t	abco		20	45	67	2	65	83	pith	3	6	0
114	5	p	t	pipo		24	58	122	2	120	123	pith	5	7.4	0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
114	6	p	t	abco		19	17	70		81	86	pith	1	2.1	0
114	7	p	t	pipo		27	50	93	1	96	96	pith	4	9	0
114	8	p	t	pipo		20	56	92		90	93	pith	11	8.8	0
114	9	p	t	pipo		28	54	92	3	95	95	pith	4	11.8	0
114	10	p	t	cade		20	32	59		56	67	pith	3	4.8	0
114	18	r	t	pipo		25	81	149		150	163	pith		8	0
115	1	p	t	psme		24	55	93	2	92	96	pith	7	11.4	0
115	2	p	t	abma		30	58	105		107	127	pith			0
115	3	p	t	psme		37	56	90	3	85	97	pith	6	7	0
115	4	p	t	abma		20	60	99		94	112	pith			0
115	5	p	t	psme		31	87	109	3	109	123	pith			0
115	6	p	t	abma		27	33	101		102	103	pith	7	16	0
115	8	p	t	abma		25	31			96	109	pith	5	6.2	0
115	9	r	s	psme		45	65	88	2			pith	5	25	35
115	10	r	s	psme		50	65	80	3			pith	7	22	35
116	1	p	s	abco		43	41	76	2			pith	6	23	8
116	2	p	s	pipo		29	51	84	2			pith	7	28	8
116	3	p	s	pipo		40	60	87	2			pith	6	23	8
116	4	p	s	abco		40	54	74	2			pith	6	21	8
116	5	p	s	pipo		22	41	80	2			pith	8	25	8
116	6	p	s	pipo		17	33	84	2			pith	4	15	8
116	7	p	s	pipo		65	40	72	1			pith	10	20	8
116	8	p	s	pipo		55	45	89	1			pith	12	18	8
116	9	r	s	pipo		45	113	200	3			pith	11	25	8
116	10	r	s	abco		55	103	150	3			pith	12	27	8
116	11	r	s	abma		50	50	72	1			pith	10	25	8
117	1	p	s	abco		65	50	85	1			pith	14	20	8
117	2	p	s	abco		34	48	79	1			pith	8	24	8
117	3	p	s	abco		40	59	88	1			pith	5	22	8
117	4	p	s	pipo		33	48	82	2			pith	6	18	8
117	5	p	s	abma		25	33	86	1			pith	5	15	8
117	6	p	s	abco		19	23	88	2			pith	5	11	8
117	7	p	s	abma		20	15	84	2			pith	3	9	8
117	8	r	s	abco		68	75	101	2			pith	7	26	8
117	9	r	s	pipo		64	132	239	4			pith		30	8
117	10	r	s	abma		45	67	87	1			pith	10	29	8
117	11	r	s	abco		95	60	112	1			pith	6	28	8
117	12	r	s	pipo		50	89	205	4			pith	5	12	8
117	13	r	s	pipo		45	82	200	3			pith	3	9	8
117	14	r	s	abco		65	64	82	2			pith	17	27	8
117	15	r	s	abco		30	55	82	1			pith	6	20	8
117	16	r	s	pipo		50	115	195	3			pith	9	29	8
117	17	r	s	pipo		50	80	187	3			pith	12	26	8
117	18	r	s	pipo		60	110	235	4			pith	8	22	8
118	1	p	s	abco		30	59	79	1			pith	7	19	9
118	2	p	s	abco		42	75	141	2			pith	7	8	9
118	3	p	s	psme		48	115	330	5			pith	6	9	9
118	4	p	s	abco		50	51	80	1			pith	6	13	9
118	5	p	s	abco		63	57	149	2			pith	7	12	9
118	6	r	s	psme		80	151	370	5			pith	12	18	9
118	7	r	s	abco		40	67	95	4			pith			9
118	8	r	s	psme		67	95	165	3			pith	4	10	9
118	9	r	s	abco		50	110					-			9
119	1	p	s	unkn		17	34	74	1			pith	9	24	7

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
119	2	p	s	pipo		29	130	282	2			pith	10	27	7
119	3	p	s	unkn		25	55	99	2			pith	9	33	7
119	4	p	s	abma		32	49	70	2			pith	10	21	7
119	5	p	s	pipo		50	88	281	3			pith	10	13	7
119	6	p	s	unkn		25	47	74	1			pith	10	28	7
119	7	p	s	unkn		25	53	90	2			pith	10	28	7
119	8	p	s	abma		24	39	84	2			pith	4	13	7
119	9	p	s	abma		30	37	80	2			pith	6	12	7
119	10	p	s	unkn		23	45	90	1			pith	6	16	7
119	11	p	s	abma		33	75	90	1			pith	4	19	7
120	1	p	t	abma		35	54	200	5	230	230	pith	1.3	3.2	0
120	2	p	t	pico		24	35	91		88	97	pith		4.5	0
120	3	p	t	pico		26	31	76	1	76	78	pith	3	5.2	0
120	4	p	t	pimo		26	20	91		88	100	pith			0
120	5	p	t	abma		33	70		0	125		-			0
120	6	p	t	pico		26	27	74		72	76	pith	4	7.5	0
120	7	r	t	pico		26	44	98	2	95	98	pith	5	9.4	0
120	8	p	t	pico		25	35	82		82	86	pith	12	8.2	0
120	9	r	t	pimo		27	32	90	1	106	106	pith	1.5	1.5	0
120	10	p	s	abma		37	88	211	2			pith	9	12	32
120	11	r	t	pimo		30	37	170	5	205	206	pith	1.5	2.1	0
120	12	p	s	abma		45	77	180	3			pith	5	11	32
120	13	r	t	pipo		28	51	100	5	97	104	pith	7	8.2	0
120	14	p	s	abma		44	80	242	3			pith	5	9	32
121	1	p	t	psme		35	49	115	3	112	114	pith	2	6.5	0
121	2	p	t	abco		30	37	109		106	115	pith	3	6.7	0
121	3	p	t	psme		48	65	100	2	99	105	pith		9.3	0
121	4	r	s	psme		60	96	152	3			pith	4	12	36
121	5	p	t	abco		35	65	116	2	114	119	pith		4.4	0
121	6	p	s	abco		29	17	77	2			pith	5	9	36
121	7	p	t	abco		31	57	151	2	156	162	pith		3.4	0
121	8	p	s	psme		36	17	74	2			pith	5	9	36
121	9	p	t	pipo		32	91	350	5	294	315	pith		4.6	0
121	10	p	s	abco		22	16	77	2			pith	4	8	36
121	11	r	s	pipo		40	115	288	4			pith	6	7	36
121	12	p	s	psme		95	110	320	3			pith	7	9	36
121	13	p	s	psme		55	107	395	4			pith	7	11	36
121	14	p	s	psme		82	105	252	3			pith		8	36
122	1	p	t	abma		36	18	95	3	96	108	pith		1.6	0
122	2	p	t	pico		21	32	95		92	98	pith	3		0
122	3	p	t	pico		33	32			131	133	pith	5	5.9	0
122	4	p	t	pico		28	37	135	5	135	135	pith	8	9.5	0
122	5	p	t	abma		32	53			102	103	pith	9	7.8	0
122	6	p	t	pico		25	20	97		96	100	pith	4	5.2	0
122	8	p	t	pico		24	36			101	104	pith	12	9.5	0
123	1	p	t	pico		41	30	117	3	115	121	pith		4.8	0
123	3	p	t	pico		36	31	111	3	103	104	pith	11	5.2	0
123	5	p	t	abma		50	134			147		-			0
123	7	p	t	abma		40	47	121	3	123	131	pith		3.1	0
123	9	p	s	pico		58	45	116	2			pith	8	24	12
123	11	p	s	pico		35	48					-			12
123	13	p	s	pico		30	40	111	2			pith	5	10	12
123	15	p	s	pico		90	34	114	3			pith	8	15	12
123	17	p	s	pico		47	49	112	2			pith	8	23	12

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
123	19	r	s	pico		30	36					-			12
123	21	r	s	pico		77	41	105	2			pith	12	26	12
124	1	p	s	pico		50	45	195	3			pith	12	21	16
124	2	p	t	tsme		32	48	171		170	175	pith	2	6.6	0
124	2	p	s	pico		59	55	218	3			pith			16
124	3	p	t	abla		80	20			110	110	pith	1	2.5	0
124	4	p	t	tsme		25	56	127		130	144	pith		6.8	0
124	5	p	t	tsme		50	56	190	4	204	215	pith		6.6	0
124	6	p	t	tsme		28	53	169	6	182	196	pith		4.8	0
124	7	p	t	tsme		38	63	180	5	164		-			0
124	8	p	t	pico		22	38	169	6	160	195	pith			0
124	9	p	t	abla		26	38	130	3	128	140	pith		2.8	0
124	10	p	t	pico		25	36			160	200	pith			0
124	11	p	t	abla		28	62	190	4	194	197	pith	2	2.7	0
124	12	p	s	pico		29	33	170	3			pith	7	11	16
124	13	p	t	abla		34	20	130	4	103	123	pith			0
124	14	p	s	pico		47	40					-			16
124	15	p	t	abla		28	21	100	5	127	127	pith	1.5	2.6	0
124	17	r	t	tsme		44	25	100	5	101	117	pith		3.5	0
124	19	r	t	abma		40	53	190	6	221	224	pith	2	4	0
124	21	r	t	tsme		48	86	200	6	252	270	pith			0
125	1	p	t	pico	33	24	38	80	2	80	86	pith		10	0
125	2	p	t	pico	38	18	42	99		95	100	pith		10.2	0
125	3	p	t	pico	39	28	42	77	2	78	83	pith		11.5	0
125	4	p	t	pico	25	18	30	89		88	88	pith	3	5.5	0
125	6	p	t	pico	35	25	40	93		92	92	pith	5	9	0
125	8	p	t	pico	17	21	16	71		70	70	pith	4	4.6	0
125	10	p	t	pico	26	18	29			88	88	pith	4	8.5	0
125	101	p	t	pico	30	27	33	94	2	87	92	pith		8.5	0
126	1	p	t	pipo	61	25	66	111	3	111	120	pith		7.5	0
126	2	p	t	abco	15	26	17	81		80	84	pith	2	1.75	0
126	3	p	t	psme	45	28	55	102	3	95	106	pith		5	0
126	4	p	t	abma	27	26	32	91		87	91	pith	2	2.25	0
126	5	p	t	pipo	50	25	64	94	3	90	97	pith		9.5	0
126	6	p	t	psme	55	25	67	103		104	104	pith	2	6.2	0
126	7	p	t	abco	41	35	55	178	2	174	174	pith	3	2.8	0
126	8	p	t	abco	69	29	78	102	1	102		-			0
126	9	r	s	psme		55	145	312	2			pith	8	8	24
126	10	p	t	psme	43	20	50	130	4	121	132	pith		8.2	0
126	11	r	s	psme			115					-			24
126	12	p	t	psme	66	34	75		0	143		-			0
126	13	r	s	psme			120					-			24
126	15	p	t	psme	58	40	63	88	3	87	101	pith		10.8	0
127	1	p	t	pipo	52	31	62	207	2	206	213	pith	3	4.5	0
127	2	p	t	abco	49	22	57	88		85	91	pith		12.2	0
127	3	p	t	pipo	77	83	88	160	3	160	173	pith			0
127	4	p	t	abco	62	62	66	118		114	121	pith		9.9	0
127	5	p	t	pipo	72	40	85	206	2	209	214	pith	11	8.8	0
127	6	p	t	abco	52	33	60	98		95	105	pith		7.3	0
127	7	p	t	pipo	56	43	63	217	2	212	215	pith	3.5	5	0
127	8	p	t	abco	32	25	39	82		80	80	pith	2	6.3	0
127	9	p	t	pipo	42	35	49	200	1	199	201	pith	3.5	6.3	0
127	10	r	t	abco	64	70	65	141		139	145	pith		7.8	0
128	1	r	t	abma	56	34	61	291	3	280	289	pith		6.7	0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
128	2	p	t	tsme	28	24	31	87		85	89	pith	4	5.1	0
128	3	r	t	abma	84	45	89	277	1	284	294	pith		7.5	0
128	4	p	t	tsme	27	25	31	76		78	82	pith	3	6.3	0
128	5	r	t	abma	57	40	63	278	1	270	281	pith		4.3	0
128	6	r	t	pico	29	27	32	90		90	90	pith	7	9.3	0
128	7	p	t	pico	31	26	36	89	1	98	98	pith	6	12.6	0
128	8	p	t	tsme	33	29	37	86		84	85	pith	3	6.3	0
128	9	p	t	pico	28	23	31			93	93	pith	4	7.7	0
128	10	p	t	tsme	37	23	39	96		94	96	pith	4	7.5	0
128	12	p	t	pico	33	25	38	80		77	83	pith		9.5	0
129	1	p	t	abma	64	35	73	214	1	213	214	pith	4	2.5	0
129	2	p	t	abma	72	34	87	218		220	232	pith		3.5	0
129	3	p	t	abma	53	23	62	227	1	226	229	pith	3	2.8	0
129	4	p	t	abma	52	26	60	216		201	217	pith		2	0
129	5	p	t	abma	57	26	69	227	2	231	231	pith	0.5	3	0
129	6	p	t	abla	41	25	46	204		211	226	pith		3	0
129	7	p	t	pico	41	29	46	208	3	204		-			0
130	1	p	t	tsme	73	70	76	316	2	313	321	pith		8.7	0
130	2	p	t	pimo	67	31	73	285		287	288	pith	2.5	4.1	0
130	3	p	t	abma	77	65	78	275	3	274	278	pith		5.3	0
130	4	p	t	abma	59	24	54	286		281	281	pith	2	5.2	0
130	5	p	t	pimo	51	30	61	292	3	288	310	pith			0
130	6	p	t	abma	68	74	72	304		304	308	pith	3	7	0
130	7	p	t	abma	60	58	65	243	3	241	253	pith			0
130	8	p	t	tsme	59	37	67	331		177		-			0
130	9	p	t	pimo	48	35	61	265	3	266	285	pith			0
130	11	r	t	pimo	52	35	59	223	3	261	271	pith		5.5	0
130	13	r	t	pimo	51	28	58	298	3	312	312	pith	2	3.3	0
130	15	p	t	tsme	74	59	84	281	2	290		pith			0
131	1	p	t	abma	79	53	83	295	3	291	304	pith			0
131	2	p	t	abma	70	35	78	302		294	314	pith		4.2	0
131	3	p	t	tsme	53	35	56	306		305	305	pith	3	2.3	0
131	4	p	t	abma	61	37	65	316		312	325	pith		5.9	0
131	5	p	t	pimo	88	52	96			173		pith			0
131	6	p	t	abma	49	30	56	306		268	274	pith	5	6.2	0
131	7	p	t	pimo	64	30	74	273	1	314	318	pith	3.5	4.7	0
131	9	p	t	tsme	60	40	64	327		327	333	pith		6.2	0
131	11	p	t	tsme	63	37	68	299	2	295	301	pith	5	7	0
131	13	p	t	abma	79	65	85	310		302		pith			0
131	15	p	t	tsme	54	38	57	312	1	332	332	pith	4	7	0
132	1	p	t	pimo	30	30	34	93		96	96	pith	3	7	0
132	2	p	t	abma	23	27	28	83		78	80	pith	2.5	3.8	0
132	3	p	t	abma	38	26	43	75		74	87	pith			0
132	4	p	t	abma	28	24	33	92		91	99	pith		3.3	0
132	5	p	t	abma	37	26	45	72		71	82	pith		10.3	0
132	6	p	t	abma	27	22	34	72		71	78	pith		8.9	0
132	7	p	t	pimo	32	30	40	95	1	98	98	pith	4	8.9	0
132	8	p	t	pico	33	27	37	97		94	99	pith		11.1	0
132	9	p	t	pimo	35	30	43	74	3	85	90	pith		10	0
132	10	p	t	pimo	22	22	30	90		91	95	pith	3.5	6.3	0
132	11	p	t	pimo	41	33	50	90		91	91	pith	9	10.5	0
133	1	p	s	abma		60	85	216	2			pith	4	8	18
133	2	r	t	abma	16	27	18	72		71	92	pith		3.1	0
133	3	p	s	pipo		35	110	267	3			pith	8	15	38

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
133	4	r	t	abma	49	30	56	152		152	177	pith		5	0
133	5	p	s	abco		45	50	195	1			pith	5	5	38
133	6	p	t	pico	39	34	44	144	4	175	180	pith	2	2.4	0
133	7	p	s	abma								-			38
133	8	p	t	abma	31	28	36	75		74	119	pith			0
133	9	p	s	abma								-			38
133	10	p	t	abma	31	23	36	155		153	153	pith	2	1.5	0
133	11	r	s	abco		35	50					-			18
133	12	r	t	pipo	93	42	100	266		288	289	pith	3	8.4	0
133	13	r	s	abma		40	100	303	3			pith	10	6	18
133	14	r	t	pipo	88	42	101	326		304	304	pith	7	12	0
133	15	p	t	abco	73	4	80	173	5	170	201	pith		8	0
133	19	r	s	abma		50	92	185	2			pith	5	6	18
133	21	p	s	abma		42	98					-			38
133	23	r	s	abma		33	71					-			38
133	25	r	s	abma		48	101	308	4			pith	5	7	18
134	1	p	t	pimo	77	50	83	280	4	285	320	pith			0
134	2	p	t	pico	41	32	46	142		141	156	pith		3.2	0
134	3	p	t	pimo	33	25	36	95	3	102	107	pith		2.8	0
134	4	p	t	abma	34	28	37	165	6	163	220	pith			0
134	5	p	s	abma		80	51	314	2			pith			36
134	6	p	t	pimo	27	28	32	97		115	115	pith	1	1.3	0
134	7	p	t	abma	46	38	52	124	3	131	153	pith			0
134	8	p	t	abma	37	37	43	150		149	179	pith			0
134	9	p	t	pico	26	35	28	70	4	108	117	pith		3.6	0
134	10	p	t	pimo	48	29	56	247		258	278	pith			0
134	11	p	t	tsme	43	33	49	100	4	205	249	pith			0
134	12	p	t	pico	32	24	36	241		234	264	pith			0
135	1	p	t	pipo	32	30	35	108	1	111	111	pith	3	4.7	0
135	2	p	t	pico	47	26	53	167		163	165	pith	4	9.9	0
135	3	p	t	pipo	17	35	18	64	4	63	72	pith		4.4	0
135	4	p	t	pipo	80	39	91	215		215	218	pith	3	5.3	0
135	5	p	t	abco	29	28	32	74	1	74	79	pith		2.6	0
135	6	p	t	pipo	66	29	72	138		139	142	pith	10	9.4	0
135	8	p	t	abco	19	27	22	70		68	86	pith			0
135	10	r	t	abco	34	25	38	90		92	107	pith			0
135	12	p	t	pipo	38	28	40	222		210	228	pith			0
135	14	p	t	pipo	82	103	83	168		170	180	pith		11	0
136	1	p	t	abma	73	45	83	289	6			pith			0
136	2	p	t	abma	35	23	43	279		270	292	pith			0
136	3	p	t	abma	82	44	90	320	5	289		-			0
136	4	p	t	pico	36	37	39	270		268	273	pith		10.3	0
136	5	r	t	pimo	60	31	53	300	4	281	285	pith		4.4	0
136	6	p	t	pimo	55	38	67	450	6	467	512	pith			0
136	7	r	t	pimo	72	80	72		0	295		-			0
136	8	p	t	tsme	51	35	57	253		256	272	pith		4.8	0
136	9	p	t	tsme	53	47	55			298	303	pith		6.3	0
136	10	p	t	pico	47	28	50	260		267	274	pith		8.7	0
136	12	r	t	pico	49	38	54	248		249	250	pith	3	4.7	0
137	1	p	t	pimo	42	33	43	140	4	142	144	pith	3	4.1	0
137	2	p	t	abma	48	24	57	190		165		-			0
137	3	p	t	tsme	67	40	76	184		189	189	pith	1.3	5	0
137	4	p	t	pimo	38	27	45	125		124	134	pith		5.2	0
137	5	p	t	pimo	53	42	57	100		100	106	pith		7.2	0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
137	6	p	t	pimo	53	34	63	157		159	160	pith	2.5	3.9	0
137	7	p	t	pico	19	26	20	41		40	43	pith	8	9	0
137	8	p	t	abma	60	39	71	194		205	207	pith	3	2.9	0
137	9	p	t	pico	23	30	25	66		70	70	pith	6	7.2	0
137	10	p	t	abma	50	37	60	195		196	202	pith		2.2	0
137	11	r	t	pimo	47	30	53	93		95	100	pith		8.2	0
137	12	r	t	pico	48	28	55	199		178	188	pith		8	0
137	13	r	t	pimo	70	79	74	180		179	186	pith		10.4	0
137	14	p	t	abma	68	49	80	161		161	170	pith		4.1	0
137	15	p	t	tsme	67	47	71	170		160	170	pith		8	0
137	16	p	t	abma	44	40	55	113		113	121	pith		5.1	0
137	17	p	t	tsme	56	46	60	190		181	193	pith		6.5	0
137	18	p	t	abma	67	47	74	153		152	185	pith			0
138	1	p	t	pimo	65	28	71	185		183	183	pith	7	9.4	0
138	2	p	t	abco	51	33	60	130		129	135	pith		6.4	0
138	3	p	t	pimo	73	67	79	190		187		-			0
138	4	p	t	abma	43	29	48	87		85	85	pith	2	6.6	0
138	5	p	t	pipo	71	52	75	200	6	201	204	pith	6	5	0
138	6	p	t	abma	49	37	57	100	6	93		-			0
138	7	p	t	abma	64	37	75		0	110		-			0
138	8	p	t	abma	58	48	63	105		103	104	pith	3	8	0
138	9	p	t	abma	92	75	93			165	175	pith		17	0
138	10	p	t	abma	50	40	58	96		93	97	pith		7.9	0
138	12	p	t	abco	69	125	69	191		190	190	pith	4	9.4	0
138	14	p	t	abco	71	110	71			174	182	pith		10.2	0
139	1	r	t	psme	86	40	97	112	3	108	118	pith			0
139	2	p	t	abco	38	37	42	67		70	73	pith	6	10.9	0
139	3	r	t	pipo	84	23	98	188	3	187	199	pith			0
139	4	p	t	abco	15	20	18	69		65	65	pith	2.2	4	0
139	5	r	t	psme	135	85	140	179	6	182		-			0
139	6	p	t	abco	27	27	30	73		65	65	pith	3	6.3	0
139	7	r	t	pipo	89	56	103	124		236		-			0
139	8	r	s	pipo		59	105	239				pith			30
139	10	r	t	abco	21	25	24	42		40	52	pith			0
139	11	r	t	pila	43	34	53	49	3	47	65	pith			0
139	12	r	t	abco	22	31	26	66		67	69	pith	4	4.5	0
139	13	r	t	pipo	69	26	77	172	3	162	185	pith			0
139	14	r	t	abco	56	43	66	68		67	76	pith		9.5	0
139	16	p	t	pipo	73	39	80	219		199	203	pith		7	0
139	18	r	t	pila	66	72	72		0	189		-			0
139	20	r	t	pila	59	46	64	86		85	95	pith		9.9	0
140	1	r	t	pipo	89	41	99	280	5	246	250	pith		12.3	0
140	2	p	t	psme	54	30	62	89		89	89	pith	5	11.5	0
140	4	p	t	abma	24	28	28	90		83	90	pith			0
140	6	p	t	abco	17	19	21	88		86	86	pith	3	3.4	0
140	8	p	t	psme	25	25	29	79		76	82	pith		6.5	0
140	10	p	t	abco	24	34	28	75		72	84	pith			0
140	12	p	t	abma	58	29	72	280		238		-			0
140	14	r	t	pipo	93	47	108	230		206	219	pith			0
141	1	r	s	abma		70	90	173	2			pith	10	24	32
141	2	p	t	psme	88	55	101	220				pith			0
141	3	r	s	psme		82	135	224	2			pith	6	11	32
141	4	p	t	abco	61	54	65	109		101	115	pith	5	11.6	0
141	5	r	s	abma		70	66					-			32

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
141	6	p	t	abma	62	40	70	104		104	106	pith	11	10.1	0
141	7	r	s	abma		61	83					-			32
141	8	p	t	abma	69	53	72	91		90	100	pith		12	0
141	9	r	s	abma		65	110					-			32
141	10	p	t	psme	57	44	62	95		95	104	pith		9.8	0
141	12	p	t	abco	52	50	58	92		88	91	pith	9	11.8	0
141	14	p	t	abco	57	49	67	92		92	98	pith		11.1	0
141	16	r	s	abma		52	76	188	3			pith	6	11	32
141	18	r	s	abco		68	81	183	3			pith	7	10	32
141	20	r	s	abma		60	86	133	2			pith	8	13	32
141	22	r	s	abco		60	119					-			32
142	1	p	s	pipo		60	68	225	2			pith	26	30	32
142	2	p	t	abco	22	30	26	109		106	106	pith	4	3.2	0
142	3	p	s	psme		75	95	271	3			pith	8	12	32
142	4	p	t	psme	40	36	47	90		91	91	pith	2	7.1	0
142	5	p	s	abma		60	85	220	3			pith	12	9	32
142	6	p	t	abma	28	32	33	91		89	97	pith		4.6	0
142	7	p	s	abma		65	111					-			32
142	8	p	s	psme		45	71	239	2			pith	7	12	32
142	9	r	s	abma		70	115	300	4			pith	6	5	32
143	1	p	t	psme	68	40	78	75	4	66	79	pith			0
143	2	p	t	cade	85	50	95	216		225	225	pith	2	3.5	0
143	3	p	t	pipo	40	35	46	114	2	114	117	pith	8	8.1	0
143	4	p	t	pipo	70	49	80	129		128	129	pith	7	12.5	0
143	5	p	t	cade	25	32	28	97	2	96	96	pith	3	2.9	0
143	6	p	t	pipo	82	48	89	138		136	136	pith	15	15.8	0
143	7	p	t	pipo	49	28	58	128	3	126	132	pith		9.4	0
143	8	p	t	cade	62	53	66			123		-			0
143	9	p	t	pipo	68	15	76	194	3	193	196	pith	4	7.1	0
143	10	p	t	pipo	45	35	55	111	3	111	119	pith		9.8	0
143	12	p	t	cade	32	27	38	115		114	114	pith	5	5.6	0
143	14	p	t	pipo	51	40	56	150		108		pith			0
143	16	p	t	cade	26	29	29	80		74	111	pith			0
143	18	p	t	pipo	68	60	73	129		76		-			0
144	1	p	t	psme	88	50	98	110	2	102	114	pith			0
144	2	p	t	pipo	60	37	68			55		-			0
144	3	p	t	psme	50	32	58	87	1	84	88	pith	13	8.7	0
144	4	p	t	pipo	63	48	70	110		113	121	pith		18.4	0
144	5	p	t	pipo	65	28	78	90	3	103		-			0
144	6	p	t	pipo	60	42	65	118		113	115	pith	2	14.9	0
144	7	r	t	psme	46	30	53	90	2	87	103	pith			0
144	8	p	t	psme	51	40	56	80		79	87	pith		9.6	0
144	9	p	t	pipo	60	32	74	115	2	114	117	pith	4	13.9	0
144	10	p	t	psme	53	50	59	105		108	108	pith	3	9.7	0
144	12	p	t	pipo	65	39	72	105		104	112	pith		16.4	0
144	14	p	t	abco	41	36	46	87		82	90	pith		6.4	0
145	1	p	t	pico	39	40	47	91	1	110	113	pith	8	12	0
145	2	p	t	psme	109	115	109	218	4			pith			0
145	3	p	t	pien	57	33	65	120	1	127	132	pith		7.3	0
145	4	p	t	psme	118	100	118	208	4			pith			0
145	5	p	t	pien	67	46	76	134	2	133	134	pith	4	12.8	0
145	6	p	t	pipo	109	98	109	283		266	278	pith			0
145	7	p	t	pien	58	41	65	125	2	120	125	pith		15	0
145	8	p	t	psme	118	100	120	207		198		-			0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
145	9	p	t	pien	56	56	65	130		129	129	pith	1	10.5	0
145	10	p	t	psme	110	118	116					-			0
145	12	p	t	pien	60	46	67	117		115	122	pith		11.4	0
146	1	p	t	psme	145	78	147	300		297		-			0
146	2	p	t	pipo	103	85	107	288				pith			0
146	3	p	t	abco	106	72	110	202	2			pith			0
146	4	p	t	cade	72	74	78	201		210	211	pith	2	6.6	0
146	5	p	t	pipo	126	64	145			273		-			0
146	6	p	t	cade	66	60	73	200		197	205	pith		7	0
146	7	p	t	pipo	54	33	60	222		209	211	pith	2	4	0
146	8	p	t	cade	73	99	78	158		159	180	pith			0
146	9	p	t	pipo			110		0	250		-			0
146	10	p	t	cade	85	82	90	254		224		-			0
146	12	p	t	cade	37	60	45			115	116	-			0
146	14	p	t	abco	45	45	52	88		88	91	pith		7.3	0
146	16	p	t	psme	36	43	39	84		81	84	pith	4	5.8	0
146	18	p	t	pipo	27	39	30	78		77	85	pith		6.7	0
146	20	p	t	abco	51	52	60	103		102	108	pith		7.3	0
147	1	p	t	psme	160	70	168	347		326	339	pith			0
147	2	r	t	pipo	68	100	69	329		319	322	pith	8	8	0
147	3	p	t	abco	84	71	88		0	125		-			0
147	4	p	t	psme	90	80	91	256				pith			0
147	5	p	t	pien	33	32	40	120		124	127	pith	6	4.5	0
147	6	p	t	psme	83	47	86	209				pith			0
147	7	p	t	pipo	73	53	77	300		310	317	pith		5.5	0
147	8	p	t	psme	40	44	45	89		90	90	pith	3	6.5	0
147	10	p	t	psme	50	48	56	93		89	93	pith	6	7	0
147	12	p	t	psme	47	39	52	88		86	89	pith	10	9.5	0
147	14	p	t	pien	20	28	23	98		98	99	pith	2	3	0
147	16	r	t	pien	42	44	51	130		131	134	pith	4	4	0
148	1	p	t	psme	124	81	125	233	5	226		-			0
148	2	p	t	psme	112	94	113	228		122		-			0
148	3	p	t	psme	49	38	58	81	1	79	89	pith		9	0
148	4	p	t	psme	30	33	34	93		94	110	pith			0
148	5	r	t	psme	109	80	111	218	4			pith			0
148	6	p	t	psme	60	65	69	116		107	108	pith	7	8	0
148	7	r	t	psme	105	90	108	263	4	168		pith			0
148	8	p	t	psme	31	32	34	72		71	85	pith			0
148	10	p	t	psme	48	40	56	88				pith			0
148	12	p	t	psme	35	29	39	74		74	78	pith		11	0
149	1	p	t	pipo	71	32	80	235	3	236	242	pith		11.5	0
149	2	p	s	abma		45	125	285	2			pith	10	15	24
149	3	p	s	abco		48	82					-			24
149	4	p	s	abma		44	115	226	4			pith			24
149	5	r	s	abma		55	97	191	2			pith	12	10	24
149	6	p	s	abma		39	81	178	3			pith	6	12	24
149	7	r	s	pipo		62	115	227	4			pith	20	32	24
149	8	p	s	abma		37	89	174	2			pith	6	15	24
149	9	p	s	abma		38	34	175	4			pith	4	7	24
149	10	p	s	abma		46	89	149	2			pith	6	11	24
149	11	p	s	abma		48	45	172	3			pith	10	10	24
149	12	p	s	abma		33	52	188	2			pith	5	10	24
149	13	r	s	abco		44	68					-			24
149	14	r	s	abco		25	45					-			24

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
149	15	r	s	abco		28	35					-			24
150	2	p	t	abma	65	85	69	179		179	182	pith	4	6.5	0
150	3	p	t	abma	101	72	109	181	2			pith	10	21	0
150	4	p	t	abma	62	65	67	178	3	171	178	pith		6.5	0
150	5	p	t	pimo	70	52	78	158	3	159	169	pith		4	0
150	6	p	t	abma	55	40	61	163	2	163	174	pith			0
150	7	p	t	abma	105	88	106			68		-			0
150	8	r	t	abma	91	103	99					-			0
150	9	r	t	abma	95	94	108		0	81		-			0
150	10	r	t	abma	92	64	100	168	4	86	92	pith		8	0
150	11	r	t	pimo	53	51	59	162	1	164	164	pith	2	3.5	0
150	13	r	t	pipo		107			0	94		-			0
151	1	p	t	pipo	53	37	62	85	1	82	85	pith	5	10	0
151	2	p	t	pipo	58	48	65	68		68	71	pith	10	15	0
151	3	p	t	pipo	68	35	76	89	1	86	87	pith	7	11.5	0
151	4	p	t	pipo	74	39	66	88		85	86	pith	8	18	0
151	5	p	t	pipo	55	36	63	84	2	82	88	pith		8	0
151	6	p	t	abco	55	47	64	64		60	65	pith		13	0
151	7	p	t	pimo	47	36	55	82	2	79	79	pith	8	16	0
152	1	p	t	abma	149	57	152	180		113		-			0
152	2	p	t	pipo	54	31	64	107	2	108	112	pith	5	11	0
152	3	r	t	pipo					0	240		-			0
152	4	p	t	abma	56	36	66	82	2	80	82	pith	2	7.6	0
152	5	p	t	abma	56	37	67	80		76	82	pith		15	0
152	6	p	t	pico	38	25	48	107	2	107	110	pith	6	11	0
152	7	r	t	pipo	101	45	106	278	5			pith			0
152	8	p	t	pipo	46	36	57	105	3	110	110	pith	2	9	0
152	9	r	t	pipo	89	82	90	267	5	259	273	pith			0
152	10	p	t	pipo	55	37	66	96	3	96	101	pith		13	0
152	11	r	t	abma	80	110	81	100	3	96	100	pith		16	0
152	12	p	t	abma	87	57	98	111	3	100	118	pith			0
152	14	r	t	abma	104	95	107	142	3	132	140	pith		22	0
152	16	r	t	abma	118	93	124			75		-			0
152	18	r	t	abco		52	48	84	2			pith	6	15	0
152	20	r	t	abco		42	97	115	1			pith	8	29	0
153	1	p	s	abma		115	126	290	2			pith	12	20	30
153	2	p	s	abma		100	76	246	3			pith	6	11	30
153	3	p	s	abma		60	89	218	2			pith	13	17	30
153	4	p	s	abma		95	75	232	3			pith	7	13.5	30
153	5	p	s	psme		34	71	235	5			pith	5	5	30
153	6	p	s	abma		110	85					-			30
153	7	p	s	pipo		63	116	280	2			pith	8	27	30
153	8	p	s	abma		59	56	131	4			pith	5	8	30
153	9	r	s	psme				239	3			pith	4	12	30
153	10	p	s	abma		128	69					-			30
153	11	r	s	abma		75	76	240	5			pith			30
153	12	r	s	abma		90	95	294	4			pith			30
153	13	r	s	pipo				204	4			pith	14	26	30
153	14	r	s	abma		87	82	267	3			pith	6	14	30
153	16	r	s	abma		70	97	266	3			pith	8	22	30
154	1	p	t	tsme	57	56	58	136	4	139	152	pith			0
154	2	p	t	pimo	38	25	42	195	4	201	230	pith			0
154	3	r	t	abma	78	53	94	280	4	273		-			0
154	4	p	t	tsme	53	42	59	200	3	200	212	pith		4	0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
154	5	p	t	pico	34	38	39	190	3	209	216	pith		2.5	0
154	6	p	t	pico	30	29	31	120	2	118	122	pith	10	6	0
154	7	r	t	pico	28	29	31	135	2	140	140	pith	3	5.5	0
154	8	r	t	pico	40	30	41	138	1	144	144	pith	10	11.5	0
154	9	r	t	abma	48	31	57	125	3	117	147	pith			0
154	10	r	t	tsme	62	49	66	247	2	245	260	pith		2.5	0
154	11	r	t	pico	52	29	52			240	245	pith		5	0
154	12	r	t	tsme	53	37	56	257	2	263	263	pith	2	3	0
154	13	r	t	pico	46	35	52	132	3	130	134	pith	10	9	0
154	15	r	t	pico	35	39	38	130		135	140	pith	10	8.5	0
155	1	p	s	abma		85	161	284	5			pith			30
155	2	p	s	psme		82	126	328	2			pith	6	11	30
155	3	r	s	abma		58	46	119	2			pith	6	12	30
155	4	p	s	abco		103	128	243	2			pith	7	13	30
155	5	r	s	pien		75	80	210	3			pith	3	4	30
155	6	p	s	abco		90	129	322	4			pith	4	4	30
155	7	r	s	pien		55	101	250	5			pith			30
155	9	r	s	abco		60	75	280	5			pith			30
155	10	p	s	psme		113	107	293	4			pith	4	6	30
155	11	r	s	abco		50	65	160	5			pith			30
155	12	p	s	pien		74	95	312	3			pith	6	7	30
155	13	r	s	abco		61	63	191	3			pith	8	12	30
155	15	r	s	abco		53	55	161	3			pith	6	8	30
155	17	p	s	abco		80	62	233	3	218		pith		5	30
155	19	r	s	psme		63	132	344	3			pith	5	7	30
155	21	r	s	psme		46	118	300	2			pith			30
156	1	p	t	tsme	57	41	61	228	3	225	245	pith			0
156	2	p	t	tsme	51	45	56	230	3	223	231	pith		5.5	0
156	3	p	t	pico	50	38	56	180	6	233	241	pith		5.6	0
156	4	r	t	pico	39	24	42	233	4	245	249	pith	5	7	0
156	5	p	t	tsme	57	37	61	226	3	224	230	pith		4.5	0
156	6	p	t	tsme	55	24	59	270	2	265	265	pith	1	3.5	0
156	7	r	t	pico	39	35	45	208	5	215	220	pith		5.5	0
156	8	p	t	tsme	53	32	60	230	3	227	239	pith			0
156	9	r	t	pico	41	37	45	226	5	266	268	pith	8	6.5	0
156	10	r	t	pico	44	29	49			259	259	pith	3	4.5	0
156	12	r	t	pimo	52	30	61			245	251	pith		5	0
157	1	p	t	tsme	53	32	64	280	2	277	289	pith		4	0
157	2	p	t	tsme	52	40	60	317	4	323	323	pith	1	1.5	0
157	3	p	t	tsme	49	35	53	260	2	256	263	pith		5	0
157	4	p	t	pimo	55	42	63	248	3	246	254	pith		4	0
157	5	p	t	tsme	73	78	75		0	259		-			0
157	6	r	t	pimo	70	60	77	248	2	247		-			0
157	7	p	t	tsme	77	42	85	385	5	390	450	pith			0
157	8	r	t	pimo	99	56	111		0	260		-			0
157	10	r	t	pimo	64	35	75	240	5	277	290	pith			0
158	1	r	t	tsme	94	72	99	300	4	271		-			0
158	2	p	t	tsme	70	90	71	377	3	381	400	pith			0
158	3	p	t	abla	45	45	52	260	4	271	301	pith			0
158	4	p	t	tsme	70	56	73	370	3	372	302	pith			0
158	5	r	t	pico	46	29	49	220	3	254	254	pith	1	0.5	0
158	6	p	t	tsme	83	57	86	459	5			pith			0
158	7	r	t	pico	40	42	41	230	3	271	283	pith		2.5	0
158	8	r	t	tsme	95	60	100	455	4	477		-			0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
159	1	p	t	tsme	103	52	111	245	4	233		-			0
159	2	p	t	pico	37	32	42	165	3	175	175	pith	1	1.5	0
159	3	p	t	pico	43	26	48	160	3	140	163	pith			0
159	4	p	t	tsme	56	39	59	186	3	182	189	pith		4.5	0
159	5	r	t	tsme	97	85	97	285	3	270		-			0
159	6	p	t	tsme	61	38	69	195	3	193	203	pith		3.5	0
159	7	r	t	pico	55	31	55	120	4	133	147	pith			0
159	8	r	t	tsme	65	56	74	316	3	309	339	pith			0
159	9	r	t	pico	27	30	31	110	3	102	113	pith		5	0
159	10	p	t	tsme	57	42	58	265	2	264	267	pith	2	2	0
159	12	p	t	pico	27	27	32	151	2	155	155	pith	1	1.5	0
159	14	p	t	pico	35	31	37	153	2	153	156	pith	1	3	0
159	16	p	t	tsme	63	40	66	207	3	116	136	pith			0
160	1	p	t	tsme	68	55	76			157		-			0
160	2	p	t	pico	48	41	57			210		-			0
160	3	p	t	tsme	63	42	70	310	2	310	314	pith	3	4	0
160	4	p	t	pico	40	23	45	295	3	290	290	pith			0
160	5	P	t	tsme	78	50	80	322	2	314	326	pith			0
160	6	p	t	pico	44	37	47			230		-			0
160	7	p	t	tsme	86	82	90			284		-			0
160	8	p	t	pico	36	25	38	265	3	272	273	pith	9	5	0
160	9	r	t	pimo	62	42	68	300	5	265	270	pith			0
160	10	r	t	pico	43	23	46	240	4	248	248	pith	5	5.5	0
160	11	p	t	tsme	53	40	55	274	3	270	280	pith		5.5	0
160	12	r	t	tsme	72	52	81	362	6	350	350	-			0
160	13	p	t	tsme	56	39	58	250	6	309	325	pith			0
161	1	p	t	pico	37	31	43	142	2	139	142	pith	10	7	0
161	2	p	t	pico	39	26	45	130	3	138	142	pith	8	7	0
161	3	p	t	tsme	48	34	54	178	3	173		-			0
161	4	r	t	tsme	49	40	54	230	3	226	227	pith	7	3	0
161	5	r	t	tsme	38	32	44	130	2	127	134	pith		9	0
161	6	p	t	pico	35	25	38	144	1	144	144	pith	8	5	0
161	7	r	t	tsme	56	36	60	130	2	226	240	pith		4	0
161	8	r	t	tsme	54	28	53	243	2	247	252	pith		5.5	0
161	10	p	t	pico	38	23	39	139	3	139	141	pith	7	9	0
161	12	p	t	pico	35	22	36	143	2	138	140	pith	6	7	0
162	1	r	s	abma		42	73					-			3
162	2	p	s	tsme		66	91	272	2			pith	8	7	3
162	3	p	s	abma		47	103	232	2			pith	6	8	3
162	4	p	s	pico		39	48	111	2			pith	10	28	3
162	5	r	s	abma		60	90	280	2			pith	3	4	3
162	6	r	s	tsme		32	95	268	4			pith		10	3
162	7	p	s	abma		42	88	252	3			pith	2	2.5	3
162	8	p	s	pico		4	48	101	3			pith	12	30	3
162	9	r	s	abma		40	98	197	2			pith	4	8	3
162	10	p	s	abma		53	88	217	2			pith	6	5.5	3
162	11	r	s	abma		47	78	212	1			pith	4	7	3
162	12	p	t	abma	64	50	74	111	2	111	111	pith	4	11	0
163	1	p	s	abco		50	81			94		-			14
163	2	p	s	pipo		60	140	430	6			pith	7	15	14
163	3	p	s	psme		28	65	170	4			pith	3	3	14
163	4	p	s	psme		84	128	297	3			pith	8	14	14
163	5	p	s	pipo		55	108	250	4			pith	16	16	14
163	6	p	s	psme		21	51	113	2			pith	5	5.5	14

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
163	7	r	s	pipo		50	81	369	3			pith	12	23	14
163	8	p	s	psme		32	66					-			14
163	9	r	s	pipo		74	97	360	3			pith	14	15	14
163	10	p	s	abco		20	85					-			14
163	11	r	s	abco		42	79					-			14
163	12	r	s	pipo		65	122					-			14
163	13	r	s	abco		67	56	115	2			pith	8	15	14
163	15	r	s	psme		41	45	131	2			pith	6	9	14
163	17	r	s	psme		42	51					-			14
163	19	r	s	psme		54	78					-			14
164	1	p	t	tsme	37	28	39	179	2	180	180	pith	2	3	0
164	2	p	t	pico		42	28	210	3			pith			0
164	3	p	t	tsme	41	28	45	175	2	170		-			0
164	4	p	t	pico	38	29	43	195	3	200	200	pith	1	1	0
164	5	p	t	tsme	39	26	43	138	3	134	149	pith			0
164	6	p	t	pico	36	28	40	197	3	128		-			0
164	7	p	t	tsme	43	30	48	218	2	216	219	pith	2	2.5	0
164	8	r	t	pico	40	38	44			197		-			0
164	9	p	t	tsme	58	34	52	180	2	176	186	pith		4	0
164	10	r	t	pico	43	33	48	335	4	291	301	pith		2.5	0
164	11	p	t	pimo	64	51	72	154	2	150	150	pith	1	3.5	0
164	13	r	t	pico	43	31	47	310	4	309	315	pith	5	6	0
165	1	p	t	abma	87	80	92	358	1	366	366	pith	3	3	0
165	2	p	t	abma	46	50	52	131	2	128	132	pith	6	7	0
165	3	p	t	pimo	62	44	77		0	69		-			0
165	4	p	t	pico	31	28	34	116	2	104	105	pith	12	9	0
165	5	p	t	tsme	46	35	49			100		-			0
165	6	p	t	abma	75	57	83	195	3	190	220	pith			0
165	7	p	t	tsme	39	29	42	141	1	140	140	pith	2	5.3	0
165	8	p	t	pico	35	35	41	117	3	126	129	pith	9	10.5	0
165	9	p	t	abma	29	31	35	117	1	114	119	pith		5	0
165	10	p	t	pico	31	35	32	128	2	131	131	pith	8	5.5	0
165	11	p	t	tsme	22	30	23	103	2	98	112	pith		5	0
165	12	p	t	pico	29	24	32	125	3	130	132	pith	8	8	0
165	13	p	t	tsme	27	20	31	117	3	117	132	pith		3.4	0
165	14	r	t	pico	43	32	48	131	1	130	131	pith	7	7.8	0
166	1	p	t	abma	63	40	68	117	1	121	121	pith	4	13	0
166	2	p	t	abma	71	49	76	114	2	112	114	pith	8	16	0
166	3	p	t	abma	79	81	83	117	3	108	112	pith		14.5	0
166	4	p	t	pico	36	39	38	96	2	96	99	pith	7	10	0
166	5	p	t	pico	37	37	43			106		-			0
166	6	p	t	abma	74	53	86	101	2	97	108	pith		15	0
166	7	r	t	pico	34	36	40	109	3	112	122	pith		12	0
166	8	p	t	abma	74	50	82	120	2	118	120	pith	6	15.5	0
166	10	r	t	pico	36	31	39	122	2	124	127	pith	8	7	0
166	12	r	t	pico	33	31	37	93	2	95	97	pith	7	10.5	0
166	14	r	t	pico	32	33	35	124	3	126	127	pith	6	7	0
166	16	r	t	abma	59	46	72	118	3	117	121	pith		10	0
167	1	p	s	abma		70	150	255	1			pith	14	14	6
167	2	p	s	abco		53	109					-			6
167	3	p	s	abma		56	98					-			6
167	4	p	s	abco		50	65	172	2			pith	5	4	6
167	5	p	s	abma		53	77	155	1			pith	5	6	6
167	6	p	s	abma		44	82	115	2			pith	5	14	6

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
167	8	p	s	abco		26	55	94	2			pith	7	22	6
167	10	p	s	pipo		41	108	330	4			pith	4	5	6
167	12	r	s	abco		45	95	165	2			pith	6	8	6
167	14	r	s	abco		50	69	161	2			pith	4	6	6
167	16	p	s	abco		45	56	100	1			pith	6	16	6
167	18	r	s	abma		67	109	133	2			pith	5	9	6
167	20	r	s	abma		118	184	326	3			pith		17	6
167	22	p	s	abma		24	44	98	2			pith	8	13	6
167	24	p	s	abma		25	40	84	3			pith	6	14	6
168	1	p	t	pien	76	62	84	192	2	199	210	pith		9	0
168	2	p	t	pien	91	70	98	480	5	142		-			0
168	3	p	t	abco	110	77	118	280	3	294	310	pith			0
168	4	p	t	pien	84	59	89	180	5			pith			0
168	5	p	t	abco	111	75	114	270	3	270		-			0
168	6	p	t	pien	84	50	95	207	4	192	204	pith		10	0
168	7	r	t	abco	113	83	119	229				pith			0
168	8	p	t	pien	112	72	122	214	4	131		-			0
168	10	p	t	pien	103	70	110	282	3	276	295	pith			0
168	12	p	t	abco	79	57	88	224	3			pith			0
168	14	r	t	abco	101	54	110	167	5			pith			0
169	1	p	t	pien	65	45	70	294	4	290	320	pith			0
169	2	p	t	tsme	93	72	102	315	5	267	295	pith			0
169	3	p	t	psme	77	65	82	190	4	179	194	pith			0
169	4	p	t	tsme	61	48	67	295	5			pith			0
169	5	p	t	psme	66	31	70	212	1	290	290	pith	2	3	0
169	6	p	t	tsme	65	48	74		0	137		-			0
169	7	r	t	psme	87	44	93	223	3	223	239	pith			0
169	8	p	t	psme	76	50	84	250	2	252	272	pith			0
169	9	p	t	psme	113	50	120	275	3	274	286	pith		5	0
169	10	p	t	pien	75	60	88			92		-			0
169	11	r	t	psme	135	62	142	300	4	241		-			0
169	12	p	t	pien	71	64	83					-			0
169	13	r	t	pien	89	65	94	235	4	229	263	pith			0
169	14	p	t	tsme	43	45	51	232	3	264	270	pith		3.5	0
169	15	p	t	tsme	68	46	73		0	258		-			0
169	16	p	t	pien	58	39	65	257	4			pith			0
169	18	p	t	pien	56	33	60	330	5	302		pith			0
169	20	r	t	pien	71	45	78	319	2	320	320	pith	2	5	0
169	22	r	t	pien	55	45	61	307	3			pith			0
170	1	r	s	pipo		54	84					-			3
170	2	p	t	pipo	135	70	139		0	254		-			0
170	3	r	s	abco		75	80	145	2			pith	8	17	7
170	4	p	t	pipo	92	48	102	172	4			pith			0
170	5	p	t	abco	56	36	62	89	1	90	90	pith	2	8.5	0
170	6	p	t	pipo	135	64	140	227	6	235	245	pith		12	0
170	7	p	t	psme	35	33	40	62	1	61	67	pith		10	0
170	8	p	t	pipo	104	59	111	200	2	200	200	pith	9	12.5	0
170	9	p	t	abco	47	35	57	54	3	49	57	pith		18	0
170	10	p	t	abco	41	37	48	68	3	63	70	pith		9.5	0
170	11	p	t	pipo	82	44	89	165	2	163	168	pith		7	0
170	13	r	s	pipo		55	160	369				pith			3
171	1	p	t	pipo	95	47	104	148	2	153	156	pith	10	14	0
171	2	p	t	pipo	65	41	68	148	2	151	154	pith	2	8.2	0
171	3	r	s	pipo		55	36	165	4			pith		19	20

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
171	4	p	t	pipo	97	43	106	222	3	217		-			0
171	5	r	s	abco		32	56					-			20
171	6	p	t	psme	56	39	63	68	2	68	70	pith	5	12	0
171	7	r	s	pipo		45	90	150	5			pith		20	20
171	8	p	t	psme	20	25	22	73	1	77	77	pith	1	5.3	0
171	9	r	s	cade		50	96	225	4			pith		15	20
171	10	p	t	psme	47	29	54	71	2	69	75	pith	6	14.5	0
171	11	r	s	cade		60	89	227	2			pith	10	6	20
171	12	p	t	psme	51	30	44	69	3	68	80	pith		7.2	0
171	13	r	s	psme		54	85	112	4			pith		13	20
171	14	p	t	pipo	57	36	67	138	3	130	155	pith			0
171	15	r	s	abco		50	81					-			20
171	16	r	s	abco		41	48	71	2			pith	6	18	20
171	17	r	t	pipo	46	32	54	124	3	133	149	pith		8	0
171	18	r	s	abco		61	61	80	2			pith	8	20	20
171	171	r	s	pipo		55	63		1	237	237	pith	2	3.5	20
172	1	p	s	psme		37	54	123	1			pith	8	12	6
172	2	p	s	psme		66	93	138	2			pith	6	24	6
172	3	p	s	abco		52	83	104	4			pith		30	6
172	4	p	s	abco		59	72	138	2			pith	9	22	6
172	5	p	s	psme		35	60	130	1			pith	5	9	6
172	6	p	s	abco		30	74	122	2			pith	6	15	6
172	7	p	s	abco		44	38	79	2			pith	4	9	6
172	8	p	s	abco		48	71					-			6
172	9	p	s	psme		80	84	123	1			pith	14	24	6
172	10	p	s	psme		24	40	104	2			pith	5	21	6
172	11	p	s	psme		50	86	100	1			pith	17	23	6
172	12	r	s	pipo		37	78					-	12		6
172	13	r	s	psme		34	45	121	2			pith	9	9	12
172	14	r	s	psme		78	141	221	2			pith	7	23	6
172	15	r	s	abco		53	80	125	1			pith	8	11	12
172	16	r	s	psme		30	32	104	2			pith	6	10	12
172	17	r	s	psme		65	179	376	5			pith		26	6
172	19	r	s	psme		18	89	174	3			pith	5	14	12
173	1	p	t	abma	78	53	85	275	3	278		-			0
173	2	p	t	abma	89	53	109			291	321	pith			0
173	3	r	t	abma	88	49	95	280	6	288	318	pith		6	0
173	4	p	t	abma	79	50	94			260	300	pith			0
173	5	p	t	abma	42	34	52			287	293	pith	2	1.8	0
173	6	p	t	tsme	45	46	47			210	260	pith			0
173	7	p	t	tsme	43	33	46	140	6	166	200	pith			0
173	8	p	t	tsme	54	39	57	220	5	232	267	pith			0
173	9	p	t	tsme	47	30	50	210	6	240	240	pith	0.8	1.1	0
173	10	p	t	tsme	41	36	47	180	5	183	250	pith			0
174	1	p	t	tsme	26	36	28			212	212	pith	0.8	2	0
174	2	p	t	pico	48	33	52			283		-			0
174	3	p	t	tsme	27	31	29			230	250	pith	1	1.1	0
174	4	p	t	abma	65	65	69	200	5	273	284	pith		2.5	0
174	5	p	t	abma	64	63	71	200	5	317	328	pith		1	0
174	6	p	t	abma	59	56	68			332	337	pith			0
174	7	p	t	abma	73	78	78			237	252	pith		5	0
174	8	p	t	pico	16	28	17	32	3	28	38	pith			0
174	9	p	t	abla	16	31	18		0	101		-			0
174	10	p	t	abma	45	55	53			180	220	pith			0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
175	1	p	t	tsme	47	41	51					-			0
175	2	p	t	tsme	48	52	50	200	4	249	249	pith	1	2.2	0
175	3	p	t	tsme	54	60	55	200	4	279	279	pith	2	2.4	0
175	4	p	t	abma	62	70	66	170	4	202	247	pith			0
175	5	p	t	pien	57	37	62	250	5	323	333	pith			0
175	6	p	t	pien	51	52	58	270	5	332	332	pith	6	4.5	0
175	7	p	t	tsme	41	29	46	210	5	285	285	pith	1	2.1	0
175	8	p	t	pien	44	37	47	255	5	298	298	pith	3	4.5	0
175	9	p	t	pien	33	30	39			252	282	pith		4	0
175	10	p	t	abma	29	30	35	160	5	243		-			0
175	11	p	t	tsme	42	42	46	220	5	253	273	pith		33	0
176	1	p	s	abco		37	43	80	1			pith	3	8.5	11
176	2	p	s	abma		45	45	68	2			pith	5	5.2	11
176	3	p	s	pipo		78	103	269	2			pith	6	8	11
176	4	p	s	abco		20	35	72	3			pith	5	5.2	11
176	5	p	s	pipo		60	110	173	3			pith	10	14	11
176	6	p	s	abco		35	65	85	1			pith	5	6.1	11
176	7	p	s	pipo								-			11
176	8	r	s	pipo		68	100	190	5			pith	4	6.4	11
176	9	p	s	abco								-			11
176	10	r	s	pipo		45	60	230	6			pith	4	8	11
176	11	p	s	abma		34	66	86	1			pith	5	12	11
176	13	r	s	abco		47	95	110	3			pith	5	12	11
176	15	r	s	pipo		50	130					-			11
176	17	r	s	pipo		56	123	280	6			pith	9	13.5	11
177	1	p	t	abco	35	21	45	55		52	58	pith		11.4	0
177	2	p	t	abco	34	27	39	40		36	42	pith		16	0
177	3	p	t	abco	39	48	43	51		52	56	pith		12.9	0
177	4	p	t	abco	25	40	28	39		40	48	pith		10.7	0
177	5	p	s	abco		30	18	64	2			pith	3	6	22
177	6	p	t	abco	13	35	14	44		43	52	pith		4.4	0
177	7	r	s	abco		34	37	61	2			pith	5	10	22
177	8	p	t	abco	48	45	54			61	70	pith		15.3	0
177	9	r	s	abco		34	30	60	2			pith	3	10	22
177	10	p	t	psme	38	32	43	62		55	58	pith	4	9.2	0
177	11	r	s	pipo			90	270	5			pith			22
177	12	p	t	abco	55	35	65		0	58		-			0
177	14	p	t	abco	43	30	50			83	93	pith		10.9	0
178	1	p	s	abco		68	75					-			36
178	2	p	t	psme	69	40	78	77		76	97	pith			0
178	3	r	s	pipo		65	108					-			36
178	4	p	t	abco	48	35	53	73		70	79	pith		9.2	0
178	5	r	s	psme		85	110					-			36
178	6	p	t	abco	32	35	35	89		85	87	pith	2	5.3	0
178	7	r	s	abco		46	75					-			36
178	8	p	t	abco	23	30	25	75		73	97	pith			0
178	9	r	s	unkn		65	130	330	3			pith	4	6	36
178	10	p	t	abco	16	30	17	67		67	77	pith		3.9	0
178	11	r	t	abco	51	32	58			147	149	pith	3	3.9	0
178	13	r	t	psme	54	25	49			134	146	pith			0
179	1	p	s	pipo		42	80	270	2			pith			20
179	2	p	s	pipo		45	45	55	3			pith			20
179	3	r	s	pipo		37	75	127	2			pith	14	12	20
179	4	p	s	pipo			40	100	3			pith			20

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
179	5	r	s	pipo		51	106	140	2			pith	8	13	20
179	6	r	s	pipo		60	85		0	160		-			20
179	7	r	s	pipo		27	59	70	1			pith			20
179	8	p	s	pipo		55	115	230	2			pith		8	20
179	9	r	s	pipo		37	92	127	1			pith	6	12	20
180	1	r	s	abco		42	62	90	2			pith	5	11	25
180	2	p	t	cade	44	40	50	79	1	69	79	pith		7.6	0
180	3	r	s	abco		52	68	84	2			pith	5	8	25
180	4	p	t	pipo	63	50	73	90	2	190	214	pith			0
180	5	r	s	abco		46	42	77	2			pith	5	8.5	25
180	6	p	t	abco	58	45	63	72	1	66		-			0
180	7	r	s	abco		52	105					-			25
180	8	p	t	abco	49	45	58	79	2	74	87	pith			0
180	9	p	t	pipo	102	42	111			355	355	pith	7	8.5	0
180	10	p	t	abco	34	19	24	70		76	90	pith			0
180	11	r	s	pipo		40	82					-			25
180	13	p	t	abco	68	30	78	100	5	93	108	pith			0
181	1	p	t	pipo	72	32	76	300		317	329	pith			0
181	2	p	t	abco	34		41			93		-			0
181	3	p	t	pipo	60	87	71		0	283		-			0
181	4	p	t	abma	59	55	65	80		91	109	pith			0
181	5	p	t	pipo	64	60	70			335	335	pith	9	6.7	0
181	6	p	t	abma	53	50	59	140		139	159	pith			0
181	7	p	t	psme	65	30	76		0	133		-			0
181	8	p	t	abma	63	50	68	140		167	207	pith			0
181	9	p	t	pipo	68	27	75	200		275	296	pith			0
181	11	p	t	psme	66	31	73	120		106	107	pith	3	5.8	0
181	13	p	s	psme		67	86	235	4			pith	2	4	27
181	15	p	s	psme		56	122	560	5			pith	3	3	27
181	17	p	s	psme		50	132	560	5			pith	3	3.5	27
181	19	p	s	psme		80	106	250	3			pith	5	5	27
181	21	p	s	psme		60	96	280	3			pith		9	27
182	1	p	t	pien	100	68	109			116	124	pith		27	0
182	2	p	t	abco	61	45	66	81		80	89	pith		8.5	0
182	3	p	t	pien	70	47	77			97	103	pith		13.2	0
182	4	p	t	pien	59	35	63			123	127	pith	7	7	0
182	5	p	t	pico	42	32	46			101	101	pith	4	8.7	0
182	7	p	t	pien	67	33	76	116		123	134	pith			0
182	9	p	t	pien	71	60	81			129	130	pith	8	12.9	0
182	11	p	t	abco					0	54		-			0
182	13	p	t	pico	35	30	39			121	122	pith	9	11.9	0
182	15	r	t	pipo	53	41	62			123	129	pith		10	0
183	1	p	s	abma		60	53	244	3			pith	4	2	35
183	2	p	s	pico		60	54	280	4			pith	5	2.8	35
183	3	p	s	abma		41	71	272	2			pith	7	5	35
183	4	p	s	abma		40	62					-			35
183	5	r	s	abma		60	56	270	3			pith	3	4	35
183	6	p	s	abma		45	60	280	2			pith	3	2.4	35
183	7	r	s	abma		59	65	257	3			pith	5	7	35
183	8	p	s	abma		55	53		6			-			35
183	9	p	s	abma		60	78	284	3			pith	4	4	35
183	11	p	t	pimo	23	26	48			69	79	pith		3.5	0
183	13	p	t	tsme	39	32	44	267	1	217		-			0
183	15	p	s	abma		67	66	267	3			pith	7	7	35

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
184	1	r	s	abma		50	62	250	3			pith	2	3	35
184	2	p	s	abma		48	75	272	2			pith	5	2.3	35
184	3	r	s	abma		40	71					-			35
184	4	p	s	abma		30	80	254	2			pith	6	1.8	35
184	5	r	s	abma		60	58	218	4			pith	2	2	35
184	6	p	s	abma		60	75	230	2			pith	5	3.6	35
184	7	r	s	abma		47	56	260	3			pith	1	3	35
184	9	r	s	abma		62	48	213	2			pith	3	3	35
184	11	r	s	abma		69	70	233	2			pith	1	3	35
184	13	r	s	abma		53	37					-			35
184	15	r	s	abma		51	57					-			35
184	17	r	s	abma		46	78					-			35
184	19	r	s	abma		52	96	274	3			pith	4	5	35
184	21	r	s	abma			94					-			35
185	1	r	t	abma	91	42	101	275	4	275		-			0
185	2	p	t	abma	61	50	65	200		232	272	pith			0
185	3	p	t	abma	82	40	95	280	4	302	314	pith			0
185	4	p	t	abma	66	65	72	285		284	320	pith			0
185	5	p	t	abma	119	105	123			187		-			0
185	6	p	t	abma	36	35	41	245	2	276	304	pith			0
185	7	p	t	abma	36	42	42			255	315	pith			0
185	8	p	t	abma	58				0	186		-			0
185	10	r	t	pimo	44	60	48	156		154	169	pith			0
186	1	r	s	pico		35	45	180	4			pith	3	5	34
186	2	p	s	abma		45	95					-			34
186	3	r	s	pimo		38	47	95	1			pith	9	14	34
186	4	p	t	abma	77	66	83	146		145	164	pith			0
186	5	r	s	abma		32	95					-			34
186	6	p	t	pimo	54	65	59	109		121	127	pith		11	0
186	7	r	s	abma		40	57					-			34
186	8	p	t	pimo	61	50	66	121		129	137	pith			0
186	9	r	s	abma		70	95	190	5			pith	5	7	34
186	10	p	t	abma	53	50	57	130		129	141	pith			0
186	11	r	s	abma		54	85					-			34
186	12	p	t	pico	41	50	43	153		148	150	pith	3.5	9.2	0
186	13	r	s	abma		65	100	280	4			pith	3	4	34
186	14	p	t	pimo	42	45	44	139		145	175	pith			0
186	15	r	s	abma		45	97					-			34
186	16	p	t	pico	34	40	38	140		140	145	pith		9.1	0
186	17	r	s	abma		60	74					-			34
186	19	r	s	abma		52	114	300	4			pith	3	6	34
186	21	r	s	abma		63	135					-			34
186	23	r	s	abma		63	75					-			34
186	25	r	s	abma		50	62					-			34
186	27	r	s	abma		50	55					-			34
186	29	r	s	abma		35	60					-			34
186	31	r	s	pimo		55	55					-			34
186	33	r	s	abma		65	70					-			34
186	35	r	t	pico	30	25	46			136	140	pith		13	0
186	37	r	t	pico	30	28	31			126	133	pith		5.7	0
186	39	r	t	pico	33	26	37			133	135	pith	4	5.3	0
187	1	p	t	pimo	32	33	38	110		110	113	pith	2	7.6	0
187	2	p	t	abma	73	45	77	334		290	290	-	3	5	0
187	3	p	t	pimo	42	40	49	115	3	110	121	pith			0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
187	4	p	t	abma	54	50	68		0	105		-			0
187	5	r	t	pimo	47	33	53	112	3	113	119	pith		10	0
187	6	p	t	abma	66	50	71	265		278		-			0
187	7	r	t	abma	76	52	83			226	266	pith			0
187	8	p	t	abma	75	45	68	205		207		-			0
187	9	p	t	abma	76	55	85	247	5	247	264	pith			0
187	10	p	t	abma	60	40	63	311				pith			0
187	12	p	t	abma	70	56	82	190		187		-			0
188	1	p	s	abma		38	60					-			5
188	2	p	s	abma		30	95	144	1			pith	5	2.6	5
188	3	r	s	abma		32	55					-			5
188	4	p	s	abma		50	90	162	1			pith	3	3.8	5
188	5	r	s	abma		27	43					-			5
188	6	p	s	abma		25	75	186	1			pith	6	3.2	5
188	7	r	s	abma		50	138					-			5
188	8	p	s	abma		65	63	104	1			pith	4	5.3	5
188	9	r	s	abma		55	88	314	3			pith			5
188	10	p	s	abma		33	60	88	1			pith	4	5.8	5
188	11	r	s	abma		53	93					-			5
188	12	r	s	abma		55	60	98	1			pith	5	5.6	5
188	13	r	s	abma		57	104					-			5
188	14	r	s	abma		42	45	98	1			pith	5	4	5
188	15	r	s	pico		48	62					-			5
188	16	r	s	abma		30	80	165	1			pith	5	4.2	5
188	17	r	s	abma		64	109	177	3			pith			5
188	19	r	s	abma		60	140	216	2			pith			5
189	1	p	t	abco	45	33	52	85		80	91	pith			0
189	2	r	t	pipo	112	38	122			212		-			0
189	3	p	t	pipo	65	35	73	180		192	215	pith			0
189	4	p	t	pipo	65	48	73			146	147	pith	5	7.9	0
189	5	p	t	pipo	83	48	93	220		221		-			0
189	6	p	t	pipo	40	30	47			150	162	pith			0
189	7	p	t	cade	83	32	102			73		-			0
189	9	p	t	pipo	88	33	98	230		200	224	pith			0
189	11	p	t	abco	74	48	80	85		83		-			0
189	13	p	t	abco	91	35	100	85		94		-			0
189	15	r	t	pila	106	40	112	170		173	180	pith		11.2	0
190	1	p	s	abco		24	53	76	2			pith	9	9	8
190	2	p	s	abco		40	49	84	1			pith	3	25	8
190	3	p	s	abco		25	52	96	2			pith	7	5	8
190	4	p	s	psme		41	50	79	1			pith	3	11	8
190	5	p	s	abco		25	61	66	3			pith		16	8
190	6	p	s	psme		34	49	75	2			pith	2	9	8
190	7	p	s	abco		40	44	67	3			pith	4	10	8
190	8	r	s	psme		42	96	195	3			pith	3	6	24
190	9	p	s	abco		25	36	93	2			pith	4	8	8
190	10	r	s	psme		70	118	200	3			pith		8	8
190	11	r	s	psme		43	90	184	2			pith	3	4	24
190	12	r	s	pipo		52	95	259	2			pith	8	21	24
190	13	r	s	psme		40	80	184	3			pith	3	9	24
190	14	r	s	pipo		40	126	243	1			pith	12	22	24
190	15	r	s	psme		60	82	155	3			pith	3	12	24
190	16	r	s	pipo								-			8
190	17	r	s	psme		60	80					-			24

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
190	18	r	s	psme		63	85					-			24
191	1	r	s	psme		70	130					-			9
191	2	p	s	psme		55	68					-			9
191	3	r	s	psme		30	74					-			9
191	4	r	s	psme		45	100	185	2			pith	4	9	9
191	5	r	s	psme		35	110	196	3			pith	3	10	9
191	6	r	s	abco				186				pith			9
191	7	r	s	psme		40	97	185				pith	4	11	9
191	8	r	s	abco		50	85					-			9
191	9	r	s	psme		40	85	219	3			pith	3	3	9
191	10	r	s	abco		46	40	175	3			pith	1	4	9
191	11	r	s	cade		70	54			102		-			9
191	12	r	s	psme		50	127					-			9
191	13	r	s	psme		40	42	122	3			pith	5	3	9
192	1	p	s	abma			74	160	5			pith	3	3	38
192	2	r	s	abma		76	95	186	3			pith	4	7	38
192	3	p	s	abma		60	79	173	5			pith	3	5	38
192	4	p	s	abma		64	94					-			38
192	5	p	s	abma		60	80	160	5			pith	3	5	38
192	6	p	s	abma		80	98	170	3			pith	3	7	38
192	7	r	s	abma		100	90	152	5			pith			38
192	8	r	s	abma		80	95					-			38
192	9	r	s	abma		50	85	180	5			pith		7	38
192	10	r	s	abma		67	68	162	2			pith	5	6	38
192	11	r	s	abma		70	80					-			38
192	12	r	s	abma		70	100	170	3			pith	5	12	38
192	13	r	s	abma		70	74	171	3			pith	3	7	38
192	14	r	s	abma		70	118	284	3			pith	6	7	38
192	15	r	s	abma		70	80	177	3			pith	3	10	38
193	1	p	t	abma	100	110	103		0	185		-			0
193	2	p	t	abma	66	63	73			175	181	pith		4.8	0
193	3	p	t	pico	52	40	54			145	149	pith		10.4	0
193	4	p	t	abma	74	80	75		0	131		-			0
193	5	p	t	abma	63	75	65			116	116	pith	5	8.4	0
193	7	r	t	pico	45	45	51			109	113	pith		6.7	0
193	9	p	t	abma	54	40	57			113	119	pith		8	0
193	11	p	t	abma	59	70	61		0	141		-			0
194	1	p	t	psme	145	135	145			393		-			0
194	2	p	t	psme	89	123	89	135	4	120		-			0
194	3	p	t	psme	104	90	102		0	269		-			0
194	4	r	t	abco	85	60	90		0	81		-			0
194	5	p	t	psme	94	80	97			58		-			0
194	6	r	t	psme	191	55	192	500	6	369		-			0
194	7	p	t	psme	70	40	65			144	176	pith			0
194	8	p	t	abco	77	34	85		0	76		-			0
194	9	p	t	abco	63	60	67			158	162	pith		5	0
194	10	r	t	abco	77	58	84	110	4	131		-			0
194	12	p	t	abco	99	65	106			211	239	pith			0
195	1	p	t	tsme	45	90	46			150	180	pith			0
195	2	p	t	abma	94	68	100			245	257	pith			0
195	3	p	t	abma	66	90	67			191	198	pith		8	0
195	4	p	t	abma	91	55	94		0	201		-			0
195	5	p	t	abma	71	40	74		0	166		-			0
195	6	p	t	abma	67	55	75		0	186		-			0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
196	1	p	t	pimo	74	75	76			136	143	pith		5.8	0
196	2	p	t	abma	112	100	113					-			0
196	3	p	t	psme	93	70	91		0	223		-			0
196	4	p	t	abma	108	104	110			283	291	pith		5	0
196	5	r	t	pipo	73	100	74			193		-			0
196	6	p	t	abma	50	68	57			86	105	pith			0
196	7	p	t	abma	48	90	51			98	98	pith	2	7.6	0
196	9	p	t	abma	49	80	51			81	86	pith		9	0
197	1	p	t	pimo	85	80	95			154		-			0
197	2	p	t	abma	65	85	71		0	141		-			0
197	3	p	t	abma	88	54	103	205	4	183	204	pith			0
197	4	p	t	tsme	56	45	59	180	4	173	199	pith			0
197	5	p	t	abma	79	61	85	105	3	101	117	pith			0
197	10	r	t	pimo	28	38	32	110	3	102	110	pith		6.5	0
197	11	p	t	pimo	32	43	36	102	3	99	109	pith		9.3	0
197	12	p	t	pimo	42	30	47			90	102	pith		6.4	0
198	1	p	s	abco		21	35	81	3			pith	2	6	5
198	2	p	s	pipo		30	76	97	2			pith	4	18	5
198	3	p	s	pipo		31	57	86	2			pith	6	11	5
198	4	p	s	abco		46	44	68	2			pith	8	12	5
198	5	r	s	pipo		56	116	159	4			pith	5	13	5
198	11	r	s	abco		43	128	168	2			pith	3	7	5
198	12	r	s	abco		28	45	68	3			pith	3	14	5
198	13	r	s	pipo		43	133	274	2			pith	6	11	5
198	14	r	s	pipo		31	90	188	3			pith	7	7	5
198	15	r	s	pipo		45	117	167	2			pith	7	13	5
199	1	r	t	pico	44	30	48			158	159	pith	1.5	1.1	0
199	2	p	t	tsme	57	44	64			292	297	pith		2	0
199	3	r	t	pico	38	30	43			139	145	pith		4.6	0
199	4	p	t	tsme	65	50	71			247	263	pith			0
199	5	p	t	pico	44	32	48			239	251	pith			0
199	6	p	t	tsme	46	43	48			300	320	pith			0
199	7	p	t	pico	39	30	45			250	253	pith	4	5.8	0
200	1	p	t	pimo	51	34	56			190	191	pith	4	11.2	0
200	2	p	t	abma	71	56	78			203	211	pith		10.8	0
200	3	p	t	pimo	42	37	47			162	175	pith			0
200	4	p	t	abma	75	43	81		0	241		-			0
200	5	p	t	pimo	55	35	62			205	210	pith		9	0
200	6	p	t	abma	50	39	60			203	204	pith	4	4.7	0
200	7	r	t	pimo	40	37	44			197	221	pith			0
201	1	r	t	pico	42	29	43			73	75	pith	10	12.2	0
201	2	p	t	abma	72	100	72			72		-			0
201	3	r	t	pico	41	30	50	67	3	67	73	pith		17	0
201	4	p	t	abma	58	53	63			122	136	pith			0
201	5	r	t	pico	43	31	47	70	2	72	74	pith	7	16.8	0
201	6	p	t	abma	81	66	90			110	130	pith			0
201	8	p	t	abma	77	70	86			86	93	pith		21	0
202	1	r	t	tsme	40	6	46					-			0
202	2	p	t	tsme	54	52	64		0	254		-			0
202	3	p	t	tsme	53	28	64	236	5	244	247	pith	8	6	0
202	4	r	t	tsme	62	58	68		0	320		-			0
202	6	p	t	tsme	52	49	57			209	233	pith			0
202	8	p	t	tsme	38	15	47			227	228	pith	2	4.1	0
205	1	r	t	abma	46	46	54			73	84	pith			0

plot	label	loc	code	spec	DBH	hght	diam	field	acc	min	est	pith	3_R	40_R	act
205	2	r	t	abma	51	35	57	100	3	92	109	pith			0
205	3	r	t	abma	43	40	53			84	98	pith			0
205	4	r	t	abma	46	36	52			96	110	pith			0
206	1	r	t	pico	31	22	34			100	101	pith	12	11.5	0
206	2	r	t	pico	38	29	42			98	101	pith	9	9.5	0
206	3	r	t	pico	34	24	37			95	100	pith	12	12	0
206	4	r	t	pico	30	28	32			98	101	pith	10	9.5	0
206	5	r	t	pico	32	24	37			101	106	pith		11.5	0
207	1	r	t	pico	43	25	48			101	101	pith	11	15.5	0
207	2	r	t	pipo	49	26	58			83	85	pith	12	16	0
207	3	r	t	pico	49	25	50			94	94	pith	8	10.5	0
207	4	r	t	pipo	60	30	64			93	95	pith	10	14.5	0
207	5	r	t	pico	37	19	44			93	93	pith	8	13	0

C.4. Basal Area Data.

At each plot, I recorded the number of all stems greater than 10cm DBH in 10cm DBH classes ('class'). I recorded the species ('species') and a code ('code') indicating whether the stem was a live tree ('live'), stump ('st') or snag ('sn'). 'Scar' shows the number of stems in the size class that have any scarring on the bole that is likely fire scarring. This datum was not reocrded at some plots ('na'). 'Count' is the number of stems in the diameter class. Sampling of diameter clases below 40 cm occurred in a 0.05ha. sub-plot, and the count here shows the number extrapolated to the 0.2 ha. plot size. All density values are the number of stems in the 0.2 ha. plot.

plot	class	species	code	scar	count
100	20	abco	st	na	8
100	30	abco	st	na	20
100	40	abco	st	na	28
100	40	abma	st	na	4
100	40	abco	sn	na	4
100	50	abco	st	na	18
100	50	abma	st	na	1
100	60	abco	st	na	7
100	80	abco	st	na	1
100	80	pipo	st	na	1
101	20	abco	st	na	12
101	30	abco	st	na	16
101	40	abco	st	na	20
101	50	abco	st	na	12
101	50	pipo	live	na	1
101	50	psme	st	na	4
101	50	abco	sn	na	2
101	60	abco	st	na	3
101	60	abma	st	na	1
101	60	pipo	st	na	2
101	60	psme	st	na	4
101	70	abco	st	na	1
101	80	abco	st	na	1
102	20	abco	st	na	4
102	30	abco	st	na	12
102	30	abma	st	na	4
102	30	abco	sn	na	4

plot	class	species	code	scar	count
102	40	abco	st	na	8
102	50	abco	st	na	8
102	50	unkn	st	na	1
102	50	abco	sn	na	1
102	60	abco	st	na	8
102	70	abco	st	na	1
102	70	abma	st	na	1
102	70	psme	st	na	3
102	70	pipo	sn	na	2
102	80	pipo	st	na	1
102	100	abco	st	na	1
103	20	abco	st	0	12
103	20	cade	st	0	12
103	20	pipo	st	0	4
103	30	abco	st	0	8
103	30	psme	st	0	4
103	50	abco	st	0	1
103	50	psme	st	1	1
103	60	pipo	st	0	2
103	70	abco	st	1	1
103	70	pipo	st	2	4
103	70	unkn	st	0	1
103	80	abco	st	0	1
103	80	pipo	st	0	1
103	90	pipo	st	0	3
103	100	abco	st	0	1
103	100	cade	st	1	1

plot	class	species	code	scar	count
103	150	cade	st	0	1
104	20	abco	st	0	20
104	20	abco	live	0	4
104	20	psme	st	0	4
104	20	abco	sn	0	16
104	30	abco	st	0	32
104	30	abco	live	0	4
104	30	abma	st	0	4
104	30	psme	st	0	4
104	30	abco	sn	0	4
104	40	abco	st	0	8
104	40	abco	live	0	4
104	40	abma	st	1	8
104	40	psme	st	0	4
104	40	abco	sn	0	20
104	50	abco	st	0	8
104	50	abco	live	0	2
104	50	abma	st	0	1
104	50	psme	st	0	1
104	50	abco	sn	0	4
104	60	abco	st	0	10
104	60	abma	st	0	1
104	60	psme	st	0	1
104	60	abco	sn	0	2
104	70	abco	st	0	1
104	70	psme	st	0	1
104	80	abco	st	0	1
104	80	psme	st	0	1
104	90	abco	st	0	1
104	90	pipo	st	1	1
105	60	abco	st	0	4
105	70	abco	st	0	3
105	80	abco	st	1	2
105	80	unkn	sn	0	1
105	100	abco	st	2	4
105	100	psme	st	0	1
105	120	psme	st	1	1
105	130	abco	st	0	1
105	130	psme	st	1	1
105	130	unkn	sn	0	1
106	30	abco	st	0	12
106	40	abco	st	0	12
106	50	abco	st	0	6
106	60	abco	st	0	7
106	60	abma	st	0	1
106	60	unkn	sn	0	1
106	70	abco	st	0	12
106	70	abma	st	0	1
106	70	pimo	st	0	1
106	80	abco	st	0	7
106	80	abma	st	0	1
106	90	abco	st	0	1
106	100	abco	st	0	3
106	100	abma	st	0	2

plot	class	species	code	scar	count
107	20	abco	live	0	48
107	20	abco	sn	0	80
107	30	abco	live	0	68
107	30	abco	sn	0	8
107	40	abco	live	0	48
107	40	abco	sn	0	8
107	50	abco	live	0	28
107	60	abco	live	0	4
108	30	abco	st	0	4
108	30	abco	live	0	8
108	30	abma	st	0	4
108	50	abco	st	0	2
108	50	abma	st	0	1
108	50	psme	st	0	1
108	60	abco	st	0	1
108	60	psme	st	0	1
108	70	abco	st	0	2
108	70	pipo	st	0	1
108	80	abco	st	0	2
108	80	psme	st	0	2
108	90	abco	st	1	3
108	90	pipo	st	0	2
108	90	psme	st	0	3
108	100	abco	st	1	1
108	110	abco	st	1	3
108	110	psme	st	0	2
108	130	psme	st	0	1
109	20	abco	live	0	32
109	20	abma	live	0	4
109	20	abco	sn	0	40
109	20	abma	sn	0	20
109	30	abco	live	0	52
109	30	abma	live	0	8
109	30	pipo	live	0	4
109	30	abco	sn	0	8
109	30	abma	sn	0	4
109	40	abco	live	0	48
109	40	abma	live	0	4
109	40	abma	sn	0	4
109	50	abco	live	0	23
109	50	abma	live	0	5
109	50	abco	sn	0	3
109	60	abco	live	0	8
109	70	abco	live	0	2
110	20	abco	st	0	28
110	20	abma	st	0	24
110	20	abma	sn	0	8
110	30	abma	st	0	24
110	40	abma	st	0	8
110	50	abco	st	2	4
110	50	abma	st	0	4
110	60	abma	st	0	3
110	70	abma	st	0	1
110	80	abma	sn	0	1

plot	class	species	code	scar	count
110	100	abma	st	0	1
110	100	pipo	st	0	1
110	100	abma	sn	0	3
110	130	abma	st	0	1
110	140	abma	st	0	1
111	20	abco	st	0	4
111	30	abco	st	0	8
111	30	psme	st	0	12
111	40	psme	st	0	8
111	50	psme	st	0	11
111	60	abco	st	0	3
111	60	psme	st	0	3
111	60	unkn	st	0	1
111	70	psme	st	0	3
111	70	unkn	st	0	1
111	70	unkn	sn	0	1
111	90	cade	st	1	1
111	120	pipo	st	0	1
112	20	abco	st	0	16
112	20	abco	sn	0	12
112	30	abco	st	0	8
112	40	abco	st	0	8
112	50	abco	st	0	9
112	60	abco	st	0	1
112	60	psme	st	0	1
112	70	abco	st	0	1
112	110	pipo	st	0	1
112	120	pipo	st	0	1
113	20	abco	st	0	12
113	20	cade	st	0	4
113	30	abco	st	0	32
113	30	pipo	st	0	4
113	30	psme	st	0	4
113	40	abco	st	0	12
113	40	abco	sn	0	4
113	50	abco	st	0	12
113	50	pipo	st	1	4
113	50	psme	st	0	1
113	60	abco	st	0	2
113	60	pipo	st	0	4
113	60	psme	st	0	1
113	70	abco	st	0	1
113	70	psme	st	0	2
113	80	pipo	st	0	1
113	90	pila	st	0	1
113	90	pipo	st	0	1
113	120	pipo	sn	0	1
114	20	abco	live	0	32
114	20	cade	live	0	4
114	20	pipo	live	0	4
114	20	abco	sn	0	8
114	20	cade	sn	0	4
114	30	abco	live	0	28
114	30	pipo	live	0	8

plot	class	species	code	scar	count
114	30	abco	sn	0	24
114	40	abco	live	0	12
114	40	pipo	live	0	12
114	40	abco	sn	0	8
114	40	pipo	sn	0	4
114	50	abco	live	0	2
114	50	pipo	live	0	10
114	50	abco	sn	0	3
114	50	cade	sn	0	1
114	90	cade	live	0	1
114	110	cade	st	0	1
115	20	abco	live	0	40
115	20	abco	sn	0	8
115	30	abco	live	0	12
115	30	abma	live	0	4
115	30	psme	live	0	8
115	30	unkn	live	0	4
115	30	psme	sn	0	4
115	40	abco	live	0	8
115	40	psme	live	0	4
115	50	abco	live	0	9
115	50	abma	live	0	1
115	50	psme	live	0	5
115	50	abco	sn	0	3
115	50	pico	sn	0	1
115	50	unkn	sn	0	1
115	60	abco	live	0	1
115	60	abma	live	0	1
115	60	psme	live	0	2
115	60	abco	sn	0	1
115	70	abco	live	0	1
115	70	psme	live	0	1
115	80	psme	live	0	1
115	90	psme	sn	0	1
116	20	abco	st	0	16
116	20	abco	live	0	12
116	20	pipo	live	0	8
116	20	abco	sn	0	4
116	20	pipo	sn	0	4
116	30	abco	st	0	8
116	30	abco	live	0	8
116	30	pipo	st	0	8
116	30	pipo	sn	0	8
116	40	abco	st	0	16
116	40	abco	live	0	16
116	40	abma	live	0	4
116	40	pipo	st	0	4
116	50	abco	st	0	10
116	50	abco	live	0	9
116	50	pipo	st	0	4
116	50	pipo	live	0	1
116	60	abco	st	0	4
116	60	abco	live	0	5
116	60	pipo	st	0	1

plot	class	species	code	scar	count
116	60	pipo	live	0	1
116	70	abco	live	0	1
116	70	pipo	st	0	1
117	20	abco	st	0	124
117	20	abco	live	0	4
117	20	unkn	st	0	4
117	20	abco	sn	0	4
117	30	abco	st	0	100
117	30	abco	live	0	8
117	30	pipo	st	0	8
117	40	abco	st	0	48
117	40	abco	live	0	4
117	40	abma	st	0	4
117	40	pipo	st	0	20
117	50	abco	st	0	17
117	50	abco	live	1	11
117	50	abma	st	0	2
117	50	pipo	st	0	5
117	50	abco	sn	0	5
117	60	abco	st	0	4
117	60	abco	live	0	3
117	70	abco	live	0	2
118	20	abco	st	0	8
118	20	abco	live	0	16
118	20	psme	live	0	4
118	20	psme	sn	0	4
118	30	abco	st	0	4
118	30	abco	live	0	16
118	40	abco	live	0	4
118	50	abco	st	0	3
118	50	abco	live	0	2
118	60	abco	st	1	1
118	60	abco	live	0	1
118	70	abco	st	0	2
118	70	abco	sn	0	1
118	80	abco	st	0	1
118	100	pipo	st	0	1
118	110	pipo	st	0	1
118	120	pipo	st	0	1
118	120	psme	st	1	1
119	20	abco	st	0	4
119	20	abma	st	0	12
119	20	abma	live	0	88
119	20	pipo	live	0	4
119	20	pipo	sn	0	4
119	30	abma	st	0	4
119	30	abma	live	0	24
119	30	unkn	st	0	4
119	40	abma	st	0	16
119	40	abma	live	0	12
119	40	pipo	st	1	4
119	40	unkn	st	0	8
119	50	abco	live	0	1
119	50	abma	live	0	2

plot	class	species	code	scar	count
119	50	unkn	st	0	4
119	60	abma	st	0	3
119	60	abma	live	0	2
119	60	pipo	st	0	2
119	60	pipo	live	0	1
119	60	unkn	st	0	2
119	70	abma	st	0	2
119	70	abma	live	0	1
119	80	abma	live	0	1
119	80	pipo	st	1	2
119	90	abma	st	0	1
119	100	abma	st	0	1
119	100	pipo	st	0	1
119	110	pipo	st	0	1
119	130	pipo	st	1	1
120	20	abco	live	0	8
120	20	abma	live	0	48
120	20	pico	live	0	12
120	20	pimo	live	0	4
120	20	tsme	live	0	4
120	20	abma	sn	0	16
120	30	abma	live	0	12
120	30	pico	live	0	12
120	30	tsme	live	0	20
120	30	abma	sn	0	4
120	40	abma	live	0	4
120	50	abma	st	0	1
120	50	abma	live	0	1
120	50	abma	sn	0	1
120	60	abma	st	0	2
120	60	abma	live	0	1
120	70	abma	st	0	2
120	80	abma	st	0	2
120	90	abma	st	0	2
121	20	abco	st	0	84
121	20	abco	live	0	44
121	20	psme	live	0	4
121	30	abco	live	0	16
121	30	abco	sn	0	4
121	40	abco	live	0	16
121	50	abco	live	0	4
121	50	psme	live	0	1
121	50	abco	sn	0	3
121	50	psme	sn	0	1
121	60	abco	live	0	6
121	60	psme	live	0	3
121	60	psme	sn	0	1
121	70	psme	live	0	1
121	80	pipo	live	0	1
121	90	unkn	st	0	1
121	100	psme	st	0	2
121	120	psme	st	0	1
122	20	abma	live	0	24
122	20	pico	live	0	192

plot	class	species	code	scar	count
122	20	tsme	live	0	24
122	20	pico	sn	0	8
122	30	pico	live	0	60
122	40	pico	live	0	8
123	20	abla	live	0	20
123	20	abma	live	0	28
123	20	pico	st	0	32
123	20	pico	live	0	12
123	20	tsme	live	0	24
123	20	abco	sn	0	20
123	20	pico	sn	0	16
123	30	abla	live	0	4
123	30	abma	live	0	4
123	30	pico	st	0	84
123	30	pico	live	0	8
123	30	tsme	live	0	4
123	30	abco	sn	0	4
123	30	pico	sn	0	4
123	40	pico	st	0	52
123	40	pico	live	0	4
123	50	abla	live	0	1
123	50	pico	st	0	9
123	50	abco	sn	0	1
123	70	abma	live	0	1
124	20	abla	live	0	56
124	20	tsme	live	0	8
124	20	abla	sn	0	24
124	20	pico	sn	0	12
124	30	abla	live	0	24
124	30	pico	st	0	4
124	30	pico	live	0	4
124	30	tsme	live	0	8
124	30	abla	sn	0	8
124	30	pico	sn	0	8
124	40	abla	live	0	12
124	40	pico	st	1	8
124	40	pico	live	0	8
124	40	tsme	live	0	16
124	40	unkn	st	0	4
124	40	pico	sn	0	4
124	50	abla	live	0	3
124	50	pico	st	1	4
124	50	tsme	live	0	12
124	50	abla	sn	0	1
124	60	pico	st	0	3
124	60	tsme	live	0	3
124	60	abla	sn	0	1
124	60	pico	sn	0	1
124	80	tsme	live	0	1
125	20	pico	live	0	20
125	30	pico	live	0	60
125	40	pico	live	2	40
125	50	pico	st	0	1
125	50	pico	live	1	6

plot	class	species	code	scar	count
125	60	pico	st	0	1
126	20	abco	live	0	76
126	20	abco	sn	0	12
126	30	abco	live	0	52
126	30	abma	live	0	8
126	30	abco	sn	0	4
126	40	abco	live	0	28
126	40	abco	sn	0	4
126	50	abco	st	0	2
126	50	abco	live	2	5
126	50	psme	live	0	1
126	50	abco	sn	0	2
126	50	abma	sn	0	1
126	60	pipo	live	0	2
126	60	psme	live	0	2
126	60	abco	sn	0	1
126	60	abma	sn	0	1
126	70	psme	live	0	3
127	20	abco	live	0	64
127	20	abco	sn	0	12
127	30	abco	live	0	24
127	30	cade	live	1	4
127	30	pipo	live	1	4
127	30	abco	sn	0	4
127	30	pipo	sn	0	4
127	40	abco	live	0	16
127	50	abco	live	0	1
127	50	pipo	live	0	2
127	60	abco	live	0	2
127	60	pipo	live	2	3
127	70	abco	live	0	1
127	70	pipo	live	1	2
127	70	abco	sn	0	1
127	80	pipo	live	0	2
127	80	abco	sn	1	1
127	90	unkn	sn	1	1
127	100	pipo	sn	0	1
128	20	abla	live	0	28
128	20	abma	live	0	20
128	20	pico	live	0	8
128	20	tsme	live	0	168
128	20	abla	sn	0	8
128	20	abma	sn	0	4
128	20	pico	sn	0	4
128	30	abla	live	0	4
128	30	abma	live	0	4
128	30	pico	live	1	8
128	30	tsme	live	0	20
129	20	abla	live	0	12
129	20	tsme	live	0	28
129	30	abla	live	0	4
129	30	abma	live	0	4
129	30	tsme	live	0	8
129	40	abma	live	0	4

plot	class	species	code	scar	count
129	40	tsme	live	0	12
129	40	abma	sn	0	4
129	50	abla	live	0	1
129	50	abma	live	0	4
129	50	pico	live	0	1
129	50	tsme	live	0	14
129	50	abma	sn	0	1
129	50	tsme	sn	0	1
129	60	abma	live	0	3
129	60	tsme	live	0	6
129	60	tsme	sn	0	5
129	70	abma	live	0	3
129	70	tsme	live	0	1
129	70	abma	sn	0	1
129	80	abma	live	0	1
129	80	tsme	live	0	1
130	20	tsme	live	0	12
130	20	tsme	sn	0	28
130	20	unkn	sn	0	4
130	30	tsme	live	0	8
130	30	abma	sn	0	8
130	40	abma	live	0	4
130	40	tsme	live	0	8
130	40	abma	sn	0	4
130	50	abma	live	0	1
130	50	tsme	live	0	11
130	50	abma	sn	0	2
130	60	abma	live	0	5
130	60	pimo	live	0	1
130	60	tsme	live	0	11
130	70	abma	live	0	4
130	70	pimo	live	0	1
130	70	tsme	live	0	1
130	80	abma	live	0	1
130	80	tsme	live	0	3
130	100	tsme	sn	0	2
130	110	tsme	sn	0	1
131	20	tsme	sn	0	4
131	30	tsme	live	0	12
131	50	abma	live	0	4
131	50	tsme	live	0	1
131	50	abma	sn	0	1
131	50	tsme	sn	0	2
131	60	abma	live	0	5
131	60	tsme	live	0	4
131	60	abma	sn	0	1
131	70	abma	live	0	7
131	70	pimo	live	0	1
131	70	tsme	live	0	1
131	70	abma	sn	0	1
131	80	abma	live	0	4
131	90	abma	live	0	1
131	90	pimo	live	1	1
131	100	abma	live	0	1

plot	class	species	code	scar	count
132	20	abma	live	0	496
132	20	pimo	live	0	48
132	20	tsme	live	0	32
132	30	abma	live	0	160
132	30	pimo	live	0	16
132	40	abma	live	0	64
133	20	abco	live	0	4
133	20	abma	live	0	52
133	30	abco	live	0	8
133	30	abma	live	0	16
133	30	pico	live	1	4
133	40	abma	live	1	12
133	50	abco	live	1	1
133	50	abma	live	0	6
133	60	abco	live	1	3
133	60	abma	st	0	1
133	60	abma	live	2	2
133	60	abma	sn	0	1
133	70	abco	live	0	1
133	70	abma	st	0	1
133	70	abma	live	0	1
133	80	abco	live	0	1
133	80	abma	st	0	2
133	80	abma	live	1	2
133	90	abma	st	0	1
133	90	abma	live	1	2
133	100	abma	st	2	2
133	100	abma	live	1	2
134	20	abma	live	0	44
134	20	pico	live	0	12
134	20	pimo	live	0	12
134	30	abma	st	0	4
134	30	abma	live	0	4
134	30	pico	live	0	4
134	30	pico	sn	0	4
134	40	abma	live	0	8
134	40	pico	st	0	4
134	40	pico	live	0	12
134	40	pimo	live	0	4
134	40	pico	sn	0	4
134	50	abma	live	0	4
134	50	pimo	live	0	2
134	50	tsme	live	0	1
134	50	abma	sn	0	1
134	60	abma	st	0	1
134	70	abma	st	0	1
134	80	pimo	live	0	1
135	20	abco	live	0	32
135	20	pipo	live	0	4
135	20	abco	sn	0	4
135	20	pipo	sn	0	4
135	30	abco	live	0	20
135	30	pipo	sn	0	4
135	40	abco	sn	0	8

plot	class	species	code	scar	count
135	50	pico	live	0	1
135	50	pipo	live	2	3
135	50	abco	sn	0	4
135	60	abco	sn	0	3
135	70	pipo	live	0	2
135	70	abco	sn	0	2
135	80	pipo	live	0	1
135	90	pipo	live	1	2
135	90	abco	sn	0	1
135	100	pipo	live	1	1
136	20	pimo	live	0	8
136	20	tsme	live	0	16
136	30	tsme	sn	0	4
136	40	pico	live	0	4
136	40	tsme	live	0	4
136	40	tsme	sn	0	4
136	50	tsme	live	0	10
136	50	pico	sn	0	1
136	50	tsme	sn	0	4
136	60	pimo	live	0	1
136	60	tsme	live	0	10
136	60	tsme	sn	0	2
136	70	abma	live	0	1
136	70	tsme	live	0	1
136	70	abma	sn	0	1
136	70	tsme	sn	0	1
136	80	abma	live	0	3
136	80	tsme	live	0	1
136	80	pimo	sn	0	1
137	20	abma	live	0	32
137	20	tsme	live	0	16
137	30	abma	live	0	12
137	30	pico	live	0	4
137	30	tsme	live	0	20
137	30	pico	sn	0	4
137	40	abma	live	0	12
137	40	pimo	live	0	8
137	40	tsme	live	0	12
137	50	abma	live	0	7
137	50	tsme	live	0	9
137	50	abma	sn	0	2
137	50	pico	sn	0	1
137	60	abma	live	0	6
137	60	pimo	live	0	2
137	60	tsme	live	0	1
137	60	abma	sn	0	1
137	70	abma	live	0	5
137	70	tsme	live	0	3
137	80	abma	live	0	1
138	20	abco	live	0	24
138	20	abma	live	0	12
138	30	abco	live	0	12
138	30	abma	live	0	4
138	40	abco	live	0	4

plot	class	species	code	scar	count
138	50	abco	live	0	5
138	50	abma	live	0	5
138	50	abco	sn	0	5
138	60	abco	live	1	4
138	60	abma	live	0	1
138	60	pimo	live	0	1
138	60	abco	sn	0	3
138	70	abco	live	0	3
138	70	abma	live	0	2
138	70	pimo	live	1	1
138	70	abco	sn	0	4
138	80	abco	live	0	3
138	80	pimo	live	1	1
138	80	pipo	live	0	1
138	80	abco	sn	0	2
138	90	abco	live	1	2
138	100	abco	live	0	1
138	100	abma	live	0	1
138	110	abco	live	0	1
138	120	abco	live	1	1
139	20	abco	live	0	32
139	30	abco	live	0	48
139	40	abco	live	0	16
139	40	abco	sn	0	24
139	50	abco	live	0	2
139	50	pipo	live	0	1
139	50	abco	sn	0	7
139	60	pipo	sn	0	1
139	60	unkn	sn	0	1
139	70	unkn	sn	0	1
139	80	pipo	live	0	1
139	100	pipo	sn	0	1
139	180	pila	st	1	1
140	20	abco	live	0	40
140	20	abma	live	0	76
140	20	psme	live	0	4
140	30	abco	live	0	8
140	30	abma	live	0	8
140	30	psme	live	1	12
140	50	abma	live	0	2
140	60	abco	live	1	1
140	60	abma	live	0	1
140	60	psme	live	0	2
140	60	abco	sn	0	1
140	60	pipo	sn	0	1
140	70	abco	live	0	1
140	70	psme	live	0	1
140	70	abma	sn	0	1
140	70	pipo	sn	1	1
140	80	abco	live	0	2
140	80	psme	live	1	1
140	90	abco	live	0	1
140	90	psme	live	1	1
140	100	psme	live	0	2

plot	class	species	code	scar	count
140	110	abma	live	1	1
141	20	abco	live	0	60
141	20	abma	live	0	8
141	20	abco	sn	0	12
141	30	abco	live	0	48
141	30	abma	live	0	4
141	30	abco	sn	0	4
141	40	abco	live	0	56
141	40	abma	live	0	8
141	40	abco	sn	1	4
141	40	abma	sn	0	4
141	50	abco	live	0	17
141	50	abma	live	0	5
141	50	psme	live	0	5
141	60	abco	live	0	5
141	60	abma	live	0	1
141	60	psme	live	0	1
141	70	abco	live	0	1
141	70	abma	live	0	3
141	80	abco	st	0	1
141	90	psme	live	1	1
141	100	abma	st	0	1
141	100	abco	sn	0	1
141	110	abco	live	0	1
142	20	abco	live	0	160
142	20	abma	live	0	24
142	20	psme	live	0	8
142	30	abco	live	0	56
142	30	abma	live	0	8
142	30	psme	live	0	32
142	30	tsme	live	0	8
142	40	abma	live	0	8
142	40	psme	live	0	8
142	50	pipo	sn	0	1
142	60	abco	live	0	1
142	60	pipo	st	0	1
142	60	pipo	sn	0	1
142	70	abco	live	0	1
142	70	pipo	st	0	1
142	70	psme	live	0	1
142	80	abco	st	0	1
142	80	psme	st	0	1
142	90	pipo	st	1	1
142	90	psme	st	0	1
142	90	psme	live	1	1
142	100	pipo	st	0	1
142	120	abma	st	1	2
142	120	pipo	st	1	1
143	20	abco	live	0	52
143	20	cade	live	0	8
143	20	pipo	live	0	8
143	20	abco	sn	0	4
143	20	pipo	sn	0	4
143	30	abco	live	0	32

plot	class	species	code	scar	count
143	30	cade	live	0	4
143	30	psme	live	0	4
143	30	abco	sn	0	4
143	40	cade	live	0	4
143	40	pipo	live	0	8
143	50	cade	live	0	1
143	50	pipo	live	0	5
143	60	pipo	live	0	1
143	60	pipo	sn	0	1
143	70	cade	live	0	1
143	70	pipo	live	0	3
143	70	psme	live	0	2
143	80	cade	live	0	1
143	80	pipo	live	0	2
143	80	pipo	sn	1	2
143	90	pipo	live	0	1
143	100	pipo	sn	0	1
144	20	abco	live	0	28
144	30	abco	live	0	24
144	30	pipo	sn	0	4
144	40	abco	live	0	4
144	40	pipo	sn	0	4
144	50	abco	live	0	7
144	50	pipo	live	0	6
144	50	psme	live	0	1
144	50	pipo	sn	0	5
144	60	abco	live	0	5
144	60	pipo	live	0	6
144	60	psme	live	0	1
144	60	pipo	sn	0	2
144	70	abco	live	0	3
144	70	pipo	live	0	3
144	70	psme	live	0	1
144	70	pipo	sn	0	1
144	90	psme	live	0	1
145	20	abco	live	0	12
145	20	pien	live	0	32
145	20	psme	live	0	40
145	20	abco	sn	0	8
145	20	pien	sn	0	4
145	30	abco	live	0	4
145	30	pien	live	0	16
145	30	pien	sn	0	4
145	40	abco	live	0	12
145	40	pico	live	0	4
145	40	pien	live	0	12
145	50	abco	live	0	3
145	50	pien	live	0	5
145	50	psme	live	0	1
145	60	abco	live	0	4
145	60	pien	live	0	3
145	70	abco	live	1	4
145	70	pien	live	0	2
145	80	abco	live	0	4

plot	class	species	code	scar	count
145	90	abco	live	0	1
145	110	pipo	live	0	1
145	110	psme	live	0	2
145	120	psme	live	0	2
146	20	abco	live	0	112
146	20	abco	sn	0	8
146	30	abco	live	0	72
146	30	pipo	live	0	4
146	40	abco	live	0	12
146	50	abco	live	0	3
146	50	cade	live	1	1
146	60	abco	live	0	2
146	60	cade	live	1	3
146	60	pipo	live	0	1
146	70	cade	live	1	1
146	80	cade	live	0	3
146	90	pipo	live	0	1
146	90	psme	sn	0	1
146	100	abco	sn	0	1
146	110	abco	live	0	1
146	110	pipo	live	1	1
146	120	pipo	live	1	1
146	130	pipo	live	1	1
147	20	abco	live	0	28
147	20	pien	live	0	4
147	20	psme	live	0	48
147	20	pien	sn	0	4
147	30	abco	live	0	16
147	30	psme	live	0	8
147	40	pien	live	0	4
147	40	psme	live	0	4
147	50	abco	live	0	1
147	50	psme	live	0	2
147	50	abco	sn	0	1
147	60	abco	live	1	4
147	70	abco	sn	0	1
147	70	pipo	sn	0	2
147	80	abco	live	0	1
147	80	abco	sn	0	1
147	80	pipo	sn	0	1
147	90	abco	live	1	3
147	90	psme	live	0	2
147	90	abco	sn	0	2
147	110	abco	live	0	1
147	110	pipo	sn	0	1
147	110	psme	sn	0	1
147	160	psme	live	0	1
148	20	abco	live	0	80
148	20	abma	live	0	32
148	20	psme	live	0	4
148	20	tsme	live	0	8
148	20	abco	sn	0	16
148	20	abma	sn	0	16
148	30	abco	live	0	40

plot	class	species	code	scar	count
148	30	abma	live	0	24
148	30	psme	live	0	4
148	30	tsme	live	0	16
148	30	abco	sn	0	4
148	30	abma	sn	0	12
148	40	abco	live	0	8
148	40	abma	live	0	4
148	40	psme	live	0	4
148	40	abco	sn	0	4
148	40	abma	sn	0	4
148	50	abco	live	0	1
148	50	abma	live	0	2
148	50	psme	live	0	2
148	70	psme	live	0	1
148	70	psme	sn	0	1
148	90	abco	live	1	1
148	120	psme	live	0	1
148	130	psme	live	0	1
149	20	abco	live	0	8
149	20	abma	live	0	28
149	30	abco	live	0	4
149	30	abma	st	0	4
149	30	abma	live	0	12
149	40	abma	st	0	4
149	50	abco	st	0	2
149	50	abco	live	0	2
149	50	abma	st	0	3
149	50	abma	live	0	2
149	60	abma	st	0	4
149	60	abma	sn	0	2
149	60	pipo	sn	0	2
149	60	psme	sn	0	1
149	70	abco	st	0	2
149	70	abco	live	0	3
149	70	abma	st	0	1
149	70	abma	live	0	1
149	70	pipo	live	0	1
149	80	abco	st	1	1
149	80	abco	live	0	1
149	80	abma	st	0	4
149	80	abma	live	0	2
149	90	abma	st	0	2
149	90	abma	live	0	1
149	100	abma	st	0	2
149	110	abma	st	0	1
149	120	abma	st	0	1
149	130	abma	st	0	1
150	20	abma	live	0	44
150	20	pico	live	0	8
150	30	abma	live	0	12
150	30	pico	live	0	16
150	30	pico	sn	0	4
150	40	abma	live	0	24
150	50	abma	live	0	16

plot	class	species	code	scar	count
150	50	abma	sn	0	1
150	60	abma	live	0	11
150	70	abma	live	0	4
150	70	pimo	live	0	1
150	80	abma	live	0	1
150	100	abma	live	0	1
150	110	abma	live	1	2
151	20	abco	live	0	4
151	20	abma	live	0	8
151	30	abco	live	0	8
151	30	abma	live	0	4
151	40	abco	live	0	12
151	40	abma	live	0	4
151	40	pipo	live	0	4
151	50	abco	live	0	3
151	50	abma	live	0	1
151	50	pimo	live	0	1
151	50	pipo	live	0	2
151	60	abco	live	0	2
151	60	pipo	live	0	3
151	70	pipo	live	0	2
152	20	abco	live	0	16
152	20	abma	live	0	52
152	20	abco	sn	0	16
152	20	abma	sn	0	4
152	30	abma	live	0	52
152	30	abma	sn	0	12
152	40	abco	live	0	4
152	40	abma	live	0	36
152	40	pico	live	0	4
152	50	abco	live	0	2
152	50	abma	live	0	7
152	50	pipo	live	0	1
152	60	abco	live	0	1
152	60	abma	live	0	12
152	60	pipo	live	0	1
152	70	abco	live	0	1
152	70	abma	live	0	1
152	80	abco	live	0	1
152	80	abma	live	0	1
152	90	abma	live	0	1
152	100	abma	live	0	1
153	20	abco	live	0	12
153	20	abma	live	0	4
153	20	tsme	live	0	4
153	30	tsme	live	0	4
153	40	abco	live	0	4
153	40	tsme	live	0	4
153	50	abma	st	0	1
153	60	abma	st	0	3
153	70	abco	st	0	1
153	70	abma	st	1	3
153	70	psme	st	1	1
153	80	abma	st	0	6

plot	class	species	code	scar	count
153	90	abma	st	1	2
153	100	abma	st	0	3
153	110	abma	st	0	1
153	120	pipo	st	0	1
153	130	abma	st	1	3
154	20	abma	live	0	8
154	20	pico	live	0	28
154	20	tsme	live	0	144
154	20	tsme	sn	0	8
154	30	pico	live	0	4
154	30	tsme	live	0	84
154	40	pimo	live	0	4
154	40	tsme	live	0	12
154	40	pico	sn	0	4
154	50	tsme	live	0	6
154	50	pico	sn	0	1
154	60	tsme	live	0	3
155	20	abma	live	0	4
155	20	pien	live	0	16
155	40	abco	st	0	4
155	40	abco	live	0	4
155	50	abco	live	0	1
155	50	abma	live	0	1
155	50	abco	sn	1	1
155	60	abco	st	0	1
155	60	abco	live	1	3
155	60	pien	live	0	1
155	70	abco	st	0	1
155	70	pien	st	0	2
155	80	abco	st	0	1
155	80	abco	live	0	2
155	80	pien	st	0	2
155	90	pien	st	0	2
155	110	abco	st	0	1
155	110	psme	st	0	1
155	120	psme	st	0	1
155	130	abco	st	0	1
155	130	psme	st	0	1
155	170	abma	st	0	1
156	20	tsme	live	0	88
156	30	tsme	live	0	20
156	40	tsme	live	0	8
156	50	pico	live	0	2
156	50	tsme	live	0	17
156	50	pico	sn	0	1
156	60	abma	live	0	1
156	60	tsme	live	0	10
156	60	abla	sn	0	1
157	20	tsme	live	0	60
157	30	tsme	live	0	32
157	30	pico	sn	0	4
157	40	pimo	live	0	4
157	40	tsme	live	0	24
157	50	abla	live	0	3

plot	class	species	code	scar	count
157	50	tsme	live	0	7
157	60	pimo	live	0	1
157	60	tsme	live	0	6
157	60	tsme	sn	0	2
157	70	tsme	live	0	1
157	80	tsme	live	0	3
158	40	tsme	live	0	12
158	40	abla	sn	0	4
158	50	abla	live	0	1
158	50	tsme	live	0	7
158	50	abla	sn	0	2
158	50	pico	sn	0	1
158	50	tsme	sn	0	1
158	50	unkn	sn	0	1
158	60	tsme	live	0	15
158	70	tsme	live	0	12
158	70	tsme	sn	0	1
158	80	tsme	live	0	5
158	90	tsme	live	0	1
159	20	abla	live	0	8
159	20	pico	live	0	24
159	20	pimo	live	0	8
159	20	tsme	live	0	32
159	30	pico	live	0	4
159	30	tsme	live	0	12
159	30	pico	sn	0	4
159	40	pico	live	0	4
159	40	tsme	live	0	20
159	40	pico	sn	0	4
159	50	pico	live	0	1
159	50	tsme	live	0	20
159	50	pico	sn	0	1
159	50	tsme	sn	0	1
159	60	tsme	live	0	10
159	60	tsme	sn	0	1
159	70	tsme	live	0	3
159	90	tsme	live	0	1
159	110	tsme	live	0	1
160	20	abma	live	0	4
160	20	tsme	live	0	60
160	30	pico	live	0	8
160	30	tsme	live	0	24
160	30	pico	sn	0	8
160	40	pico	live	0	8
160	40	tsme	live	0	12
160	40	pico	sn	0	4
160	50	pico	live	0	2
160	50	tsme	live	0	14
160	50	pico	sn	0	3
160	60	pimo	live	0	1
160	60	tsme	live	0	10
160	70	tsme	live	0	2
160	80	tsme	live	0	1
160	90	tsme	live	0	1

plot	class	species	code	scar	count
161	20	pico	live	0	60
161	20	pimo	live	0	4
161	20	tsme	live	0	36
161	20	pico	sn	0	12
161	30	pico	live	0	76
161	30	tsme	live	0	28
161	40	pico	live	0	72
161	40	tsme	live	0	4
161	50	pico	live	0	1
161	50	tsme	live	0	1
162	20	abma	st	0	4
162	20	abma	live	0	20
162	20	pico	live	0	12
162	20	tsme	st	0	4
162	20	tsme	live	0	12
162	20	unkn	st	0	4
162	30	abma	st	0	8
162	30	tsme	st	0	20
162	40	abma	live	0	8
162	40	pico	live	0	4
162	40	tsme	st	0	4
162	40	tsme	live	0	8
162	50	abma	st	0	2
162	50	abma	live	0	3
162	50	pico	st	0	5
162	50	pico	live	0	1
162	50	tsme	st	0	3
162	50	tsme	live	0	2
162	60	abma	st	0	1
162	60	abma	live	0	3
162	60	pico	st	0	2
162	60	tsme	live	0	1
162	70	abma	st	0	1
162	70	abma	live	0	4
162	80	abma	live	0	2
162	100	abma	st	0	1
162	100	pimo	live	1	1
162	100	tsme	st	1	1
163	20	abco	live	0	160
163	30	abco	live	0	60
163	40	abco	live	0	8
163	50	abco	live	0	2
163	50	psme	st	0	1
163	60	abco	st	0	1
163	60	abco	live	0	2
163	60	psme	st	1	2
163	60	abco	sn	0	1
163	80	abco	st	0	1
163	80	psme	st	0	1
163	80	abco	sn	0	1
163	90	abco	st	1	1
163	90	pipo	st	0	1
163	110	pipo	st	0	1
163	120	psme	st	0	2

plot	class	species	code	scar	count
163	140	pipo	st	0	1
163	140	psme	st	0	1
164	20	pico	live	0	60
164	20	tsme	live	0	64
164	20	pico	sn	0	8
164	30	pico	live	0	16
164	30	tsme	live	0	52
164	40	pico	live	0	4
164	40	tsme	live	0	40
164	40	pico	sn	0	4
164	50	tsme	live	0	5
164	60	tsme	live	0	1
164	70	pimo	live	0	1
165	20	abma	live	0	16
165	20	pico	live	0	56
165	20	tsme	live	0	136
165	20	pico	sn	0	4
165	30	abma	live	0	4
165	30	pico	live	3	60
165	30	tsme	live	0	16
165	30	pico	sn	1	4
165	40	pico	live	2	16
165	40	pico	sn	1	8
165	50	abma	live	0	1
165	50	tsme	live	1	1
165	70	pimo	live	1	1
165	80	abma	live	0	1
165	90	abma	live	1	1
166	20	abco	live	0	16
166	20	abma	live	0	8
166	20	pico	live	0	20
166	20	pico	sn	0	16
166	30	pico	live	0	8
166	30	pico	sn	0	8
166	40	abma	live	0	8
166	40	pico	live	0	4
166	40	abma	sn	0	16
166	40	pico	sn	0	16
166	50	abma	live	0	11
166	60	abma	live	0	8
166	60	abma	sn	0	1
166	60	pico	sn	0	1
166	70	abma	live	0	7
166	80	abma	live	0	5
167	20	abco	st	0	20
167	20	abco	live	0	12
167	20	abma	st	0	8
167	20	abma	live	0	32
167	20	abco	sn	0	4
167	30	abco	st	0	12
167	30	abco	live	0	4
167	30	abma	st	0	12
167	30	abma	live	0	4
167	40	abco	st	0	8

plot	class	species	code	scar	count
167	40	abco	live	0	12
167	40	abma	live	0	8
167	40	pipo	live	0	4
167	50	abco	st	0	3
167	50	abco	live	0	2
167	50	abma	st	0	2
167	60	abco	st	0	1
167	60	abma	st	0	1
167	70	abco	st	1	1
167	70	abco	live	0	1
167	70	abma	st	0	1
167	80	abco	live	0	1
167	80	abma	live	0	1
167	80	abco	sn	0	1
167	90	abma	st	1	2
167	100	abco	st	1	1
167	100	abma	st	0	1
167	100	abco	sn	0	1
167	110	abco	st	1	1
167	110	pipo	st	0	1
167	120	abma	live	0	1
167	140	abma	live	0	1
167	150	abma	st	0	1
168	20	abco	live	0	4
168	30	abco	live	0	4
168	30	pien	live	0	4
168	40	pien	live	0	8
168	50	abco	live	0	3
168	50	abco	sn	0	1
168	60	pien	live	0	2
168	60	abco	sn	0	2
168	60	unkn	sn	0	1
168	70	abco	live	0	1
168	70	pien	live	0	2
168	80	abco	live	0	2
168	80	pien	live	0	2
168	80	psme	sn	0	1
168	90	pien	live	0	4
168	100	abco	live	0	2
168	100	pien	live	0	1
168	100	abco	sn	0	1
168	110	abco	live	0	2
168	110	pien	live	0	1
168	120	abco	live	0	1
168	120	pien	live	0	1
169	20	abla	live	0	4
169	20	pien	live	0	4
169	20	tsme	live	0	56
169	20	tsme	sn	0	4
169	30	abco	live	0	4
169	30	tsme	live	0	28
169	30	abla	sn	0	16
169	40	tsme	live	0	4
169	40	abla	sn	0	4

plot	class	species	code	scar	count
169	50	pien	live	0	1
169	50	tsme	live	0	3
169	50	tsme	sn	0	1
169	50	unkn	sn	0	1
169	60	abco	live	0	1
169	60	pien	live	0	1
169	60	tsme	live	0	1
169	60	abla	sn	0	1
169	70	psme	live	0	2
169	70	tsme	live	0	4
169	80	pien	live	0	2
169	80	psme	live	0	2
169	100	tsme	live	0	1
169	120	psme	live	0	1
170	20	abco	live	0	76
170	20	pipo	live	0	4
170	20	abco	sn	0	8
170	30	abco	live	0	52
170	40	abco	live	0	36
170	50	abco	live	0	1
170	50	pipo	live	0	1
170	60	abco	live	0	1
170	60	pipo	live	0	2
170	70	abco	live	0	1
170	70	pipo	live	0	2
170	80	pipo	live	0	2
170	90	pipo	live	0	3
170	110	pipo	live	0	3
170	140	pipo	live	0	2
171	20	abco	st	0	8
171	20	abco	live	0	8
171	20	psme	live	0	4
171	20	abco	sn	0	8
171	30	abco	live	0	24
171	30	abco	sn	0	24
171	40	abco	live	0	4
171	40	abco	sn	0	24
171	50	abco	live	1	4
171	50	pipo	live	0	2
171	50	psme	live	0	2
171	50	abco	sn	0	5
171	60	abco	live	1	2
171	60	pipo	live	1	3
171	60	psme	live	0	1
171	60	abco	sn	0	2
171	70	abco	live	0	1
171	100	pipo	live	1	2
172	20	abco	st	0	4
172	20	unkn	st	0	4
172	30	psme	st	0	4
172	40	abco	st	0	12
172	40	psme	st	0	8
172	50	abco	st	0	2
172	50	psme	st	0	11

plot	class	species	code	scar	count
172	50	unkn	st	0	1
172	60	abco	st	0	2
172	60	psme	st	0	6
172	60	psme	live	0	1
172	70	abco	st	1	3
172	70	psme	st	0	1
172	80	abco	st	2	6
172	80	psme	st	0	2
172	90	abco	st	0	1
172	90	psme	st	0	1
172	100	abco	st	0	1
173	20	abma	live	0	8
173	20	tsme	live	0	52
173	30	tsme	live	0	20
173	50	abma	live	0	3
173	50	tsme	live	0	7
173	50	abma	sn	0	2
173	60	abma	live	0	3
173	60	tsme	live	0	1
173	60	abma	sn	0	2
173	60	tsme	sn	0	2
173	70	abma	live	0	3
173	80	abma	live	0	2
173	90	abma	live	0	1
173	100	abma	live	0	1
174	20	abla	live	0	20
174	20	pico	live	0	12
174	20	tsme	live	0	28
174	20	tsme	sn	0	4
174	30	tsme	live	0	4
174	30	pico	sn	0	4
174	50	pico	live	0	1
174	50	abma	sn	0	1
174	60	abma	live	0	3
174	70	abma	live	0	2
174	80	abma	live	0	1
174	80	abma	sn	0	1
175	20	abla	live	0	20
175	20	tsme	live	0	28
175	20	tsme	sn	0	4
175	30	abla	live	0	4
175	30	abma	live	0	4
175	30	tsme	live	0	12
175	30	abla	sn	0	4
175	30	tsme	sn	0	16
175	40	tsme	live	0	8
175	40	tsme	sn	0	8
175	50	pien	live	0	3
175	50	tsme	live	0	6
175	50	tsme	sn	0	6
175	60	pien	live	0	1
175	60	tsme	live	0	1
175	60	tsme	sn	0	4
175	70	abma	live	0	1

plot	class	species	code	scar	count
176	20	abco	st	0	4
176	30	abco	st	0	24
176	30	abco	live	0	4
176	30	abma	st	0	4
176	40	abco	st	1	12
176	40	abco	live	0	12
176	40	abma	st	1	16
176	50	abco	st	1	4
176	50	abco	live	0	5
176	50	abma	st	0	5
176	50	abma	live	1	4
176	50	pipo	st	0	1
176	50	abma	sn	0	1
176	60	abco	st	0	2
176	60	abco	live	0	3
176	60	abma	live	0	1
176	70	abco	st	1	2
176	70	abma	st	0	2
176	100	abco	st	0	1
176	100	pipo	st	1	2
176	120	pipo	st	1	1
177	20	abco	st	0	28
177	20	abco	live	0	16
177	20	cach	st	0	4
177	20	cach	sn	0	12
177	30	abco	st	0	4
177	30	abco	live	0	36
177	40	abco	live	0	12
177	40	psme	live	0	4
177	50	abco	live	0	6
177	60	abco	live	0	1
177	90	pipo	st	0	1
178	20	abco	live	0	24
178	20	psme	live	0	4
178	20	abco	sn	0	4
178	30	abco	live	0	16
178	40	abco	live	0	12
178	50	abco	st	0	1
178	50	abco	live	1	5
178	50	psme	st	0	1
178	50	psme	live	0	1
178	50	abco	sn	0	1
178	60	abco	live	0	3
178	60	abco	sn	0	1
178	70	psme	live	0	1
178	80	abco	st	1	2
178	80	psme	st	0	1
179	20	abco	live	0	12
179	30	abco	live	0	8
179	30	abco	sn	0	4
179	50	pipo	st	0	2
179	60	abco	sn	0	1
179	70	abco	live	0	1
179	90	pipo	st	0	2
179	100	pipo	st	0	1
179	100	pipo	st	1	1
179	120	pipo	st	0	1
180	20	abco	live	0	8
180	20	cade	live	0	8
180	20	potr	live	0	4
180	20	abco	sn	0	16
180	30	abco	live	0	12
180	30	potr	live	0	4
180	30	abco	sn	0	20
180	40	abco	live	0	12
180	40	cade	live	0	4
180	40	pipo	st	0	4
180	40	abco	sn	0	16
180	50	abco	live	0	1
180	50	pipo	live	0	1
180	50	abco	sn	0	4
180	60	abco	live	0	1
180	60	pipo	st	0	1
180	60	abco	sn	0	2
180	70	abco	st	0	1
180	70	abco	live	0	1
180	70	pipo	live	0	1
180	70	abco	sn	0	1
180	80	pipo	st	0	2
180	80	abco	sn	0	1
180	90	abco	st	2	3
180	100	abco	st	0	1
180	110	pipo	live	0	1
181	20	abco	live	0	28
181	20	tsme	live	0	20
181	30	abco	live	0	8
181	30	psme	live	0	4
181	30	tsme	live	0	12
181	30	abco	sn	0	4
181	40	abco	live	0	4
181	40	tsme	live	0	12
181	50	abco	live	0	3
181	50	abma	st	0	1
181	50	abco	sn	0	1
181	60	abco	live	0	1
181	60	abma	live	0	2
181	60	abma	sn	0	1
181	70	abco	st	0	1
181	70	abma	st	0	1
181	70	pien	live	0	1
181	70	pipo	live	0	3
181	70	psme	st	0	1
181	70	psme	live	0	3
181	80	abma	st	0	1
181	80	pipo	live	0	1
181	80	psme	st	1	1
181	90	abma	sn	0	1
181	120	psme	st	1	2

plot	class	species	code	scar	count
181	130	psme	st	0	1
182	20	abco	live	0	12
182	20	pien	live	0	12
182	20	pien	sn	0	4
182	30	abco	live	0	12
182	30	pico	live	0	4
182	30	pien	live	0	12
182	30	abco	sn	0	4
182	30	pien	sn	0	12
182	40	abco	live	0	4
182	40	pien	st	0	4
182	40	pien	live	0	20
182	50	abco	live	0	2
182	50	pico	live	0	4
182	50	pien	st	0	2
182	50	pien	live	0	8
182	50	pipo	st	1	1
182	60	abco	live	0	4
182	60	pien	live	0	2
182	60	pien	sn	0	1
182	70	pien	live	0	6
182	70	pipo	live	0	1
182	80	pien	live	0	2
182	110	abco	live	0	1
182	120	abco	live	1	1
182	120	pien	live	0	1
183	20	pico	live	0	4
183	20	pimo	live	0	4
183	20	tsme	live	0	12
183	30	abma	st	1	8
183	40	abma	st	0	16
183	50	abma	st	0	5
183	50	abma	live	0	1
183	60	abma	st	3	12
183	60	pico	st	1	1
183	60	abma	sn	0	1
183	70	abma	st	2	6
183	80	abma	st	0	1
184	20	abla	live	0	8
184	20	pico	live	0	8
184	20	pimo	live	0	12
184	20	pipo	live	0	4
184	20	tsme	live	0	4
184	20	abma	sn	0	4
184	30	abla	live	0	4
184	30	abma	st	0	8
184	30	pico	st	0	4
184	30	pico	live	0	8
184	30	pipo	live	0	4
184	40	abla	live	0	4
184	40	abma	st	0	12
184	50	abma	st	0	10
184	50	pico	st	0	1
184	60	abma	st	0	11

plot	class	species	code	scar	count
184	70	abma	st	0	4
184	80	abma	st	0	4
184	80	abma	sn	0	1
185	20	abma	live	0	24
185	20	tsme	live	0	12
185	30	abma	live	0	36
185	40	abma	live	0	16
185	50	abma	live	0	14
185	50	abma	sn	0	1
185	60	abma	live	0	8
185	70	abma	live	0	8
185	80	abma	live	0	4
185	80	abma	sn	0	1
185	90	abma	live	0	1
185	100	abma	live	0	2
185	110	abma	live	0	1
185	200	abma	live	0	1
186	20	abma	live	0	8
186	20	pico	live	0	8
186	20	pimo	live	0	4
186	20	pico	sn	0	4
186	30	pico	live	0	24
186	30	pimo	live	0	8
186	40	pico	live	0	20
186	40	pimo	live	0	8
186	50	abma	live	0	4
186	50	pico	live	0	5
186	50	pimo	live	0	6
186	50	pico	sn	0	3
186	60	abma	live	0	1
186	60	pico	live	0	1
186	60	pimo	live	0	1
186	70	pimo	live	0	1
186	80	abma	live	0	1
186	100	abma	st	1	1
187	20	abla	live	0	4
187	20	abma	live	0	8
187	20	pico	live	0	8
187	20	tsme	live	0	4
187	30	abma	live	0	8
187	30	tsme	live	0	4
187	50	pimo	live	2	2
187	50	abma	sn	0	1
187	60	abma	live	1	9
187	60	pimo	live	1	1
187	60	tsme	live	0	1
187	60	abma	sn	0	1
187	70	abma	live	1	2
187	70	abma	sn	0	1
187	80	abma	live	1	3
187	80	abma	sn	0	1
188	20	abla	live	0	16
188	20	abma	st	0	16
188	20	abma	live	0	12

plot	class	species	code	scar	count
188	20	abla	sn	0	8
188	20	abma	sn	0	4
188	30	abma	st	0	48
188	30	abma	live	0	12
188	30	pico	st	0	4
188	30	abla	sn	0	4
188	40	abma	st	0	24
188	40	abma	live	0	8
188	40	pico	st	0	8
188	50	abma	st	0	5
188	50	abma	live	0	7
188	50	pico	st	0	1
188	60	abma	st	0	3
188	60	abma	live	0	6
188	70	abma	live	0	1
188	80	abma	st	0	3
188	80	abma	live	0	1
188	90	abma	st	0	1
188	100	abma	st	0	1
188	100	abma	sn	0	1
189	20	abco	live	na	64
189	30	abco	live	na	16
189	30	pipo	live	na	4
189	40	abco	live	na	24
189	40	abco	sn	na	4
189	50	abco	live	na	7
189	50	pipo	live	na	2
189	60	abco	live	na	2
189	60	pipo	live	na	1
189	70	pipo	live	na	2
189	80	abco	live	na	1
189	80	abco	sn	na	2
189	80	pipo	sn	na	1
189	90	cade	live	na	1
189	90	pila	live	na	1
189	90	pipo	live	na	3
189	90	pila	sn	na	1
189	100	abco	live	na	1
189	110	pipo	live	na	1
189	130	pipo	sn	na	1
189	140	pila	live	na	1
190	30	abco	sn	na	4
190	50	abco	st	na	5
190	50	psme	st	na	1
190	60	abco	st	na	6
190	60	cade	live	na	2
190	60	psme	st	na	1
190	60	abco	sn	na	1
190	70	abco	st	na	2
190	70	cade	live	na	1
190	90	cade	live	na	1
191	20	abco	st	na	32
191	20	abco	live	na	20
191	30	abco	st	na	28
191	30	abco	live	na	16
191	30	psme	live	na	12
191	40	abco	st	na	8
191	40	psme	live	na	4
191	50	abco	st	na	6
191	50	psme	live	na	3
191	60	abco	st	na	5
191	60	cade	st	na	1
191	60	cade	live	na	1
191	60	pila	st	na	1
191	60	psme	st	na	5
191	60	psme	live	na	2
191	70	abco	st	na	2
191	70	psme	st	na	1
191	80	abco	st	na	2
191	80	pipo	st	na	1
191	80	psme	st	na	1
191	80	psme	live	na	1
191	90	pila	st	na	1
191	90	pipo	st	na	1
191	90	psme	st	na	1
192	20	abma	live	na	4
192	20	pico	live	na	32
192	20	pipo	live	na	4
192	30	pico	live	na	8
192	50	abma	st	na	5
192	60	abma	st	na	3
192	70	abma	st	na	7
192	80	abma	st	na	7
192	90	abma	st	na	1
192	100	abma	st	na	3
193	20	abma	live	na	28
193	20	pico	live	na	4
193	20	tsme	live	na	4
193	20	abma	sn	na	8
193	20	pico	sn	na	4
193	30	abma	live	na	8
193	30	pico	live	na	4
193	40	abma	live	na	8
193	40	tsme	live	na	4
193	40	pico	sn	na	4
193	50	abma	live	na	4
193	50	pico	live	na	1
193	50	tsme	live	na	1
193	50	pimo	sn	na	2
193	60	abma	live	na	4
193	70	abma	live	na	7
193	80	abma	live	na	6
193	80	abma	sn	na	1
193	90	abma	live	na	1
193	100	abma	live	na	2
193	110	abma	live	na	2
194	20	abco	live	na	4
194	30	abco	live	na	8

plot	class	species	code	scar	count
194	30	abma	live	na	4
194	30	abco	sn	na	4
194	40	abma	live	na	8
194	40	abma	sn	na	4
194	50	abco	live	na	9
194	50	abco	sn	na	1
194	60	abco	live	na	1
194	70	abco	live	na	5
194	70	psme	live	na	1
194	70	abma	sn	na	1
194	80	abco	live	na	2
194	90	abco	live	na	1
194	90	abco	sn	na	2
194	100	abco	live	na	1
194	100	psme	live	na	1
194	110	psme	live	na	1
194	110	psme	sn	na	1
194	120	abco	live	na	1
194	120	psme	sn	na	1
194	150	psme	live	na	1
194	160	psme	live	na	1
194	170	psme	live	na	1
195	30	abma	live	na	8
195	30	tsme	live	na	8
195	40	abma	live	na	12
195	50	abma	live	na	4
195	50	tsme	live	na	1
195	50	abma	sn	na	2
195	60	abma	live	na	4
195	60	abma	sn	na	3
195	70	abma	live	na	6
195	80	abma	live	na	8
195	80	tsme	live	na	1
195	80	abma	sn	na	1
195	90	abma	live	na	4
195	90	tsme	live	na	2
195	100	abma	live	na	5
195	100	tsme	live	na	1
195	110	abma	live	na	2
196	20	abco	live	na	8
196	20	abma	live	na	96
196	30	abma	live	na	60
196	40	abco	live	na	4
196	40	abma	live	na	28
196	50	abma	live	na	5
196	60	abco	live	na	2
196	60	abma	live	na	1
196	70	abco	sn	na	1
196	80	pimo	live	na	1
196	80	abma	sn	na	1
196	100	abma	live	na	1
196	100	psme	live	na	1
196	110	abma	live	na	1
196	130	abma	live	na	1

plot	class	species	code	scar	count
196	130	psme	live	na	1
197	20	abla	live	na	20
197	20	abma	live	na	32
197	20	tsme	live	na	8
197	20	abma	sn	na	4
197	30	abma	live	na	4
197	30	abma	sn	na	4
197	40	abco	live	na	4
197	40	abma	live	na	8
197	40	pimo	live	na	4
197	40	tsme	live	na	4
197	50	abco	live	na	2
197	50	abma	live	na	7
197	50	tsme	live	na	1
197	60	abco	live	na	2
197	60	abma	live	na	3
197	60	tsme	live	na	1
197	60	abma	sn	na	1
197	70	abma	live	na	1
197	80	abma	live	na	2
197	90	abma	live	na	1
197	90	pimo	live	na	1
197	100	abma	live	na	1
197	110	abma	live	na	1
197	130	abma	live	na	1
198	20	abco	st	na	8
198	20	abco	live	na	16
198	20	abco	sn	na	4
198	30	abco	st	na	36
198	30	pipo	st	na	4
198	40	abco	st	na	40
198	40	abco	live	na	20
198	40	pipo	st	na	8
198	40	pipo	live	na	12
198	40	abco	sn	na	4
198	50	abco	st	na	5
198	50	abco	live	na	7
198	50	pipo	st	na	6
198	50	pipo	live	na	5
198	50	abco	sn	na	1
198	60	abco	st	na	6
198	60	abco	live	na	3
198	60	pipo	live	na	3
198	70	pipo	live	na	1
198	80	pipo	st	na	1
199	20	abla	live	na	12
199	20	pico	live	na	12
199	20	tsme	live	na	40
199	20	pico	sn	na	4
199	30	pico	live	na	4
199	30	tsme	live	na	16
199	30	pico	sn	na	8
199	30	tsme	sn	na	4
199	40	pico	live	na	8

plot	class	species	code	scar	count
199	40	tsme	live	na	8
199	40	pico	sn	na	12
199	50	pico	live	na	4
199	50	tsme	live	na	11
199	50	pico	sn	na	3
199	50	tsme	sn	na	2
199	60	tsme	live	na	7
199	60	tsme	sn	na	1
199	70	tsme	live	na	4
199	80	tsme	live	na	2
199	90	tsme	live	na	1
200	20	abma	live	na	16
200	20	pico	live	na	4
200	20	tsme	live	na	36
200	20	abma	sn	na	4
200	30	tsme	live	na	32
200	40	pimo	live	na	4
200	40	tsme	live	na	24
200	40	abma	sn	na	4
200	50	abma	live	na	4
200	50	pico	live	na	1
200	50	pimo	live	na	1
200	50	tsme	live	na	5
200	50	pico	sn	na	1
200	60	abma	live	na	3
200	60	tsme	live	na	4
200	60	abma	sn	na	1
200	60	tsme	sn	na	2
200	70	abma	live	na	4
200	70	tsme	live	na	4
200	70	abma	sn	na	1
200	80	abma	live	na	2
200	80	tsme	live	na	1
201	20	abma	live	na	12
201	30	abma	live	na	12
201	50	abma	live	na	7
201	60	abma	st	na	1
201	60	abma	live	na	3
201	60	pico	live	na	1
201	70	abma	st	na	4
201	70	abma	live	na	4
201	70	unkn	st	na	1
201	80	abma	st	na	1
201	80	abma	live	na	2
201	90	abma	st	na	3
201	90	abma	live	na	1
201	100	abma	st	na	1
201	100	abma	live	na	1
201	110	abma	st	na	1
201	120	abma	st	na	1
202	20	abla	live	na	4
202	20	tsme	live	na	60
202	20	tsme	sn	na	20
202	30	tsme	live	na	24
202	30	tsme	sn	na	24
202	40	tsme	live	na	12
202	50	tsme	live	na	20
202	50	tsme	sn	na	3
202	60	tsme	live	na	12
202	60	tsme	sn	na	4
202	70	tsme	live	na	4
202	70	tsme	sn	na	2

C.5. Wedge Data.

The wedges cut from trees in the field were processed in the laboratory and the years of fire scars were determined and recorded. The year of the fire scar ('year'), the plots at which it was detected ('plot') and the apparent season of the fire scar ('season') are included in the following table where:

'U' indicates an undetermined season fire scar,
'D' indicates a dormant season fire scar,
'E' indicates an early early-wood fire scar,
'M' indicates a middle early-wood fire scar,
'L' indicates a late early-wood fire scar,
and 'A' indicates a late-wood fire scar.

year	plot	season	year	plot	season	year	plot	season
1623	104	U	1739	143	L	1776	121	L
1623	170	U	1739	180	U	1776	139	L
1629	104	U	1739	189	L	1776	189	A
1636	104	U	1743	139	U	1776	303	L
1656	104	U	1743	170	L	1783	133	U
1656	170	U	1748	143	A	1783	180	U
1666	189	U	1750	303	A	1784	198	L
1673	104	U	1752	104	L	1786	190	L
1683	189	U	1754	170	U	1788	148	U
1683	303	U	1755	135	U	1788	170	M
1689	104	L	1756	121	M	1793	139	A
1694	303	L	1756	133	U	1793	180	U
1696	104	L	1756	139	U	1794	104	M
1702	104	M	1756	179	U	1794	143	L
1704	170	A	1756	180	D	1794	190	L
1704	189	A	1756	189	U	1795	167	A
1707	104	L	1756	190	D	1795	176	U
1707	127	U	1756	198	A	1797	135	U
1711	104	A	1758	167	U	1799	103	U
1711	143	D	1763	139	U	1799	121	U
1711	179	U	1765	104	M	1799	127	U
1720	303	L	1765	143	L	1799	139	L
1723	104	L	1767	303	U	1799	180	U
1723	121	U	1770	135	U	1799	183	U
1723	143	L	1771	170	M	1799	189	U
1723	189	U	1771	187	U	1799	303	L
1729	180	U	1771	189	D	1809	139	L
1739	104	D	1771	190	M	1809	170	A
1739	133	U	1776	104	U	1809	303	A

year	plot	season
1814	104	U
1814	176	L
1816	180	E
1820	139	A
1822	104	D
1822	114	U
1822	176	L
1824	167	U
1824	180	A
1824	189	U
1828	143	L
1829	104	U
1829	121	L
1829	176	M
1829	181	U
1835	103	U
1835	104	L
1835	167	U
1835	171	U
1835	187	U
1835	190	M
1838	123	U
1838	124	U
1838	135	A
1839	143	A
1839	186	U
1839	189	D
1842	100	U
1842	103	U
1842	114	U
1843	170	L
1843	303	A
1850	176	U
1854	143	L
1854	162	U
1854	171	U
1854	189	A
1855	100	U
1855	103	L
1855	104	D
1855	114	D
1855	121	M
1855	135	D
1855	145	U
1855	182	U
1856	127	U
1856	164	U
1856	176	A
1856	180	U
1868	100	U
1868	104	U
1869	102	U
1871	119	U
1871	121	L
1871	127	U
1871	133	U
1871	139	U
1871	140	U
1871	141	U
1871	143	A
1871	145	U
1871	162	U
1871	167	L
1871	176	L
1871	180	U
1871	183	U
1871	185	U
1871	187	U
1871	189	U
1871	303	A
1874	100	U
1874	103	E
1874	190	D
1878	135	U
1881	143	L
1882	100	U
1882	103	M
1885	141	U
1885	162	U
1885	170	D
1885	176	A
1885	303	D
1887	182	U
1887	198	L
1888	100	U
1888	103	U
1888	114	E
1888	119	U
1888	121	U
1888	135	L
1888	140	A
1888	165	U
1888	167	U
1898	140	A
1898	141	U
1898	143	L
1898	148	U
1898	162	U
1898	163	U
1898	170	A
1898	171	U
1898	183	U
1898	189	A
1898	302	U
1898	303	A
1902	100	A
1902	102	U
1902	114	U
1910	186	U
1910	193	U
1914	167	U
1914	176	U
1921	103	U
1921	148	U
1927	176	U
1934	103	U
1934	104	U
1934	125	U
1935	140	U
1936	177	U
1936	181	U
1940	186	U
1942	135	U
1955	103	U
1957	100	U
1957	133	U
1958	192	U
1958	193	U
1958	198	D
1963	148	U
1981	165	U
1984	123	U
1992	170	U
1992	303	U