Draft Report to Dr. Lauren Fins, University of Idaho
College of Natural Resources

Results of Whitebark Pine Monitoring Plot Establishment, Stand, Fuels and Forest Health Surveys in the Frank Church - River of No Return Wilderness Area, South-Central Idaho

August 2005

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Summary

Three populations of whitebark pines were surveyed and permanently tagged in the Frank Church - River of No Return Wilderness Area during July and August 2005, one north of Big Creek and two to the south. The population to the north, Black Butte, had a good representation of the three burn categories represented in the study: unburnt (100+ years) old (15-100 years) and young (<15 years). The other two populations had only one burn type available: Dave Lewis Peak had only young burn and Lookout Mountain only unburnt. Black Butte and Lookout Mountain had stands of the three habitat series represented in the study: pure (>85%) whitebark pine, whitebark pine-lodgepole pine (sometimes mixed with Douglas-fir), and whitebark pine mixed with subalpine fir and other species (typically lodgepole pine). Dave Lewis Peak had only the latter two. It was not possible to replicate all factorial combinations, so populations were nested within habitat series and burn types for analysis. Lookout Mountain had the highest white pine blister rust infection and mortality rates; unburned sites also had higher infection rates than the other burn types. Dave Lewis Peak had the highest mountain pine beetle attack and mortality rates. Elevation was negatively correlated with infection rates, but only in unburnt sites and lodgepole-whitebark habitat series. Slope, aspect and percentage of trees in clumps were uncorrelated with any response variables. ADD FUELS Logistical considerations present a major challenge for field work in this Wilderness Area: thorough planning and packing support, if possible, are the keys to a successful project. Further sites for sampling in 2006 are suggested.

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Introduction

The recent rapid decline in the abundance and health of whitebark pine has spurred a coordinated effort throughout the species' range to document whitebark pine populations and ecology, and assess their health (Kendall and Keane 2001). The introduced fungal pathogen *Cronartium ribicola* has proven extremely detrimental to whitebark pine, causing 90-100% mortality in some portions of the range, particularly the Northern U.S. Rockies (Keane and Arno 1993; Keane et al. 1994). It is the most susceptible to white pine blister rust (Hoff and Hagle 1990, Hoff and McDonald 1993). Infection and associated mortality decline substantially to the north, towards Jasper National Park in Alberta (Stuart-Smith 1998; Campbell and Antos 2000; Zeglen 2002). Populations are declining and at some are risk of extirpation within a single generation. The wildlife species that rely on whitebark pine for food and habitat and associated subalpine plant communities are also at risk of losing this keystone species (Kendall and Keane 2001). Whitebark pine communities are extremely fragile since the short growing season means that the ecosystem will take decades or longer to recover from disturbance. Understanding the impacts of *C. ribicola* and the ecosystem dynamics in which the mountain pine beetle, succession, fire and human influence all play roles is key to developing a successful recovery strategy for this species (Kendall and Keane 2001; Wilson and Stuart-Smith 2002).

No studies have been conducted on whitebark pine in the Frank Church - River of No Return Wilderness Area. Situated west and southwest of the Bitterroot and Selway Mountains, this 2.2 million acre protected area harbours a diverse array of whitebark pine populations and stands. Their status at this time with respect to white pine blister rust and mountain pine beetle is unknown, leaving a large information gap with respect to the range of whitebark pine. Information on fire, forest health and disease resistance obtained during this study may be used to complement existing research and restoration initiatives on whitebark pine (e.g., Zeglen 2000; Kendall and Keane 2001; McDonald and Hoff 2001; Wilson and Stuart-Smith 2002).

This study had two objectives: (1) to establish permanent monitoring plots in whitebark pine stands to evaluate the dynamics of stand composition and health, and (2) to collect baseline stand and fuel data on whitebark pine stands in the Frank Church - River of No Return Wilderness Area in order to determine the influence of habitat type and fire history on the composition and health of stands, and to identify putatively rust-resistant individuals.

Study Area

The Frank Church - River of No Return Wilderness Area is approximately 2.2 million acres in south-central Idaho. The terrain is steep and mountainous, encompassing much of the Salmon River drainage. The study area was within the north half of the Wilderness Area in the Batholith geological formation, comprised of mostly igneous and metamorphic substrates dominated by granitic and grandioritic rocks. Steeper sections are overlain by colluvium and decomposed granite. The climate is fairly arid, with growing season water deficits and most precipitation occurring during the spring and late fall. Forested areas are dominated by ponderosa pine at low elevations, following an elevational cline upwards to Douglas-fir, lodgepole pine, subalpine fir and whitebark pine from approximately 8000' to the timberline. This Wilderness Area supports viable populations of small mammals, ungulates and large carnivores year-round, and many species of fish, birds, herpetiles and invertebrates. Although no grizzly bears have been documented in the area for the past 75-80 years, the Frank Church has excellent habitat potential to support a population of the species. The Craighead Institute for Ecological Research1 has documented large areas with whitebark pine stands that comprise an important part of the bears' diet (Mattson et al. 1992). While relatively large, intense fires were the main historic disturbance agent in the Frank Church,

[1] This data on grizzly bear habitat quality and suitability, part of the Grizzly Bear Model – Comparison Project remains unpublished to date, but it may be possible to obtain information by contacting the Institute directly: www.grizzlybear.org/

an extremely large and severe fire in summer 2000 burnt much of the Big Creek drainage where some of the study populations were located.

Methods

Site selection

The study populations were selected initially based on lanscape-level USFS fire history data and photogrammetric cover type data. Accessibility and logistics were also major considerations in site selection. Three populations were sampled, one north of Big Creek and two to the south (Figure 1). Populations were a minimum of 5 miles apart in order to sample genetically distinct sites. Sites were accessed via mule pack string based out of the University of Idaho Taylor Ranch Field Station and backpacking.

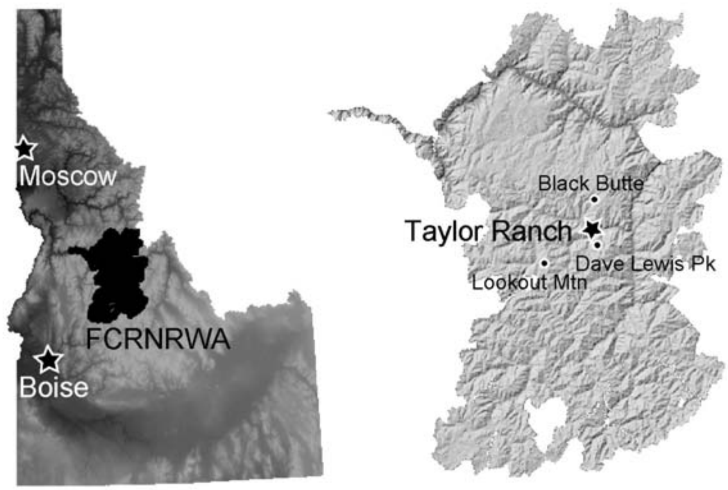

Figure 1. Map of the study area and populations.

Sites were selected in the field using random stratified sampling in accordance with Tomback et al. (2005). The goal was to sample three to four of each factorial combination: habitat series (pure whitebark pine, whitebark pine-lodgepole pine, whitebark-mixed subalpine) and burn class (young burn, <15 years; old burn, 16-100 years; unburnt, >100 years). Plots were selected so that a 150' × 30' area was representative of a single, relatively homogeneous factorial combination, a minimum of 250' away from adjacent plots and a maximum of 1 mile away (Figure 2).

Site selection was constrained by availability of factor combinations and topography: some populations did not have all burn types or habitat series on the ground, or of sufficient extent for sampling. Burn types were determined based on the charcoal and scarring on trees, coarse woody debris, and the ground. Initially a random number table was generated to facilitate random site selection, but the distribution of factorial combinations across the ground was so patchy that this was not a feasible strategy for this area.

Field data collection

The protocols described Tomback et al. (2005) were the main guidelines for data collection. Since permanent monumenting is forbidden in Wilderness Areas, 150' transects were begun at an individually tagged whitebark pine tree along a bearing following the contour, with the uphill slope to the right, and terminated at 150' without monumenting. Location and elevation at the start point were recorded with a GPS. Where the terrain changed aspect, the transect continued along the contour line and the change in bearing recorded, as per Tomback et al. (2005). All whitebark pine trees and snags that were not hazardous to tag taller than 4.5' along the transect and 15' on either side were tagged with sequentially numbered aluminum tags and aluminum nails at the base of the tree, facing away from the trail (in the vicinity of a trail) or downhill. The tags were painted a matte grey to detract from their visibility in accordance with wilderness protocols. The last tagged tree along the transect and its position was noted to facilitate relocation. All stems within a clump were tagged if they were separate below 4.5' (Tomback et al. 2005).

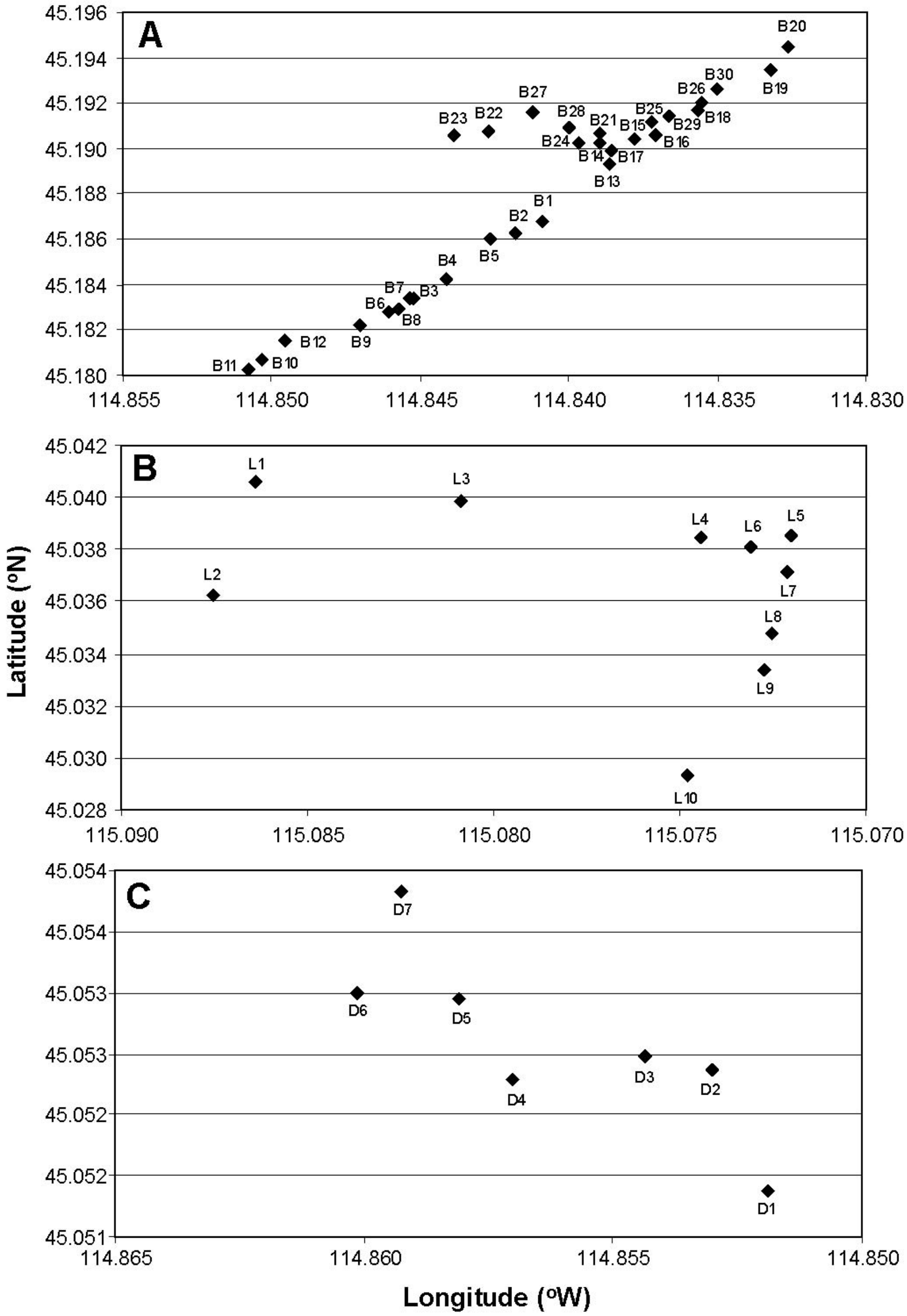

Figure 2. Maps of plot locations for each population (A) Black Butte, (B) Lookout Mountain, (C) Dave Lewis Peak.

Trees were measured with respect to their position and DBH, and rated for canopy mortality, overall health, white pine blister rust status, mountain pine beetle attack, bark damage and mortality. Putatively resistant trees were noted for further investigation and/or cone collection. All whitebark pines smaller than 4.5' were included in a regeneration survey which tallied the number of trees larger and smaller than 20" (50 cm) and the incidence of blister rust.

A fuel survey was conducted to assess fire risk, based on Brown (1974), modified by Byrne (USFS, Moscow, ID, pers. comm.). From 0-6' along the transect, the number of woody pieces intersecting it 0-0.25" and 0.25-1" were recorded. From 1-10', the number of 1-3" pieces intersecting the transect was recorded. From 0-50', all coarse woody debris >3" intersecting the transect were recorded and evaluated for decay class. At 6', 10' and 25', depth (mm) of litter, humus and buried wood were measured.

Other data was also collected for each plot: canopy cover of all tree species in plot, species and percent cover of up to five major understory plants, cone abundance for 2005 and 2006 cones, and indications of Clark's nutcracker and other wildlife. Activity was only recorded where they were directly observed within the plot, even if there were signs of their presence at other times, such as caches or digging holes.

Habitat types recognized by the USFS were keyed out using Steele et al. (1981) based on tree and vegetation cover.

Data analysis

Plot means for variables were tabulated in Excel and SAS V.9.3. Factorial ANOVA was conducted in SAS using PROC GLM, all variables were assumed random. Pearson correlation coefficients were calculated among topographic, stand descriptive and health variables. Where required, variables were transformed to meet assumptions of normality and homoscedasticity: infection percentages were sqare-root transformed. Habitat series and burn class were nested within populations. Stepwise linear regression ($\alpha = 0.05$ criterion for entry and retention in the model) was performed using PROC REG to determine whether transformed health variables for mature and juvenile trees were related to elevation, aspect, slope, tree numbers in plot or percentage of trees in clumps. Least-squares means of variables were calculated for each factor combination, and Duncan's multiple range test used to assess significant differences within factor classes. All significance levels were set at $\alpha = 0.05$.

The *a priori* habitat series used for plot selection were used to stratify the habitat type factor, rather than the keyed habitat types because high-elevation habitats are poorly sampled in the guide and would likely be stratified and described further, already partially done by Cooper (1975) and Reed (1976), both cited in Steele et al. (1981). More information may now be available as a result of recent studies on whitebark pine ecosystems; however there has not yet been a new formal approximation of habitat types for this region. Other states and studies have classified whitebark pine ecosystems in greater detail (e.g. Pfister et al. 1977; Arno and Hoff 1990; Ogilvie 1990; Campbell 1998; Perkins 2001).

In cases where blister rust or beetle presence in individual trees was uncertain, a minimum and maximum value was calculated for the plot, and the mean was used for the analysis. This applied to blister rust infection, beetle attack, and cause of mortality.

Results

The overall models for mean percentage of blister rust infected and mountain pine beetle attacked mature trees were significant ($p = 0.0018$ and $p = 0.0004$, respectively), but no individual term or interaction was significant. The models for mortality caused by rust and beetle were not significant. Least-squares means of blister rust infection were significantly higher in the Lookout Mountain population than in any other population-burn class or population-habitat series combination (Table 1). Pure whitebark stands on Lookout Mountain had significantly higher rust-caused mortality than other habitat series-population combinations (Table 2). Unburned sites had significantly higher rust infection levels (45.32%) than young or old burns (21.94 and 29.32, respectively) when all other factors were pooled; no other variables differed among burn types alone. Mountain pine beetle attack showed a gradient increasing with habitat series:

pure whitebark (7.36%) ≤ whitebark-lodgepole (15.61%) ≤ mixed subalpine (21.47%); no other variables differed among habitat series alone.

Table 1. Distribution of blister rust and mountain pine beetle on mature trees: populations nested within burn classes. Different superscript letters indicate significant differences (ANOVA, p ≤ 0.05). B = Black Butte; D = Dave Lewis; L = Lookout.

			WPBR infected %		WPBR mortality %		MPB attack %		MPB mortality %	
Burn Class	**Pop**	**n**	**LS Mean**	**SD**	**LS Mean**	**SD**	**LS Mean**	**SD**	**LS Mean**	**SD**
Never	B	9	30.64[a]	18.85	0.33 [a]	0.98	19.8[ab]	15.04	0.33[a]	0.98
Old	B	8	29.32[a]	13.71	1.43 [a]	2.20	12.76[ab]	13.68	2.25[a]	3.20
Recent	B	13	23.03[a]	14.66	1.75 [a]	2.34	5.02 [a]	6.64	1.98[a]	2.46
Recent	D	7	19.92[a]	18.57	0.70[ab]	1.84	48.74 [b]	26.48	7.53[a]	11.79
Never	L	10	60.44[b]	13.76	5.73 [a]	9.06	6.15 [a]	7.64	2.04[a]	5.51

Table 2. Distribution of blister rust and mountain pine beetle on mature trees: populations nested within habitat series. Different superscript letters indicate significant differences (ANOVA, p ≤ 0.05). See Table 1 for population codes.

			WPBR infected %		WPBR mortality %		MPB attack %		MPB mortality %	
Habitat Series	**Pop**	**n**	**LS Mean**	**SD**	**LS Mean**	**SD**	**LS Mean**	**SD**	**LS Mean**	**SD**
Mixed subalpine	B	11	31.24[a]	15.95	1.64[a]	2.10	16.34[a]	16.71	2.24 [a]	2.84
Whitebark	B	7	28.62[a]	17.16	0.42[a]	1.11	10.79[a]	10.21	0.42 [a]	1.11
Lodgepole-whitebark	B	12	22.15[a]	14.44	1.34[a]	2.34	7.53[a]	9.35	1.59 [a]	2.52
Lodgepole-whitebark	D	4	24.44[a]	20.63	1.22[a]	2.44	49.18[b]	32.33	10.39 [b]	15.01
Mixed subalpine	D	3	13.89[a]	17.35	0.00[a]	0.00	48.15[b]	23.13	3.70[ab]	6.42
Mixed subalpine	L	3	50.39[b]	9.24	3.60[a]	3.23	3.31[a]	3.83	0.92 [a]	0.81
Whitebark	L	4	59.18[b]	11.63	9.55[b]	13.82	1.35[a]	1.56	0.00 [a]	0.00
Lodgepole-whitebark	L	3	72.18[b]	14.23	2.78[a]	4.81	15.38[a]	7.66	5.88 [a]	10.19

The Dave Lewis population had significantly more mountain pine beetle attack than the other populations or population-habitat series combinations (range (mean ± SE): 48.14 ± 8.41% to 49.18 ± 7.29%; Tables 2, 3). This population also had more beetle-caused mortality than all other populations or population-habitat series combinations (range: 3.70 ± 3.19% to 10.39 ± 2.77%) except for whitebark-lodgepole types on Lookout Mountain (5.88 ± 3.19%) (Table 2).

Table 3. Distribution of blister rust and mountain pine beetle on mature trees: populations nested within habitat series by burn types. Different superscript letters indicate significant differences (ANOVA, p ≤ 0.05). See Table 1 for population codes.

Habitat Series	**Burn Class**			WPBR Infection %		WPBR Mortality %		MPB Attack %		MPB Mortality %	
		Pop	**n**	**LS Mean**	**SD**	**LS Mean**	**SD**	**LS Mean**	**SD**	**LS Mean**	**SD**
Mixed subalpine	Never	B	4	35.45[a]	14.92	0.00[a]	0.00	24.61[ab]	19.34	0.00 [a]	0.00
Mixed subalpine	Old	B	3	36.03[a]	17.13	3.82[a]	1.81	21.83[ab]	15.86	6.00[ab]	1.45
Mixed subalpine	Recent	B	4	23.43[a]	17.39	1.65[a]	2.03	3.96[ab]	7.93	1.65 [a]	2.03
Whitebark	Never	B	1	38.24[a]	–	2.94[a]	–	20.59[ab]	–	2.94[ab]	–
Whitebark	Old	B	2	35.24[a]	12.40	0.00[a]	0.00	18.29[ab]	3.24	0.00 [a]	0.00
Whitebark	Recent	B	4	22.92[a]	20.83	0.00[a]	0.00	4.58[ab]	9.17	0.00 [a]	0.00
Lodgepole-whitebark	Never	B	4	23.92[a]	24.80	0.00[a]	0.00	14.82[ab]	12.84	0.00 [a]	0.00
Lodgepole-whitebark	Old	B	3	18.67[a]	3.90	0.00[a]	0.00	0.00 [a]	0.00	0.00 [a]	0.00
Lodgepole-whitebark	Recent	B	5	22.82[a]	9.60	3.22[a]	2.75	6.21[ab]	4.37	3.82[ab]	2.61
Mixed subalpine	Recent	D	4	24.44[a]	20.63	1.22[a]	2.44	49.18 [b]	32.33	10.39[b]	15.01
Mixed subalpine	Recent	D	3	13.89[a]	17.35	0.00[a]	0.00	48.15 [b]	23.13	3.70[ab]	6.42
Mixed subalpine	Never	L	3	50.39[b]	9.24	3.60[a]	3.23	3.31[ab]	3.83	0.92 [a]	0.81

Whitebark	Never	L	4	59.18[b]	11.63	9.55[b]	13.82	1.35[ab]	1.56	0.00[a]	0.00
Lodgepole-whitebark	Never	L	3	72.18[b]	14.23	2.78[a]	4.81	15.38[ab]	7.66	5.88[ab]	10.19

Elevation and aspect were the only topographic variables that had any significant correlation (r = -0.414, Table 4). Elevation was also significantly negatively correlated with infection rates in mature and juvenile trees. Slope and aspect were not correlated with infection. Percentage of trees in a stand in clumps (i.e. not single stems alone) was not related to any other variable. Mature tree abundance was positively correlated with regeneration abundance and infection rates of juvenile and mature trees. Sample sizes of infected regeneration shorter than 20" were too small to analyze statistically. Only three plots had blister rust: two mixed subalpine fir stands at Dave Lewis and one pure whitebark stand at Lookout. The regeneration taller than 20" had far higher infection rates. All but two of the plots at Lookout had blister rust on the taller regeneration (range: 5.26 to 75%); five of the 30 plots sampled at Black Butte had infections (range: 5.88 to 18.18%); only one plot had signs of blister rust at Dave Lewis (Table 5). By habitat series, pure whitebark stands had the most infected taller regeneration and the other series were similar (Table 5). Unburned sites had the most infected larger regeneration, while old burns had less and young burns the least.

Although the Pearson correlation coefficient between these variables was 0.442 (Table 2), regression analysis did not reveal a significant relationship between transformed percentages of juvenile and mature infection rates by habitat series or population; only the unburnt class had a significant regression ($p = 0.0092$, Root MSE = 1.55, $R^2 = 0.354$, $R^2_{adj} = 0.314$).

Table 4. Pearson correlation coefficients of topographic and health variables. Significant correlations ($p \leq 0.05$) are in bold font.

	Slope %	**Aspect**	**No. of Mature WBP**	**Clump %**	**No. of Regen**	**Regen Infected %**	**Mean Mature Infected %**	**[Regen Infected %]$^{0.5}$**	**[Mean Mature Infected %]$^{0.5}$**
Elevation	**-0.41448**	-0.10233	0.00462	0.09411	-0.07403	**-0.44837**	**-0.44560**	**-0.39465**	**-0.32246**
p	0.0038	0.4937	0.9754	0.5292	0.6209	0.0029	0.0017	0.0097	0.0271
n	47	47	47	47	47	42	47	42	47
Slope %		0.00094	0.11578	-0.14971	0.11684	0.29617	0.17348	0.26044	0.16884
p		0.9950	0.4383	0.3152	0.4341	0.0569	0.2435	0.0957	0.2566
n		47	47	47	47	42	47	42	47
Aspect			0.28682	0.01003	0.22386	0.29594	0.23441	0.28353	0.20089
p			0.0506	0.9466	0.1304	0.0571	0.1128	0.0688	0.1757
n			47	47	47	42	47	42	47
No. of Mature WBP				0.19217	**0.43295**	**0.59644**	0.25496	**0.59042**	**0.30488**
p				0.1956	0.0024	<.0001	0.0837	<.0001	0.0372
n				47	47	42	47	42	47
Clump %					-0.27770	0.25659	-0.04126	0.26538	-0.06618
p					0.0588	0.1009	0.7831	0.0894	0.6585
n					47	42	47	42	47
No. of Regen						0.19537	0.24565	**0.30694**	0.24931
p						0.2150	0.0960	0.0480	0.0910
n						42	47	42	47
Regen Infected %							**0.46484**	**0.96098**	**0.42559**
p							0.0019	<.0001	0.0050
n							42	42	42
Mean mature Infected %								**0.47281**	**0.95323**
p								0.0016	<.0001
n								42	47
[Regen Infected %]$^{0.5}$									**0.44252**
p									0.0033
n									42

Table 5. Distribution of blister rust infection on regeneration taller than 20". Different superscript letters indicate significant differences (one-tailed t-test with unequal variances, $p \leq 0.05$).

Burn Class	**n**	**Mean**	**SD**	**SE**
Never	9	23.61[a]	21.51	7.17
Old burn	3	15.08[ab]	4.59	2.65
Recent burn	2	7.69 [b]	0.00	0.00
Habitat Series				
Pure whitebark	6	14.40 [a]	9.56	3.90
Whitebark-lodgepole	3	38.94 [a]	12.27	7.08
Whitebark-subalpine	5	13.98 [a]	10.44	4.67
Population				
Black Butte	5	11.76 [a]	5.62	2.51
Dave Lewis*	1	7.69	–	–
Lookout	8	25.82 [a]	21.87	7.73

*only one plot was infected so no statistical comparisons are possible.

When topographic variables were regressed on transformed infection rates, a significant relationship was found between elevation and infection rates of mature trees for whitebark-lodgepole habitat series and unburnt plots ($R^2 = 0.453$, $p = 0.0022$ and $R^2 = 0.313$, $p = 0.0128$, respectively), supporting the results shown in Table 2. Juvenile infection rates had a significant relationship with the number of mature trees present in the stand at Black Butte ($R^2 = 0.175$, $p = 0.0332$) and Lookout Mountain ($R^2 = 0.481$, $p = 0.0262$), but not Dave Lewis. There was no significant trend between burn class and number of mature trees or regeneration in a plot.

Fuels data

Discussion

Experimental design was the most challenging part of this study. Data at the landscape level often had only limited applicability at the stand (sampling) level. In particular, the USFS historic burn map, based on burn perimeters, did not always account for the complex effects of topography where sparks frequently ignite small fires over ridgetops, and overburns are frequent. Many areas mapped as unburned or old burns were actually young burns since they were reburnt in the 2000 fire. Plots identified as old burns during reconnaisance when there were still snowdrifts were often proven to be new burns when evidence on the ground was revealed after the snow melted.

The GAP data set, based largely on photo interpretation, was of limited utility for high elevation ecosystems. It is notoriously difficult to distinguish lodgepole and whitebark pines from air photos, and it can even be challenging from a distance in the field. Many areas mapped as pure whitebark stands were either mixed with lodgepole pine or subalpine fir. According to Holly Akenson (pers. comm.), the Craighead Institute has ground-truthed many whitebark pine ecosystems in the Frank Church as a part of a grizzly bear habitat suitability study and has a more detailed and accurate data set, but they have not yet made it available to the University of Idaho despite offering to do so following their data collection in 1999. Pure whitebark pine stands were relatively rare in the sampled populations, far less so than indicated by the GAP map, but less so on Lookout Mountain.

More information on natural disturbance regimes is required to determine the return interval for stand-replacing and lower-intensity fires, since the climax stand type would vary with disturbance frequency and intensity (Wilson and Stuart-Smith 2002). Sites with periodic low-intensity ground fires would reduce fuel loadings and competing vegetation. More frequent stand-replacing fires may maintain a seral climax favoring whitebark pine as opposed to subalpine fir (Keane and Arno 1993; Keane et al. 1994). Furthermore, the USFS designated habitat types for ecosystems containing whitebark pine do not necessarily correspond with the apparent vegetation and climax stand type, but this is largely due to the low sample size in the habitat type approximation guide (Steele et al. 1981). Since the three general habitat series were used to select stands for sampling *a priori* based on field reconnaisance, these types were used throughout the analysis although they often keyed to a different habitat type. Lookout Mountain and Dave Lewis often had Douglas-fir growing in the lodgepole-whitebark sites, but they were still grouped into that habitat series since they had the same plant communities and edatopic conditions.

Interestingly, slope and aspect were not correlated with number of mature trees or regeneration abundance. Other studies (Hutchins and Lanner 1982; Tomback et al. 1995, 2001; Wilson 2001) found that Clark's nutcracker preferentially selects south-facing slopes and more open sites, including recent burns because these sites have earlier snowmelt and more caching sites. Similar to the findings of Tomback et al. (1995), larger regeneration had much higher rates of infection than smaller regeneration, due to the larger surface area. The sample size of infected regeneration was too small to draw statistical comparisons, but pure whitebark and unburned stands had the highest infection rates and recent burns the least. This has implications for fire management and stand health: maintaining natural fire regimes may reduce the incidence and severity of blister rust both in regeneration, to enhance recruitment, and in mature trees, to reduce the alternate host prevalence and spore concentrations.

The incidence and severity of blister rust varied widely among populations. It is likely, however, that the actual incidence of blister rust at Black Butte was 10-20% higher than recorded since this population was surveyed immediately after snowmelt, and some cankers were still dormant. Trees often had evidence of rodent chewing but no associated canker indications at the time of surveying (i.e., orange margin on surface, spores, or cracked and thickened bark). Only cankers that could be definitely identified were recorded, otherwise trees or canopy sections were classed as uninfected or unknown, if a canker was likely due to flagging or other indications but not visible (e.g. due to lichen growth on branches) or not clearly identifiable. It was for this reason that a maximum and minimum infection rate were calculated and the mean used as the dependent variable.

This highly unbalanced distribution of factors necessitated the nesting of populations within habitat series and burn types. In particular, two of the three populations had only one burn type represented, so burn type and population would be confounded if populations were analyzed separately (i.e. not nested within factors). Sampling additional populations to obtain a more comprehensive data set in 2006 would be beneficial.

As expected, sites dominated by mature lodgepole and whitebark pine trees had higher prevalence of mountain pine beetle (Baker et al. 1971). While all populations had some low, endemic level of beetle attack, it was far more severe and widespread at Dave Lewis. This likely was a synergistic factor related to the fire severity also, where the area was covered in dense stands of mature lodgepole pine with fairly heavy mountain pine beetle infestation and standing snags killed by the beetle (Perkins 2001). It was generally not possible to ascertain beetle or rust that may have infected or killed snags that had been dead for some years and had no remaining bark. Mountain pine beetle is recognized as an integral component of the natural successional dynamics in whitebark pine ecosystems: mature, large-diameter trees are more susceptible to beetle attack, creating infestation centers and eventually areas of large standing dead trees that drive the fire cycle (Ogilvie 1990; Keane et al. 1994). In northern populations, the beetle is a less important factor since stands of whitebark pine tend to be more mixed with other species and patchily distributed (Campbell and Antos 2000; Perkins 2001; Stuart-Smith 1998).

"Bark stripping" was recorded regardless of the cause. This index would be more informative if it could be recorded separately for chewing associated with blister rust. Many trees, especially in burned plots, had stripping associated with mechanical damage due to branches or trees falling. Trees also often had ungulate rubbing also recorded as stripping. In these cases, it would be unrelated to blister rust but still useful for tree identification, or else as a baseline from which the effects of future blister rust infection could be gauged.

At Black Butte, virtually every plot had evidence of abundant cones in 2004, and relatively few cones in 2005. Second-year cones were not visible until late July; pollen cones were first visible July 5. Lookout Mountain had a relatively good cone crop (2005) and evidence of a moderate crop in 2004, but few cones for 2006. Dave Lewis had a poor cone crop in 2005 and few scales on the ground from 2004, and little to no cones likely for 2006.

Trees within a clump were often of different sizes. This may reflect variability in germination speed, embryo maturity, and caching times for different seeds. Prior studies have found seeds took from one to several years to germinate following caching within a single clump (McCaughey 1993, Tomback et al. 2001). Germination and caching also vary depending on fire regime and stand openness.

Putatively resistant trees were identified only in plots with fairly uniform, heavy infections. Trees were selected based on either lack of cankers or if they had only dead or inactive cankers, implying potential for tolerance or resistance. Unfortunately, many selected trees were reproductively immature and would not likely be cone-bearing for decades.

Acknowledgements

The field work, helpful suggestions, energy and enthusiasm of Catherine Roberts were instrumental to this project. The USFS provided financial support. John Byrne, John Schwandt and Dennis Ferguson of the USFS Intermountain Forest and Range Experiment Station, Moscow, ID, provided training and resources. Jim and Holly Akenson, Managers and Research Scientists of the University of Idaho's Taylor Ranch Field Station regularly went above and beyond the call of duty in coordinating logistical issues, packing, and general support.

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Follow-Up Items

1) Sampling whitebark pine in Wilderness Areas

Whitebark pine has long been overlooked since it is so difficult to sample. During the past two decades, there has been a sharp rise in the number of field studies of this species and its habitat, and associated environmental factors. This interest has been two-fold: (1) whitebark pines are highly susceptible to the introduced fungal pathogen that causes white pine blister rust and populations have been declining dramatically, far outpacing recruitment; and (2) recognition of its role as an umbrella species for many plant, bird and wildlife species that depend on high elevation ecosystem. Most of these studies have taken place in areas with fairly easy road and trail access, such as National, State or Provincial Parks, Recreation Areas, or sites with other access maintained by mining or logging interests. Wilderness areas present unique logistical challenges for designing studies and collecting information in the field. Motorized access and tools are generally prohibited in these remote sites, and travel must be by foot or pack animal. These restrictions make studies in Wilderness Areas relatively inefficient relative to other areas since less area can be covered in a field season.

The Frank Church - River of No Return Wilderness Area is unique: not only is it the largest contiguous Wilderness in the continental United States, but it also has several airstrips available for public use that were grandfathered in since they were parts of preexisting inholdings before the Idaho Primitive Area was reclassified as a Wilderness Area. This area thus has the benefit of limited air access, as well as a rich heritage of pioneering. One of the legacies of this lifestyle is that pack animal support is still available through several providers in the area. The mule packing support provided by Taylor Ranch Field Station was invaluable for establishing plots during 2005. Stock packing will be necessary to establish additional plots in the future, and also for cone collecting, since backpacking a full trip worth of camp gear, field equipment and supplies is extremely arduous in this very steep terrain where the sites would be a full day or two from the closest base.

We are aware of two packers in the Big Creek drainage who may be able to support this project, and possibly more. It would be necessary to reserve their services in the fall or winter to guarantee availability. The most likely is Mile Hi Outfitters, led by Travis and based out of Cabin Creek. This site provides good access for most of the populations selected for further sampling. There is a USFS packer, Patrick, based out of the station at Big Creek. This project is supported by the USFS, so perhaps this could be an option. The Root Ranch (in Chamberlain Basin, north of Big Creek) and Flying B Ranch (on the middle fork of the Salmon River) also do pack trips, but they may or may not be available for hire. There may be others based locally as well.

Another option, although this is not recommended since it would be far less efficient, is to stipulate that there will be no packing support for establishing and/or monitoring plots (i.e. everything with the exception of cone collecting). In this case, for a 10-day trip a person would have to carry approximately 75-80 lbs of gear, of which about 18 would be food, 7-10 water and 25 would be field gear necessary for measuring, recording, plant identification, etc. Depending on population density, 4-8 lbs worth of nails and tags would be left on site in the trees. It is critical that potential staff be informed of this well in advance of their trip if pack support is not planned so they can assemble suitable gear and food.

2) Future considerations: recommended populations in the FCRNRWA to sample in 2006

Local, recent information is important to determine accessibility. Conditions after the fire, especially downed trees and periodic washouts and slides all mean that information about trails more than 10 years old should be confirmed with another source, or ground truthed. Only some trails are maintained by the USFS, but there are quite a few outfitter trails that are not part of the formal trail network and not listed on any maps. Local knowledge is the only means of obtaining this information.

1. Accessible from Big Creek road and/or USFS ranger station, in the Payette National Forest. There is a maintained trail S to Snowslide Peak (9104'), Center Mountain (9323') and Cougar Peak (9120'). There is McFadden Point to the N, but this area would likely be marginal to poor and a reconnaisance to confirm whether there is whitebark in the area is necessary. The southward sites would comprise an excellent location with good potential, but presently (mid-August 2005) there is a small fire on Center Mountain, so it will be useful to get an update on the status of the area before sampling. This route can loop back up to the headwaters of Monumental Creek and there are several potential sites in that area, depending on access.

2. Cottonwood Butte, 5-6 miles north of the population sampled at Black Butte, in the Payette National Forest. This would be a 2-day pack trip from either Taylor Ranch or Cabin Creek. Another alternative is to fly to Cold Meadows and meet the packer or hike from there, although it is still a 1-2 day trip that way: 15-20 miles. This is probably a good population and fairly abundant whitebarks spread throughout the area near the Butte. This area did not burn during any recent fires.

3. Bighorn Crags, in the Salmon National Forest. It may be possible to sample 2 populations in this area: 1 to the south where most of the trail access is and 1 to the north between the Roaring Creek Lakes and Goat Lake, by the Beehive (9610'). The southern access could be hiked in directly since the parking lot at the trailhead is at about 8200' and the terrain ranges between 8-9500'. The northern sites would require a pack trip either through the Crags, and consequently this would be 3 days 1 way from Cabin Creek, or from a trailhead by the main Salmon River by the Special Mining Management Zone (e.g. Clear Creek, or there looks like a trailhead several miles to the west also), a 1 to 2 day trip.

4. Rainbow Ridge by the head of Monumental Ck, there is an access road to the Thunder Mountain mining area. There are some good potential sites in this area, but it depends on packing access and trail conditions.

5. Other sites that may be worth discussing with a packer: (1) ridges south of Mormon Mountain, e.g. Shellrock Ridge. There isn't really a trail though and there are steep tricky sections and also downed trees. (2) ridges south between Big Creek and Monumental Creek: there are some high spots and much of the area outside the Big Creek drainage itself didn't burn in the 2000 fire. There are also areas further to the northeast, N of the Salmon River that look like candidate sites, but these are much further away and are in different mountain ranges (Clearwaters and Bitterroots) and probably also in different geological and climatic zones (and forest districts). They are probably too far from the other sites and logistical support to consider at this time.

Appendices

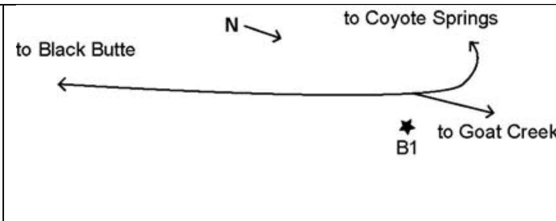
Appendix 1. Plot locations, transect start points and characteristics. GPS settings correspond to the USGS topographic quadrangles (Papoose Peak, Monument, Dave Lewis Peak): NAD27, Zone 11.

Population	Plot	Latitude (ºN)	Longitude (ºW)	Elevation (ft)	Slope %	Aspect	Habitat Series	Habitat type	Burn Class	Trees in plot
Black Butte	B1	45.18677	114.84093	8459	75	165	MX SUB	ABLA/CAGE	N	16
Black Butte	B2	45.18630	114.84180	8488	34	128	MX SUB	ABLA/CAGE	Y	8
Black Butte	B3	45.18337	114.84527	8552	75	129	MX SUB	ABLA/CAGE	Y	13
Black Butte	B4	45.18423	114.84417	8540	46	132	PIAL/PICO	PIAL(/CAGE)	Y	9
Black Butte	B5	45.18603	114.84267	8517	13	1	PIAL/PICO	PIAL(/VASC)	O	14
Black Butte	B6	45.18272	114.84587	8554	30	134	PIAL/PICO	PIAL(/CAGE)	Y	33
Black Butte	B7	45.18340	114.84537	8568	45	136	PIAL	PIAL	O	17
Black Butte	B8	45.18272	114.84587	8543	38	147	PIAL/PICO	PIAL	Y	23
Black Butte	B9	45.18223	114.84705	8567	46	131	MX SUB	ABLA/CAGE	Y	24
Black Butte	B10	45.18067	114.85032	8651	22	155	PIAL/PICO	PICO/CAGE	Y	27
Black Butte	B11	45.18027	114.85082	8623	28	180	PIAL/PICO	PICO/CAGE	N	9
Black Butte	B12	45.18155	114.84958	8657	11	114	PIAL/PICO	PIAL	Y	20
Black Butte	B13	45.18930	114.83865	8582	17	240	PIAL	PIAL	N	13
Black Butte	B14	45.19027	114.83900	8651	15	220	PIAL/PICO	PICO/ARRY	N	23
Black Butte	B15	45.19040	114.83783	8655	12	220	PIAL/PICO	PICO/CAGE	N	12
Black Butte	B16	45.19062	114.83712	8721	9	193	MX SUB	ABLA/CAGE	N	24
Black Butte	B17	45.18990	114.83860	8644	18	225	PIAL/PICO	PIAL(/CAGE)	N	13
Black Butte	B18	45.19168	114.83570	8738	22	156	MX SUB	ABLA/CAGE	N	7
Black Butte	B19	45.19348	114.83325	8735	15	127	PIAL	PIAL(/CAGE)	Y	30
Black Butte	B20	45.19445	114.83262	8697	17	55	MX SUB	ABLA/CAGE	Y	41
Black Butte	B21	45.19070	114.83900	8644	16	211	MX SUB	ABLA/CAGE	N	19
Black Butte	B22	45.19078	114.84273	8600	24	252	PIAL	PIAL	Y	4
Black Butte	B23	45.19062	114.84388	8528	14	268	PIAL	PIAL(/CAGE)	Y	6
Black Butte	B24	45.19028	114.83972	8655	16	224	PIAL	PIAL(/CAGE)	Y	6
Black Butte	B25	45.19140	114.83668	8700	10	342	MX SUB	ABLA/CAGE	O	17
Black Butte	B26	45.19202	114.83555	8727	8	336	MX SUB	ABLA/CAGE	O	20
Black Butte	B27	45.19163	114.84125	8685	13	290	PIAL/PICO	PIAL(/VASC)	O	23
Black Butte	B28	45.19093	114.84002	8662	18	232	PIAL	ABLA-PIAL	O	25
Black Butte	B29	45.19117	114.83727	8725	7	239	MX SUB	ABLA-PIAL	O	65
Black Butte	B30	45.19263	114.83503	8728	54	326	PIAL/PICO	PIAL	O	50
Lookout	L1	45.04060	115.08637	7510	72	310	PIAL/PICO	PSME/CAGE	N	34
Lookout	L2	45.03622	115.08755	7752	17	217	PIAL/PICO	PSME/CAGE	N	7
Lookout	L3	45.03988	115.08087	7925	54	158	PIAL/PICO	PIAL(/CAGE)	N	12
Lookout	L4	45.03848	115.07445	8110	11	230	PIAL	PIAL(/CAGE)	N	20
Lookout	L5	45.03852	115.07203	8245	67	44	PIAL	PIAL(/CAGE)	N	26
Lookout	L6	45.03807	115.07308	8241	68	324	PIAL	PIAL(/CAGE)	N	76
Lookout	L7	45.03713	115.07210	8380	44	326	MX SUB	ABLA/VACA	N	33
Lookout	L8	45.03480	115.07252	8533	6	282	MX SUB	ABLA/CAGE	N	41
Lookout	L9	45.03338	115.07272	8647	57	306	PIAL	PIAL(/CAGE)	N	42
Lookout	L10	45.02932	115.07478	8685	36	289	MX SUB	ABLA/CAGE	N	40
Dave Lewis	D1	45.05138	114.85188	8300	3	245	MX SUB	ABLA/CAGE	Y	41
Dave Lewis	D2	45.05237	114.85302	8467	26	204	MX SUB	PSME/CAGE	Y	22
Dave Lewis	D3	45.05248	114.85435	8488	21	176	PIAL/PICO	PSME/CAGE	Y	9
Dave Lewis	D4	45.05228	114.85700	8377	62	201	PIAL/PICO	PSME/CAGE	Y	9
Dave Lewis	D5	45.05295	114.85810	8473	43	208	PIAL/PICO	PSME/CAGE	Y	12
Dave Lewis	D6	45.05300	114.86015	8298	50	307	MX SUB	ABLA/VACA	Y	25
Dave Lewis	D7	45.05383	114.85927	8277	55	323	MX SUB	ABLA/VACA	Y	12

Appendix 2. Monitoring plot location diagrams

Black Butte Population

B1



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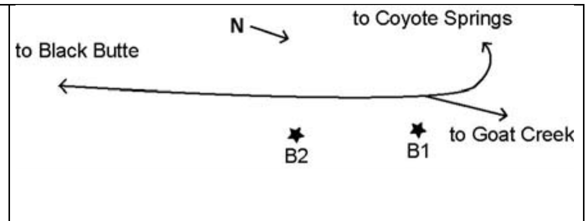

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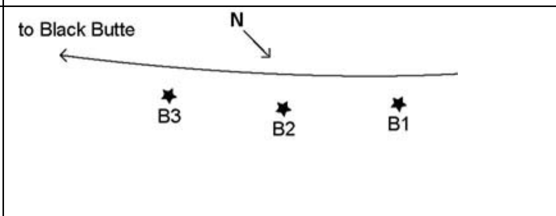

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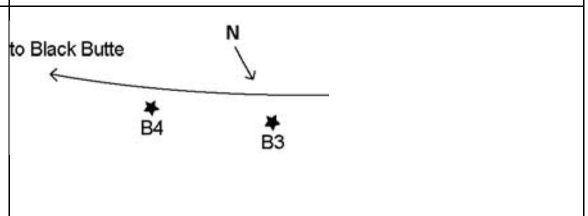

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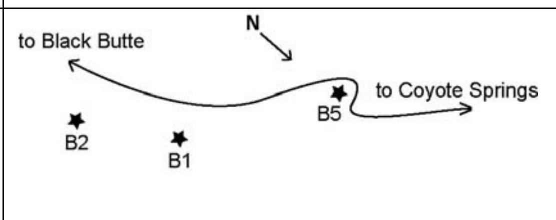

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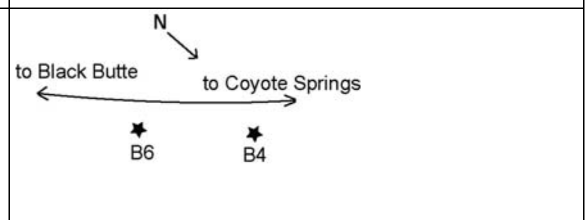

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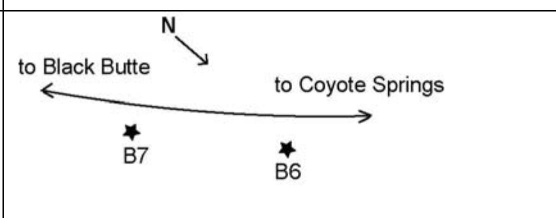

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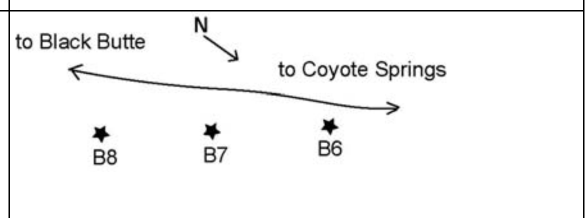

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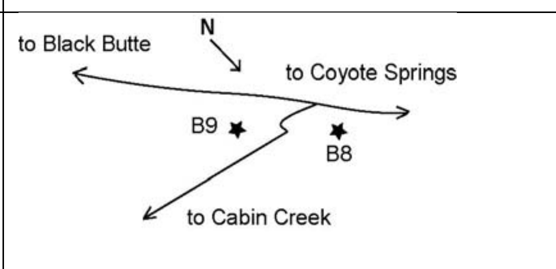

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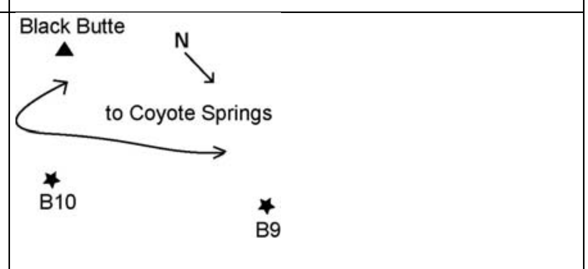

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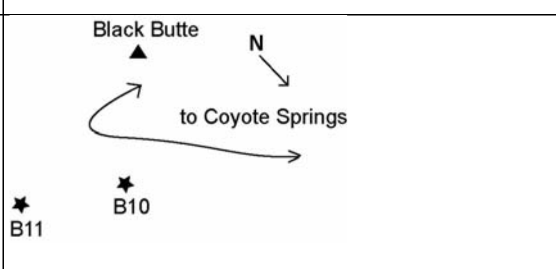

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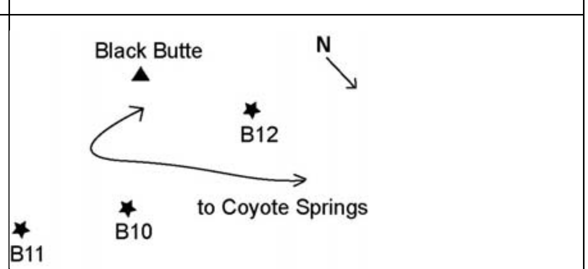

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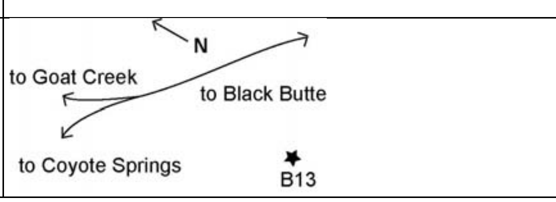

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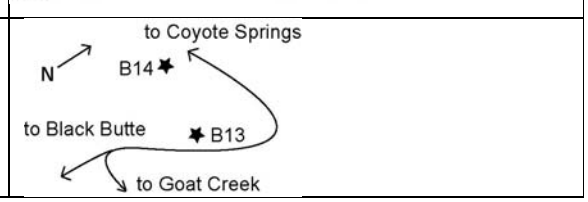
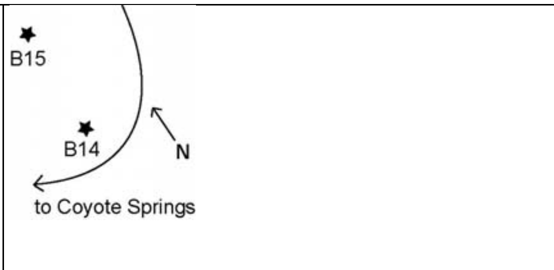
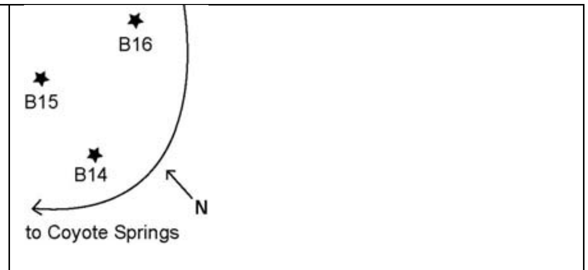
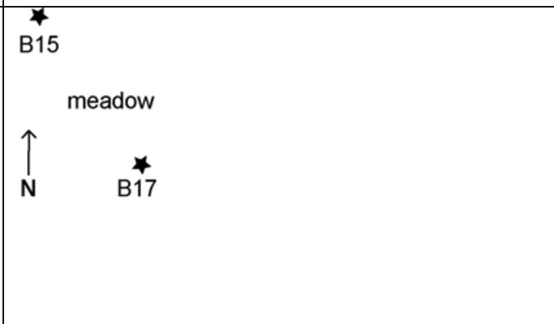
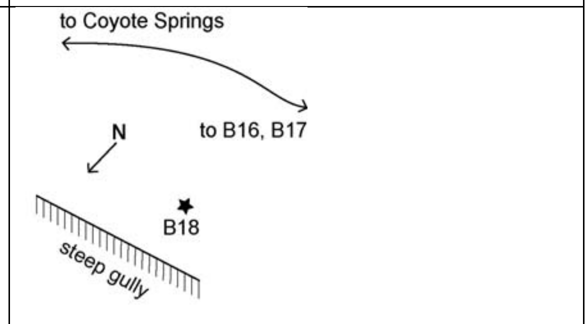
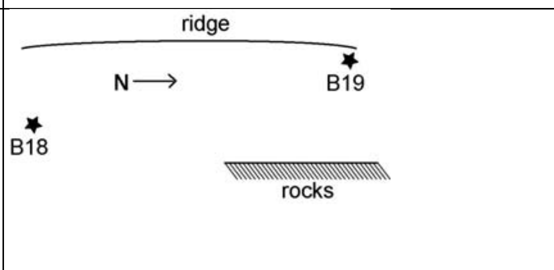
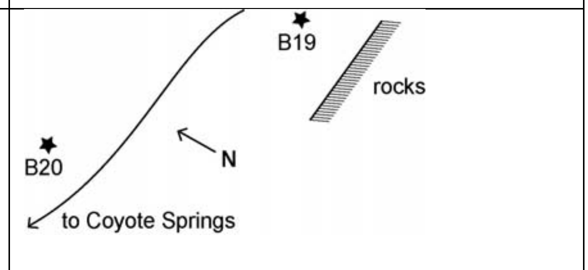
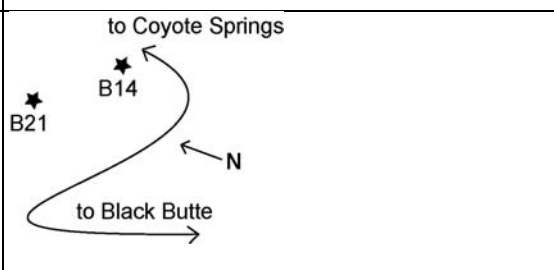
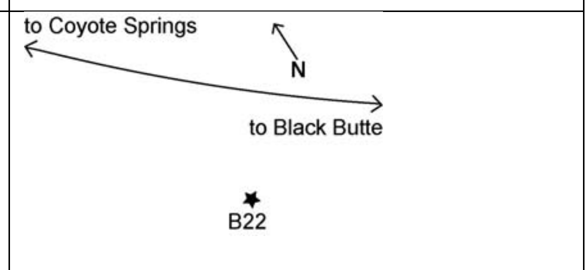
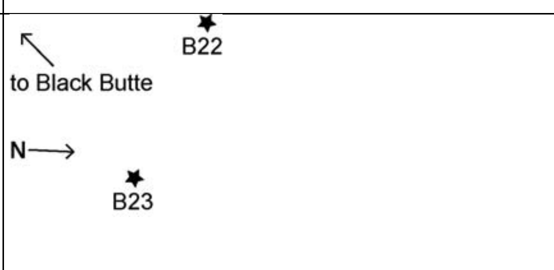
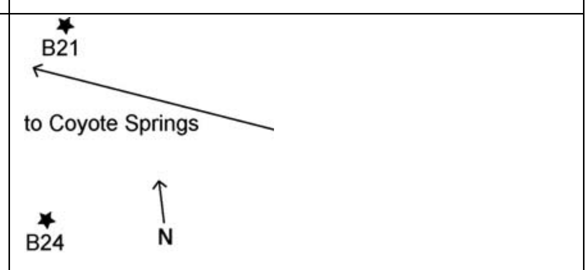
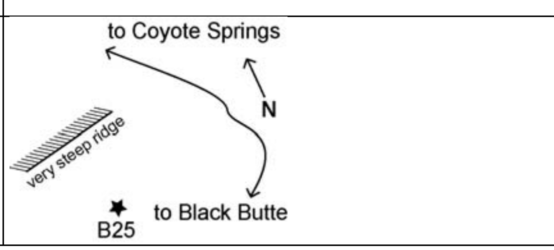
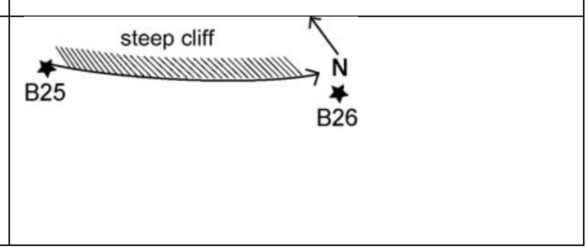
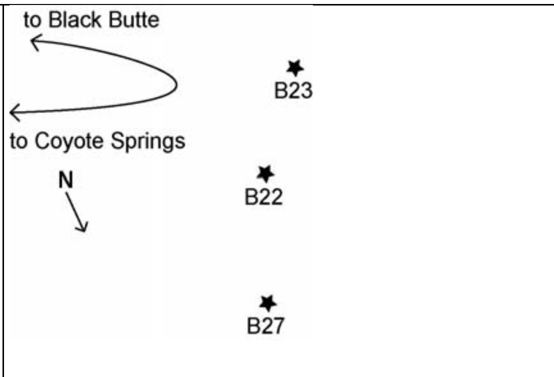
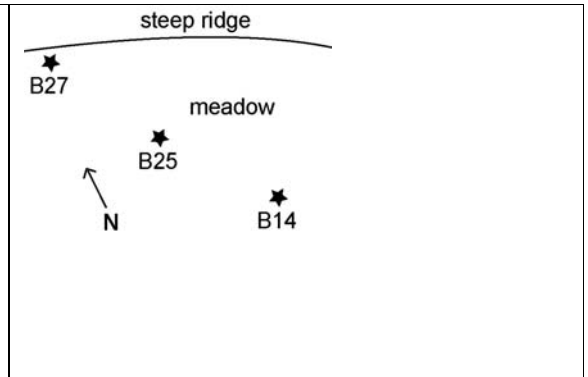
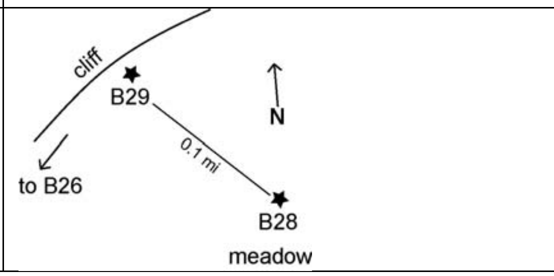
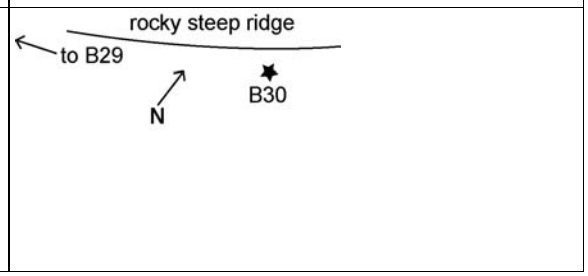
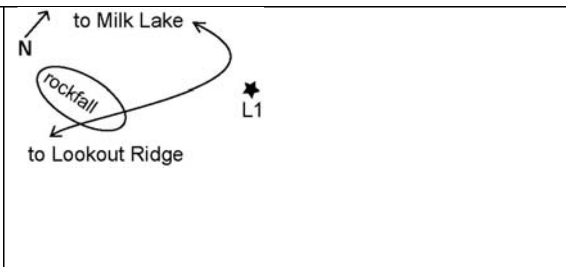
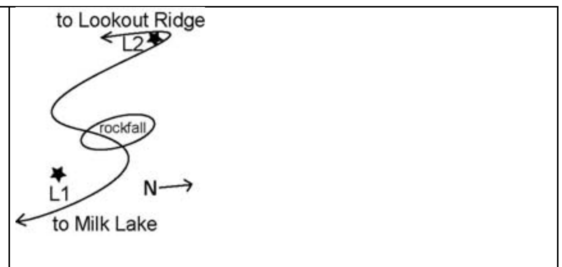
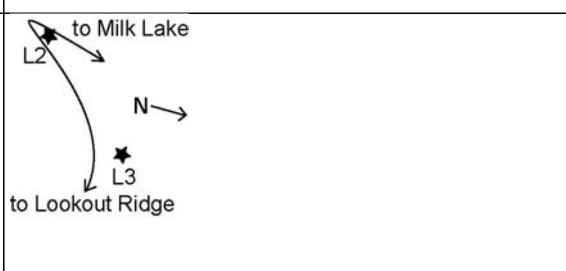
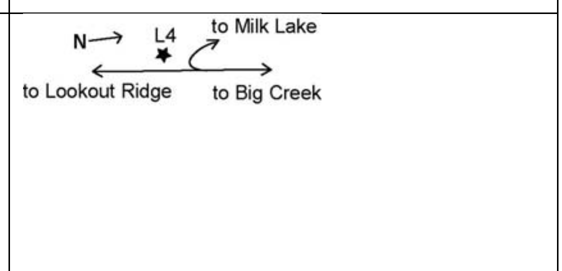
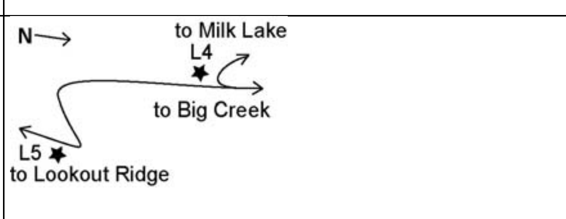
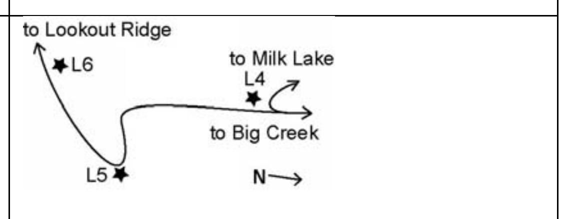
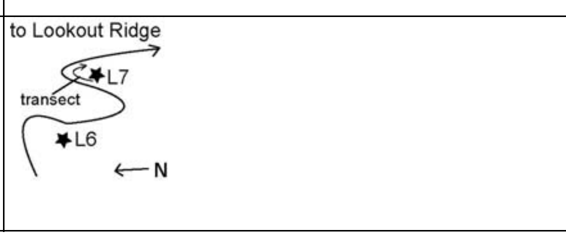
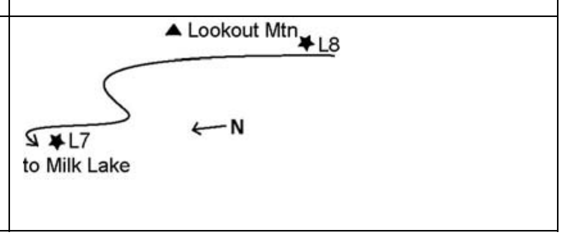


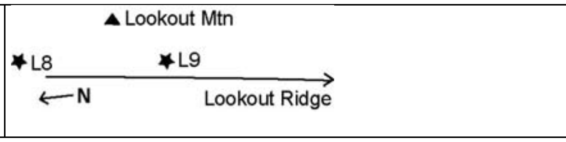
B15		B16	
B17		B18	
B19		B20	
B21		B22	
B23		B24	
B25		B26	

B27		B28	
B29		B30	

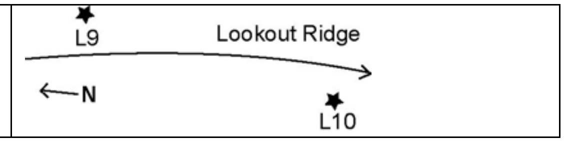
Lookout Mountain Population

L1		L2	
L3		L4	
L5		L6	
L7		L8	

L9

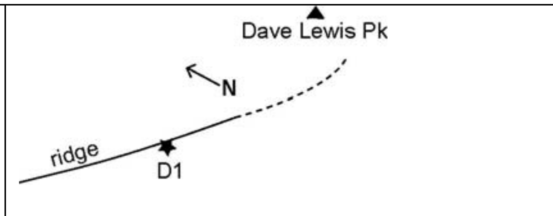


L10

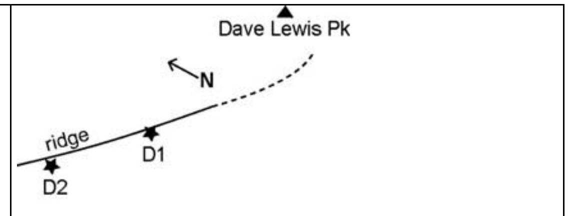


Dave Lewis Population

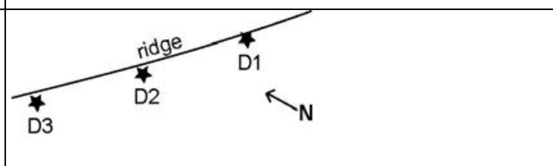
D1



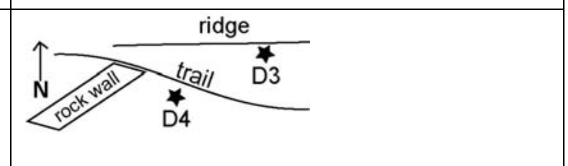
D2



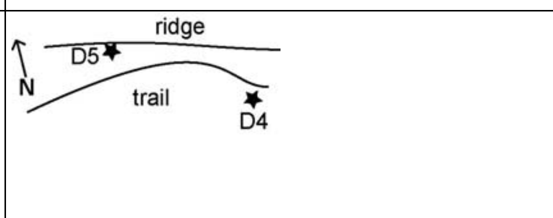
D3



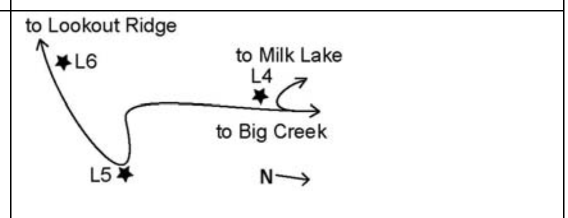
D4



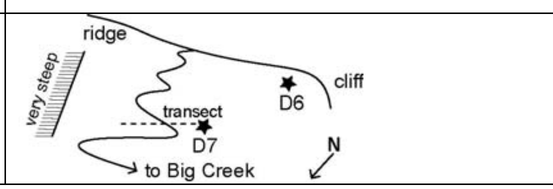
D5



D6



D7



Appendix 3. Putatively resistant trees. For exact locations see Appendix 4.

Plot No.	Tag	DBH (in.)	Indications	Cones
B5	58	1.3	canker scars on stem (possibly on branches also), looks like old cankers now inactive or dead	too young
B15	278	0.7	has several dead cankers but looks healthy	too young
L3	685	9.1	mature tree with no cankers in moderately infected stand	few
L3	688	3.8	mature tree with no cankers in moderately infected stand	none
L4	694	2.5	dead branch cankers but looks healthy in moderately infected stand	too young
L5	709	3.9	no cankers in moderately infected stand	few
L5	710	1.7	only dead branch cankers, looks healthy	too young
L5	711	3.0	only dead branch cankers, looks healthy	none
L5	718	3.0	only dead branch cankers, looks healthy	few
L5	720	2.4	only dead branch cankers, looks healthy	too young
L5	732	2.8	only dead branch cankers, looks healthy	too young

Appendix 4. Individual-tree data from all plots sampled in 2005.

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B1	1	1	0.0	0.0	I	A	1.3	1	U	N	N	N	N	N	N	0	L	L	N	H	.
B1	2	2	0.0	0.0	I	B	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	3	16	0.0	8.8	R	B	2.2	10	U	N	N	N	N	N	N	0	L	H	N	S	.
B1	4	15	0.0	8.7	R	A	5.6	2	L	N	N	N	N	A	N	0	L	M	N	I	.
B1	5	17	2.3	8.9	R	C	2.1	1	L	N	N	N	N	D	N	0	N	L	N	I	.
B1	6	2	23.3	1.3	R	.	8.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	7	3	24.3	1.7	R	.	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	8	4	94.7	8.2	R	A	7.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	9	5	94.7	91.0	R	B	16.0	1	L	N	N	N	N	I	N	0	N	N	Y	I	.
B1	10	6	97.8	13.8	R	.	13.3	2	L	N	N	N	I	I	N	0	L	L	Y	I	.
B1	11	9	119.2	10.1	L	A	2.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	12	10	121.5	10.4	L	B	0.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	13	11	137.0	8.5	L	A	7.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	14	13	137.5	12.5	L	A	8.7	2	U	N	N	N	N	N	N	0	N	N	Y	H	.
B1	15	14	138.1	12.4	L	B	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B1	16	12	138.3	9.5	L	B	1.2	7	U	N	N	N	N	N	N	0	N	N	N	H	.
B2	1	8	0.0	0.0	I	A	10.4	3	U	N	N	N	N	N	N	0	M	H	N	S	.
B2	2	25	1.1	2.1	L	D	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B2	3	18	1.3	3.2	L	B	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B2	4	21	1.6	2.4	R	B	8.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B2	5	20	1.6	1.4	R	A	8.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B2	6	19	3.0	1.0	L	C	1.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B2	7	22	6.5	3.4	R	.	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B2	8	23	34.7	9.1	R	.	0.3	1	U	N	N	N	N	N	N	0	N	M	N	S	.
B3	1	26	0.0	0.0	L	B	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B3	2	27	0.0	0.4	I	A	4.4	1	L	N	N	N	N	A	N	0	N	N	N	I	.
B3	3	28	1.3	0.6	L	C	4.4	1	U	N	N	N	N	N	N	0	L	L	N	H	.
B3	4	29	1.3	0.2	L	D	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B3	5	30	8.4	0.0	L	A	4.0	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B3	6	31	8.9	15.0	L	B	0.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B3	7	32	14.8	2.5	R	A	6.2	1	L	N	N	N	N	I	D	0	N	N	N	H	.
B3	8	33	15.2	4.6	R	B	8.1	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B3	9	34	15.8	4.6	R	C	7.8	10	??	U	U	U	U	U	U	0	M	H	N	S	.
B3	10	35	21.6	6.0	R	.	5.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B3	11	36	26.3	7.2	R	A	5.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B3	12	37	26.3	6.6	R	B	6.4	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B3	13	38	33.9	9.6	R	.	4.4	1	U	N	N	N	N	N	N	0	N	M	N	S	.
B4	1	39	0.0	0.0	I	A	10.4	1	L	N	N	N	N	D	N	0	N	M	N	S	.
B4	2	40	1.3	1.1	L	B	9.0	2	L	N	N	N	I	N	N	0	M	N	N	I	.
B4	3	41	17.2	8.8	R	.	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B4	4	42	53.0	12.7	L	.	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B4	5	43	53.8	12.2	L	.	2.4	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B4	6	44	58.8	11.4	L	.	0.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B4	7	45	61.0	13.5	L	.	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B4	8	46	64.7	10.1	L	.	0.4	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B4	9	47	67.3	9.2	L	.	2.1	11	U	N	N	N	N	D	N	0	H	H	N	D	U
B5	1	48	0.0	0.0	I	A	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	2	49	1.0	0.4	R	B	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	3	50	1.3	4.0	L	C	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	4	52	2.0	0.0	I	E	0.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	5	51	2.1	0.3	L	D	0.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	6	53	8.5	13.5	R	A	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	7	54	8.7	14.8	R	B	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	8	55	27.8	15.0	R	A	3.2	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B5	9	56	28.4	13.9	R	B	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	10	58	51.3	11.7	L	B	1.3	1	??	U	U	U	U	U	U	60	N	N	N	H	.
B5	11	57	52.3	11.2	L	A	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	12	61	73.1	5.6	R	C	2.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.

[2] from beginning of 150.0' transect to germination point of tree
[3] from 0.0-15.0' away from transect to germination point of tree
[4] direction from transect start: R=right, L=left, I=intersecting
[5] letter indicates member of clump, "." indicates single individual
[6] 1 (0-5%), 2 (6-15%), 3 (16-25%), 4 (26-35%), 5 (36-45%), 6 (46-55%), 7 (56-65%), 8 (66-75%), 9 (76-85%), 10 (86-95%), 11 (96-100%)
[7] U=uninfected, L=1-10 cankers, M=11-30, H=31+, ??=uncertain
[8] A=sporulating, I=alive & not sporulating, N=none, U=uncertain, O=other (other species), D=dead
[9] N=none, L=light, M=moderate, H=heavy
[10] H=healthy & uninfected, I=healthy & infected, S=sick, R=recently dead, D=dead
[11] R=rust, B=beetle, U=unknown/other, F=fire

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B5	13	59	73.4	3.5	R	A	4.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B5	14	60	73.5	4.2	R	B	5.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	1	63	0.0	0.0	I	A	3.6	1	U	N	U	N	N	I	I	15	L	N	N	I	.
B6	2	64	0.0	1.2	R	B	7.3	1	L	N	N	N	N	N	N	0	L	L	N	H	.
B6	3	62	1.0	1.1	R	C	7.0	1	L	N	N	N	N	I	A	0	N	L	Y	I	.
B6	4	68	7.1	13.2	L	A	7.5	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B6	5	69	9.3	15.0	L	B	9.3	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B6	6	65	9.8	4.7	R	A	5.7	1	U	N	N	N	I	N	N	0	N	L	N	I	.
B6	7	70	9.8	14.9	L	C	6.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	8	71	10.2	14.5	L	D	5.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	9	66	10.8	4.4	R	B	5.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	10	67	11.3	4.6	R	C	6.5	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B6	11	75	20.4	7.5	R	.	2.2	1	L	N	N	N	I	N	N	0	N	L	N	I	.
B6	12	73	22.5	10.1	R	B	10.6	1	L	N	N	N	I	N	N	0	N	N	Y	H	.
B6	13	72	23.2	9.0	R	A	10.8	1	L	N	N	N	N	I	N	0	N	H	Y	H	.
B6	14	74	23.3	11.2	R	C	18.3	11	??	N	N	N	N	N	N	0	N	N	N	D	B
B6	15	80	26.5	10.2	R	D	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	16	77	26.7	9.6	R	A	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	17	78	26.9	9.4	R	B	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	18	76	27.3	7.4	R	.	1.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	19	81	27.6	13.9	R	.	1.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	20	79	27.7	10.0	R	C	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	21	82	40.8	8.0	L	A	7.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B6	22	83	42.1	7.5	L	B	7.6	11	U	N	N	N	N	N	N	0	L	H	N	D	U
B6	23	84	50.4	6.2	R	A	5.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B6	24	85	51.4	5.7	R	B	4.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	25	86	55.1	9.5	R	A	5.0	1	L	N	N	N	A	N	N	0	N	M	N	I	.
B6	26	87	56.3	9.1	R	B	67.0	1	M	N	A	N	A	A	A	35	N	H	N	S	.
B6	27	88	57.5	9.9	R	C	5.1	1	L	N	A	N	N	N	N	85	M	M	N	S	.
B6	28	89	113.9	7.9	R	A	2.3	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B6	29	90	114.3	7.8	R	B	3.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B6	30	91	115.3	6.9	R	C	1.2	1	U	N	N	N	N	A	N	0	N	N	N	I	.
B6	31	92	131.1	7.1	L	A	5.3	1	L	N	N	N	A	N	N	0	N	M	N	I	.
B6	32	93	132.2	7.8	L	B	3.3	1	L	N	N	N	N	D	N	0	L	N	Y	H	.
B6	33	94	139.3	6.9	L	.	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B7	1	95	0.0	0.0	I	A	6.2	3	U	N	N	N	N	N	N	0	H	M	N	H	.
B7	2	96	0.7	1.6	L	B	6.5	1	L	N	N	N	I	A	N	0	L	H	Y	I	.
B7	3	97	1.8	2.2	L	C	6.0	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B7	4	98	1.9	3.2	L	D	5.1	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B7	5	100	2.1	0.5	L	F	5.2	2	U	N	N	N	N	N	N	0	L	H	N	H	.
B7	6	99	2.5	1.5	L	E	4.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B7	7	101	14.7	3.8	R	A	7.4	3	L	N	N	N	A	N	N	0	M	M	N	I	.
B7	8	102	17.2	4.6	R	B	6.4	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B7	9	105	22.8	15.1	L	B	2.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B7	10	103	24.8	9.7	L	.	10.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B7	11	104	32.9	15.1	L	A	4.1	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B7	12	106	33.9	14.7	L	C	4.1	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B7	13	107	34.1	14.1	L	D	4.4	1	L	N	N	N	A	N	N	0	N	M	N	I	.
B7	14	108	64.6	10.3	R	.	16.5	5	U	N	N	N	N	N	N	0	M	N	N	H	.
B7	15	109	67.6	5.7	L	A	3.3	11	.	.	.	.	.	.	.	.	.	.	.	D	F
B7	16	110	67.8	6.3	L	B	4.5	11	.	.	.	.	.	.	.	.	.	.	.	D	F
B7	17	111	68.5	6.7	L	C	6.7	11	.	.	.	.	.	.	.	.	.	.	.	D	F
B8	1	112	0.0	0.0	I	A	4.9	11	.	.	.	.	.	.	.	.	H	H	N	R	U
B8	2	113	1.0	0.0	I	B	11.2	1	U	N	N	N	N	N	N	0	M	M	Y	H	.
B8	3	114	2.3	0.4	L	C	9.7	11	.	.	.	.	.	.	.	.	H	H	N	D	U
B8	4	115	17.4	4.2	R	.	9.2	1	L	N	N	N	A	A	A	0	L	N	N	I	.
B8	5	116	23.7	2.4	L	.	1.8	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B8	6	117	73.7	5.9	L	A	1.2	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B8	7	118	74.0	5.5	L	B	2.5	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B8	8	120	93.4	5.1	R	B	4.0	1	L	N	N	N	A	N	N	0	N	N	N	I	.
B8	9	119	93.8	5.1	R	A	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B8	10	121	105.3	2.2	R	.	3.5	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B8	11	122	111.2	13.5	R	A	4.0	11	.	.	.	.	.	.	.	.	H	H	.	D	U
B8	12	123	112.1	13.3	R	B	4.6	1	U	N	N	N	N	N	N	0	L	H	N	H	.
B8	13	124	114.7	10.8	R	.	1.3	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B8	14	125	115.0	6.3	R	A	2.9	2	U	N	N	N	N	N	N	0	N	M	N	H	.
B8	15	126	116.4	4.7	R	B	4.3	2	U	N	N	N	N	N	N	0	L	M	N	H	.
B8	16	127	121.3	14.5	R	.	9.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B8	17	128	125.4	3.2	L	.	1.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B8	18	129	132.5	9.2	L	A	1.4	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B8	19	130	132.7	9.1	L	B	2.6	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B8	20	133	136.9	4.4	R	.	1.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B8	21	131	138.2	4.5	L	.	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B8	22	132	138.6	13.9	L	.	0.4	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B8	23	134	138.8	7.2	R	.	1.1	1	L	N	N	N	I	N	N	0	N	M	N	I	.
B9	1	135	0.0	0.0	I	A	3.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B9	2	136	1.3	1.0	L	B	4.9	2	U	N	N	N	N	N	N	0	N	M	N	H	.

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B9	3	138	1.8	0.3	R	D	6.5	1	L	N	N	N	N	U	A	0	N	L	N	I	.
B9	4	137	2.1	0.5	L	C	6.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B9	5	139	6.8	7.8	L	.	6.3	1	L	N	N	N	A	N	N	0	L	L	N	I	.
B9	6	140	14.3	15.2	L	A	1.8	9	M	N	N	A	.	.	.	90	H	H	N	S	.
B9	7	141	14.8	13.0	L	B	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B9	8	142	15.0	13.0	L	C	2.9	1	L	N	N	N	A	N	N	0	N	M	N	I	.
B9	9	145	28.4	13.4	L	.	3.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B9	10	143	33.0	5.3	L	A	3.8	1	L	N	N	A	N	N	A	50	N	N	N	I	.
B9	11	144	33.4	5.7	L	B	5.4	1	L	N	N	N	I	I	N	0	N	N	N	I	.
B9	12	146	52.8	11.8	R	A	2.5	1	U	N	N	N	N	N	N	0	L	L	N	H	.
B9	13	147	53.1	11.6	R	B	2.3	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B9	14	148	53.5	9.6	R	A	0.5	2	U	N	N	N	N	N	N	0	L	N	N	H	.
B9	15	158	54.4	10.8	R	F	1.6	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B9	16	149	54.5	9.8	R	B	3.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B9	17	150	54.5	10.3	R	C	2.1	11	U	N	N	N	N	N	N	0	H	H	N	S	.
B9	18	151	54.5	9.6	R	D	3.1	1	L	N	N	N	N	N	N	0	N	N	N	I	.
B9	19	152	55.1	9.8	R	E	3.6	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B9	20	153	56.6	98.0	R	.	0.6	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B9	21	155	79.0	9.6	R	B	4.3	11	U	N	N	N	N	N	N	0	H	H	N	D	U
B9	22	154	79.3	8.8	R	A	4.1	11	U	N	N	N	N	N	N	0	H	H	N	D	U
B9	23	156	96.5	5.4	L	A	10.4	11	U	N	N	N	N	N	N	0	H	H	N	D	F
B9	24	157	97.3	5.4	L	B	13.0	11	U	N	N	N	N	N	N	0	H	H	N	D	F
B10	1	159	0.0	0.0	I	A	5.7	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B10	2	160	0.0	1.0	L	B	9.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	3	161	15.8	0.5	L	.	2.2	1	L	N	A	N	.	.	.	70	N	M	N	S	.
B10	4	162	21.1	5.9	L	.	4.5	2	U	N	N	N	N	N	N	0	L	L	N	H	.
B10	5	163	23.1	0.6	L	A	12.6	1	L	N	N	N	N	A	N	0	L	L	Y	I	.
B10	6	166	23.1	0.4	R	D	5.0	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B10	7	164	24.3	1.3	L	B	1.1	4	U	N	N	N	N	N	N	0	L	L	N	H	.
B10	8	165	24.3	0.6	L	C	7.9	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	9	167	25.7	2.5	R	A	0.4	3	U	N	N	N	N	N	N	0	N	M	N	H	.
B10	10	168	25.9	2.4	R	B	1.3	2	U	N	N	N	N	N	N	0	N	L	N	H	.
B10	11	169	26.3	2.7	R	C	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	12	170	30.5	4.6	R	.	12.3	1	L	N	N	N	I	N	N	0	N	N	Y	I	.
B10	13	171	31.5	6.9	R	.	4.4	1	L	A	N	N	N	N	N	40	N	L	N	I	.
B10	14	183	121.8	11.0	L	E	5.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	15	185	121.8	10.0	L	H	4.5	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B10	16	184	122.2	10.6	L	F	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	17	173	122.3	3.9	L	B	10.1	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B10	18	175	122.3	4.7	L	D	8.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	19	172	123.2	3.5	L	A	6.4	5	L	N	N	N	N	A	N	0	N	M	N	I	.
B10	20	174	123.4	5.0	L	C	3.0	4	L	I	N	N	N	N	N	0	N	L	N	I	.
B10	21	177	124.3	3.7	L	F	8.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	22	178	124.5	2.9	L	G	4.9	3	U	N	N	N	N	N	N	0	N	L	N	H	.
B10	23	176	125.3	3.8	L	E	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	24	179	125.6	8.0	L	A	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	25	181	126.6	6.9	L	C	9.2	6	L	A	N	N	A	N	N	100	N	L	N	S	.
B10	26	182	127.5	7.2	L	D	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B10	27	180	127.9	6.5	L	B	7.1	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B11	1	186	0.0	0.0	I	A	11.0	1	U	N	N	N	N	N	N	0	L	N	N	H	
B11	2	187	0.0	1.4	L	B	12.6	2	U	N	N	N	N	N	N	0	M	N	N	H	
B11	3	190	13.0	11.4	L	.	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	
B11	4	188	14.8	10.2	L	A	9.4	1	U	N	N	N	N	N	N	0	N	N	N	H	
B11	5	189	15.7	10.2	L	B	11.1	1	U	N	N	N	N	N	N	0	N	N	N	H	
B11	6	191	47.4	10.6	L	.	8.1	1	L	N	N	N	N	A	A	0	L	N	N	I	
B11	7	193	53.6	8.0	R	B	7.7	1	U	N	N	N	N	N	N	0	N	N	N	H	
B11	8	192	53.9	6.7	R	A	10.6	1	U	N	N	N	N	N	N	0	N	N	Y	H	
B11	9	194	63.5	12.0	L	.	6.0	4	U	N	N	N	N	N	N	0	L	M	N	H	
B12	1	195	0.0	0.0	I	.	11.4	4	U	N	N	N	N	N	N	0	M	M	Y	H	.
B12	2	196	30.8	16.0	R	.	4.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B12	3	197	39.2	0.0	I	A	10.6	11	U	N	N	N	N	N	N	0	N	N	N	D	F
B12	4	198	40.3	0.0	I	B	7.4	11	U	N	N	N	N	N	N	0	N	N	N	D	F
B12	5	199	45.5	4.7	L	A	2.5	11	U	N	N	N	N	N	N	0	M	L	N	D	U
B12	6	200	45.5	4.3	L	B	5.7	1	U	N	N	N	N	N	N	0	L	H	N	H	.
B12	7	201	74.2	9.3	R	.	8.7	11	U	N	N	N	N	N	N	0	N	N	N	D	F
B12	8	202	75.8	10.5	L	A	8.1	11	U	N	N	N	N	N	N	0	N	N	N	D	F
B12	9	203	76.5	10.5	L	B	9.5	11	U	N	N	N	N	N	N	0	N	N	N	D	F
B12	10	204	104.2	10.4	L	.	7.8	1	L	N	N	N	U	A	A	0	L	N	N	I	.
B12	11	205	106.5	15.0	R	A	10.2	11	U	N	N	N	N	N	N	0	H	H	N	D	F
B12	12	206	107.3	14.4	R	B	9.3	11	U	N	N	N	N	N	N	0	H	H	N	D	F
B12	13	207	111.5	12.6	R	.	8.5	11	U	N	N	N	N	N	N	0	H	H	N	D	F
B12	14	208	124.8	8.1	L	A	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B12	15	209	125.0	8.4	L	B	3.2	1	L	N	N	I	N	A	N	40	N	L	N	I	.
B12	16	210	129.3	7.1	L	.	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B12	17	211	134.4	12.9	L	.	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B12	18	212	140.3	9.3	L	A	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B12	19	213	140.6	10.1	L	B	0.5	1	U	N	N	N	N	N	N	0	N	M	N	H	.

Plot	No.	Tree Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B12	20	214	143.9	7.3	L	.	1.8	1	U	N	N	N	N	N	N	0	N	H	N	H	.
B13	1	220	0.0	0.0	I	F	5.1	2	L	N	N	U	N	N	D	0	L	N	Y	I	.
B13	2	221	0.0	8.2	L	.	3.7	11	.	.	.	.	.	.	.	.	L	N	N	D	U
B13	3	219	1.4	1.5	L	E	6.2	3	U	N	N	N	N	N	N	0	L	L	Y	H	.
B13	4	215	1.6	0.7	R	A	2.7	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B13	5	218	1.8	2.0	L	D	7.9	1	U	N	N	N	N	N	N	0	N	L	Y	H	.
B13	6	217	2.2	2.7	L	C	9.2	4	M	I	N	N	.	.	.	45	L	M	Y	S	.
B13	7	216	2.7	1.3	L	B	8.7	8	M	D	I	N	.	.	.	100	H	H	Y	S	.
B13	8	224	52.9	12.0	L	B	2.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	9	227	53.5	12.5	L	E	3.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	10	230	53.5	12.8	L	H	5.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	11	223	53.8	10.9	L	A	7.4	1	M	N	N	N	A	A	N	0	N	L	N	I	.
B13	12	226	53.8	12.2	L	D	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	13	228	53.8	12.9	L	F	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	14	225	54.1	12.6	L	C	3.5	1	L	N	N	N	N	N	D	0	N	L	N	I	.
B13	15	229	54.2	13.2	L	G	5.2	2	M	N	N	I	N	N	D	0	N	M	N	S	.
B13	16	231	73.2	14.8	R	A	4.0	2	U	N	N	N	N	N	N	0	N	L	N	H	.
B13	17	234	74.0	12.2	R	D	9.2	2	U	N	N	N	N	N	N	0	L	N	N	H	.
B13	18	232	74.3	14.5	R	B	12.0	2	U	N	N	N	N	N	N	0	N	N	Y	H	.
B13	19	233	74.3	13.1	R	C	12.7	2	M	N	N	N	A	A	A	0	M	N	Y	I	.
B13	20	235	74.7	13.2	R	E	8.8	1	M	.	.	A	.	.	A	20	L	N	N	I	.
B13	21	236	74.7	14.3	R	F	9.9	2	L	N	N	I	N	N	N	25	M	L	N	I	.
B13	22	240	102.2	15.0	R	A	5.2	1	M	N	N	N	A	N	A	0	N	L	N	I	.
B13	23	241	102.5	15.0	R	B	3.1	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	24	237	103.3	7.8	R	A	16.4	4	??	U	U	U	U	U	U	.	M	N	N	S	.
B13	25	242	104.4	14.9	R	C	3.5	2	U	N	N	N	N	N	N	0	N	L	N	H	.
B13	26	243	104.5	15.0	R	D	1.4	1	L	N	N	N	N	A	N	0	N	L	N	I	.
B13	27	238	105.1	7.1	R	B	1.8	10	U	N	N	N	N	N	N	0	H	M	N	S	.
B13	28	239	105.8	7.5	R	C	5.0	11	U	N	N	N	N	N	N	0	H	H	N	D	U
B13	29	244	114.1	7.2	R	.	6.3	1	L	N	N	N	N	D	N	0	N	N	N	I	.
B13	30	245	137.4	12.1	L	A	4.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	31	246	138.0	12.3	L	B	2.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	32	247	138.8	12.6	L	C	8.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	33	248	139.3	13.1	L	D	4.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B13	34	249	139.5	12.7	L	E	3.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B14	1	250	0.0	0.0	I	A	10.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B14	2	252	0.0	1.3	L	C	13.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B14	3	251	1.7	0.4	L	B	9.0	1	U	N	N	N	N	N	N	0	N	N	N	H	
B14	4	253	21.1	11.8	L	.	5.6	1	L	A	N	N	.	.	.	25	L	L	N	I	.
B14	5	254	29.6	1.5	L	A	1.5	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B14	6	255	30.3	2.6	L	B	2.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B14	7	256	31.0	2.1	L	C	9.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B14	8	260	31.3	8.5	L	D	4.2	1	L	N	N	A	.	.	.	100	N	N	N	S	.
B14	9	259	31.8	9.3	L	C	8.0	1	L	N	N	N	N	N	A	0	N	N	N	H	.
B14	10	258	32.3	9.1	L	B	8.9	2	L	N	N	N	N	N	A	0	L	N	N	H	.
B14	11	257	32.8	6.7	L	A	8.8	2	M	N	N	N	A	A	N	0	L	N	N	I	.
B14	12	262	90.8	14.1	L	B	14.9	2	M	N	A	N	.	.	.	80	M	M	Y	S	.
B14	13	261	91.3	12.7	L	A	10.7	2	M	A	N	N	.	.	.	100	M	L	Y	S	.
B14	14	263	92.3	14.9	L	C	11.2	1	M	N	A	N	N	A	N	75	N	N	Y	I	.
B14	15	264	93.5	14.5	L	D	8.3	2	M	A	N	N	.	.	.	100	M	M	Y	S	.
B14	16	267	104.3	14.5	L	B	6.3	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B14	17	268	104.3	15.0	L	C	5.5	1	L	N	N	N	A	N	N	0	L	N	N	I	.
B14	18	266	104.6	13.5	L	A	0.4	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B14	19	269	104.8	13.9	L	D	8.3	1	M	N	N	N	I	I	A	0	N	N	N	I	.
B14	20	270	104.9	14.8	L	E	2.1	2	U	N	N	N	N	N	N	0	N	L	N	H	.
B14	21	271	105.8	14.8	L	F	2.1	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B14	22	272	106.4	3.9	R	A	0.7	1	L	N	N	N	N	A	A	0	N	N	N	I	.
B14	23	273	106.8	4.3	R	B	3.2	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B15	1	274	0.0	1.3	R	A	1.2	1	U	N	N	N	N	N	N	0	L	L	N	H	.
B15	2	279	0.0	0.0	I	F	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B15	3	275	1.5	1.7	R	B	1.4	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B15	4	277	1.5	0.3	R	D	2.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B15	5	276	2.1	1.4	R	C	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B15	6	278	2.7	0.0	L	E	2.2	2	L	N	N	N	D	D	N	0	L	L	N	I	.
B15	7	280	5.8	0.8	R	A	3.6	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B15	8	281	6.2	0.8	R	B	2.9	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B15	9	282	87.7	14.0	L	.	5.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B15	10	283	108.5	14.0	R	A	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B15	11	284	108.5	13.0	R	B	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B15	12	285	108.8	13.0	R	C	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B16	1	286	0.0	0.0	I	A	4.1	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B16	2	287	0.0	0.6	L	B	4.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B16	3	288	3.8	14.7	L	A	1.0	1	L	N	N	N	I	N	A	0	N	N	N	I	.
B16	4	289	4.2	14.7	L	B	1.4	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B16	5	290	10.9	13.5	L	A	3.6	2	U	N	N	N	N	N	N	0	M	M	N	H	.
B16	6	291	11.3	13.5	L	B	2.3	9	M	N	I	N	.	.	.	100	H	H	N	S	.
B16	7	292	22.6	1.8	R	A	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B16	8	293	22.8	2.2	R	B	3.8	1	L	N	N	N	N	A	N	0	L	M	N	I	.
B16	9	297	52.9	5.0	R	D	0.5	1	U	N	N	N	N	N	N	0	L	L	N	H	.
B16	10	298	53.1	9.0	R	E	3.6	2	U	N	N	N	N	N	N	0	N	H	N	H	.
B16	11	295	53.3	5.6	R	B	0.7	1	L	N	N	N	A	N	N	0	N	N	N	I	.
B16	12	296	53.3	5.7	R	C	0.7	3	U	N	N	N	N	N	N	0	N	N	N	H	.
B16	13	299	53.6	5.3	R	F	2.7	1	L	N	N	N	A	N	N	0	N	N	N	I	.
B16	14	294	53.8	5.0	R	A	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B16	15	300	54.5	1.0	L	.	2.9	2	L	N	N	N	N	A	N	0	L	L	N	I	.
B16	16	301	69.6	9.9	L	.	6.4	1	L	N	A	N	.	.	.	40	N	N	N	I	.
B16	17	302	69.6	11.8	L	.	0.5	1	L	N	I	N	.	.	.	33	N	N	N	I	.
B16	18	303	120.6	4.6	L	A	1.1	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B16	19	304	124.6	5.0	L	B	1.0	3	U	N	N	N	N	N	N	0	L	N	N	H	.
B16	20	306	139.4	6.1	L	B	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B16	21	305	149.3	5.9	L	A	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B16	22	307	149.3	7.0	L	C	2.3	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B16	23	308	149.7	7.3	L	D	2.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B16	24	309	149.7	6.8	L	E	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B17	1	310	0.0	0.0	I	A	1.0	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B17	2	311	0.3	1.8	L	B	12.1	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B17	3	314	0.4	2.8	L	E	8.0	1	L	A	N	N	.	.	.	30	N	L	Y	I	.
B17	4	313	0.5	2.9	L	D	10.3	1	L	N	N	N	N	I	I	0	M	N	Y	I	.
B17	5	315	2.0	4.4	L	F	1.8	1	L	N	N	N	A	N	N	0	N	N	N	I	.
B17	6	312	2.1	2.3	L	C	11.5	1	L	N	N	N	N	A	A	0	N	N	Y	I	.
B17	7	316	43.6	7.5	R	A	6.0	2	L	N	N	N	A	N	N	0	N	N	N	I	.
B17	8	317	43.6	8.6	R	B	4.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B17	9	318	50.2	4.6	R	A	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B17	10	319	50.3	5.0	R	B	4.9	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B17	11	320	57.0	6.4	R	.	7.5	1	L	N	N	N	N	N	A	0	L	N	N	I	.
B17	12	322	82.0	6.6	L	.	5.3	1	L	N	N	N	N	A	N	0	N	L	N	I	.
B17	13	321	86.2	7.1	R	.	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B18	1	323	0.0	0.0	I	A	13.1	1	L	N	N	N	N	A	N	0	N	N	Y	I	.
B18	2	324	1.3	1.5	L	B	19.3	3	L	N	N	N	A	N	N	0	N	L	Y	I	.
B18	3	325	2.4	1.3	L	C	14.6	1	L	N	N	N	I	N	N	0	L	N	Y	I	.
B18	4	328	63.9	5.5	R	.	0.7	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B18	5	329	66.2	14.3	R	.	0.6	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B18	6	331	68.2	5.5	R	.	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B18	7	332	71.6	6.2	R	.	0.4	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B19	1	326	0.0	0.0	I	A	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	2	327	1.3	0.5	L	B	5.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	3	330	1.8	0.5	L	C	6.5	1	L	A	N	N	I	I	N	35	N	N	N	I	.
B19	4	333	3.1	1.3	R	A	1.9	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	5	336	3.3	1.9	R	D	5.3	1	L	N	N	N	N	N	A	0	N	L	N	I	.
B19	6	334	3.5	1.2	R	B	6.7	1	L	N	N	N	A	A	N	0	N	N	N	I	.
B19	7	335	3.7	1.8	R	C	3.3	2	L	N	N	N	N	A	N	0	N	N	N	I	.
B19	8	338	15.5	13.7	L	B	0.7	1	L	N	N	N	N	A	A	0	N	N	N	I	.
B19	9	337	15.8	13.5	L	A	2.4	1	L	N	N	N	N	A	A	0	N	N	N	I	.
B19	10	339	23.2	5.8	R	A	11.1	1	L	N	N	N	N	N	A	0	N	N	Y	I	.
B19	11	340	23.6	5.8	R	B	10.4	1	M	N	N	N	A	N	N	0	L	N	Y	I	.
B19	12	341	32.8	6.9	R	.	8.8	1	M	N	N	N	A	A	A	0	N	N	N	I	.
B19	13	342	33.8	8.1	R	.	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	14	343	37.5	3.8	R	.	2.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	15	344	39.2	1.2	R	A	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	16	345	39.3	1.5	R	B	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	17	346	42.5	5.2	R	.	9.7	1	M	N	N	N	A	A	A	0	L	N	Y	I	.
B19	18	347	43.8	9.8	R	.	4.0	8	U	N	N	N	N	N	N	0	N	N	N	S	.
B19	19	349	45.3	9.8	R	A	5.4	11	??	.	.	.	.	.	.	.	N	L	N	D	F
B19	20	350	50.3	9.8	R	B	6.2	11	??	.	.	.	.	.	.	.	N	N	N	D	F
B19	21	348	54.0	1.0	L	.	7.6	5	L	N	N	N	A	N	N	0	N	N	N	I	.
B19	22	351	64.3	11.4	R	A	2.6	11	??	.	.	.	.	.	.	.	L	N	N	D	F
B19	23	352	64.3	11.4	R	B	3.4	11	??	.	.	.	.	.	.	.	N	L	N	D	F
B19	24	353	64.3	11.4	R	C	3.1	11	??	.	.	.	.	.	.	.	N	L	N	D	F
B19	25	354	72.4	14.2	R	.	12.8	2	U	N	N	N	N	N	N	0	N	N	Y	H	.
B19	26	355	79.0	6.1	R	.	14.5	11	??	.	.	.	.	.	.	.	H	H	??	D	F
B19	27	356	123.5	9.2	L	.	5.4	1	L	N	N	N	A	N	N	0	N	N	N	I	.
B19	28	358	140.4	6.6	R	.	6.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B19	29	357	141.8	7.5	R	.	14.5	2	U	N	N	N	N	N	N	0	M	N	Y	H	.
B19	30	359	145.7	2.5	R	.	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	1	360	0.0	0.0	I	A	15.9	1	L	N	N	N	A	N	N	0	N	N	N	I	.
B20	2	362	0.6	2.6	R	C	10.9	1	M	N	N	N	A	N	N	0	N	N	N	I	.
B20	3	361	1.0	1.2	R	B	6.8	5	U	N	N	N	N	N	N	0	L	H	Y	H	.
B20	4	363	7.8	1.0	R	.	4.5	3	L	N	N	N	A	N	N	0	L	M	N	I	.
B20	5	364	10.3	7.5	R	.	11.6	11	U	U	U	U	U	U	U	0	H	H	N	D	F
B20	6	365	12.0	4.3	L	.	0.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	7	366	18.8	2.5	R	A	0.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	8	367	19.2	3.6	R	B	0.3	2	L	N	I	N	N	A	N	0	N	N	N	I	.
B20	9	368	19.3	4.0	R	C	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	10	370	21.4	5.9	L	.	5.3	1	M	N	N	N	N	A	N	0	N	N	N	H	.

Plot	No.	Tree Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B20	11	369	21.7	3.8	L	.	0.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	12	371	25.3	1.0	R	A	0.9	6	L	N	N	N	N	N	A	0	N	H	N	S	.
B20	13	372	25.3	1.0	R	B	2.3	1	L	N	A	N	.	.	.	80	L	M	N	I	.
B20	14	374	27.3	8.0	R	.	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	15	373	28.1	5.7	R	.	0.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	16	375	35.3	9.1	R	.	1.7	1	L	N	N	N	I	A	N	0	N	L	N	I	.
B20	17	376	36.6	7.6	R	.	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	18	377	38.5	4.9	L	A	8.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	19	378	38.5	5.4	L	B	6.3	11	??	U	U	U	U	U	U	0	H	H	N	D	U
B20	20	379	43.6	2.6	R	.	0.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	21	380	47.6	13.3	R	.	0.9	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B20	22	382	52.8	10.8	L	.	1.0	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B20	23	381	53.3	10.3	R	.	11.3	4	L	I	N	N	N	N	N	100	N	L	Y	S	.
B20	24	383	69.4	1.6	R	A	1.3	2	U	N	N	N	N	N	N	0	N	L	N	H	.
B20	25	384	69.8	1.6	R	B	0.5	10	U	N	N	N	N	N	N	0	N	L	N	H	.
B20	26	385	71.1	8.3	R	A	7.3	1	L	N	N	N	A	A	N	0	N	N	Y	I	.
B20	27	386	71.7	7.8	R	B	5.5	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B20	28	387	76.2	14.5	L	A	2.4	1	L	N	A	N	.	.	.	100	N	M	Y	S	.
B20	29	388	77.2	14.9	L	B	1.8	2	U	N	N	N	N	N	N	0	N	L	N	H	.
B20	30	389	77.5	14.5	L	C	0.9	11	??	U	U	U	U	U	U	??	H	H	N	D	U
B20	31	390	80.6	5.2	R	.	3.6	2	U	N	N	N	N	N	N	0	N	L	??	H	.
B20	32	391	84.3	4.4	R	.	0.5	9	U	N	N	N	N	N	N	0	M	M	N	H	.
B20	33	392	106.1	14.4	R	.	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	34	393	108.0	14.7	R	.	1.9	2	U	N	N	N	N	N	N	0	N	M	N	H	.
B20	35	394	111.9	6.2	R	A	1.6	2	U	N	N	N	N	N	N	0	N	M	N	H	.
B20	36	396	112.3	10.5	R	.	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B20	37	395	112.4	6.4	R	B	0.7	3	L	N	N	N	A	N	N	0	N	N	N	I	.
B20	38	397	135.8	5.6	R	.	3.9	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B20	39	398	136.3	9.2	R	.	1.8	1	L	N	N	N	I	A	N	0	N	L	N	I	.
B20	40	399	138.5	1.4	L	.	1.1	2	U	N	N	N	N	N	N	0	N	M	N	H	.
B20	41	400	146.3	5.6	R	.	1.2	2	L	N	N	N	A	N	N	0	N	N	Y	I	.
B21	1	265	0.0	0.0	I	A	2.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	2	403	1.2	0.4	R	D	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	3	401	1.4	2.6	R	B	7.1	1	L	N	N	I	N	N	D	50	N	M	Y	I	.
B21	4	402	1.4	2.0	R	C	7.1	5	L	N	I	A	N	N	A	60	L	H	Y	S	.
B21	5	404	2.1	1.3	R	E	1.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	6	409	35.3	13.2	R	A	6.2	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B21	7	410	35.7	13.1	R	B	8.0	1	L	N	N	N	A	N	N	0	N	N	Y	I	.
B21	8	405	35.9	7.8	R	A	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	9	406	36.3	7.9	R	B	11.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B21	10	407	36.5	7.6	R	C	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	11	411	36.8	13.3	R	C	4.0	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B21	12	408	36.9	7.5	R	D	3.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	13	412	50.2	3.1	R	A	3.1	1	L	U	N	N	N	A	N	0	N	N	N	I	.
B21	14	413	50.3	2.9	R	B	3.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	15	417	53.2	6.2	R	.	4.3	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	16	414	53.7	3.0	R	A	7.8	1	L	A	N	N	A	.	.	33	N	N	Y	I	.
B21	17	415	54.6	2.8	L	B	11.9	1	U	N	N	N	N	N	N	0	L	L	Y	I	.
B21	18	416	54.7	4.7	L	.	2.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B21	19	418	114.2	13.1	L	.	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B22	1	419	0.0	0.0	I	.	6.6	2	M	N	N	A	N	N	A	70	L	N	N	S	.
B22	2	420	95.5	4.4	L	A	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B22	3	421	95.1	4.2	L	B	1.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B22	4	422	106.2	1.0	R	.	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B23	1	424	117.5	1.9	L	B	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B23	2	423	117.7	1.7	L	A	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B23	3	425	142.4	2.6	L	A	2.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B23	4	426	142.6	2.0	L	B	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B23	5	427	143.1	2.3	L	C	3.4	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B23	6	428	150.0	0.0	L	.	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B24	1	429	0.0	0.0	I	A	2.9	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B24	2	432	0.7	0.6	L	D	5.1	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B24	3	430	1.0	0.3	R	B	5.2	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B24	4	433	1.2	0.9	L	E	3.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B24	5	434	1.6	0.5	L	F	3.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B24	6	431	1.7	0.6	R	C	4.4	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B25	1	435	0.0	0.0	I	A	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	
B25	2	438	0.0	10.7	L	.	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B25	3	436	0.8	0.2	L	B	1.0	11	.	.	.	.	.	.	.	.	H	H	N	D	U
B25	4	437	1.3	1.0	L	C	2.6	1	L	N	N	N	N	A	N	0	N	N	N	I	.
B25	5	439	17.1	12.0	L	.	0.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B25	6	440	26.3	3.7	L	A	2.7	1	L	A	N	A	N	N	N	15	L	N	N	I	.
B25	7	441	26.3	2.7	L	B	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B25	8	445	38.3	2.5	L	D	4.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B25	9	443	38.8	0.9	L	B	5.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B25	10	444	39.0	19.0	L	C	9.4	1	L	N	N	N	A	N	N	0	L	N	N	I	.
B25	11	442	39.7	1.0	L	A	4.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B25	12	446	50.5	9.4	L	.	2.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B25	13	447	55.9	12.8	L	.	9.7	2	L	U	U	U	I	U	U	0	M	N	Y	I	.
B25	14	448	72.2	11.2	L	.	8.6	11	.	.	.	.	.	.	.	.	H	H	??	D	U
B25	15	449	77.8	11.2	L	.	9.0	1	L	N	N	N	I	N	N	0	N	N	N	I	.
B25	16	450	97.8	7.3	L	.	14.0	3	L	N	N	N	I	A	N	0	L	M	Y	I	.
B25	17	451	149.0	11.8	L	.	2.8	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B26	1	454	0.4	1.4	L	C	11.4	1	L	N	N	N	N	I	N	0	N	N	Y	I	.
B26	2	453	1.3	0.5	L	B	7.5	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B26	3	457	1.3	1.7	L	E	2.4	11	.	.	.	.	.	.	.	.	H	H	Y	D	B
B26	4	459	1.8	1.4	L	G	11.9	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B26	5	456	2.0	0.5	L	D	7.0	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B26	6	452	2.2	0.0	I	A	3.7	4	U	N	N	N	N	N	N	0	M	N	Y	H	.
B26	7	458	2.4	2.6	L	F	3.4	1	L	N	N	N	N	A	N	0	N	N	Y	I	.
B26	8	460	7.8	12.9	R	.	5.1	1	L	N	N	N	N	A	N	0	N	N	N	I	.
B26	9	462	39.8	14.0	R	B	12.2	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B26	10	461	40.1	12.8	R	A	5.0	3	L	N	N	N	N	D	N	0	N	L	N	I	.
B26	11	463	48.1	3.6	L	.	6.1	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B26	12	464	49.5	7.4	L	.	4.2	3	L	N	N	N	N	N	A	0	N	L	N	I	.
B26	13	465	78.5	4.5	L	A	0.7	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B26	14	455	79.4	4.5	L	B	1.0	11	.	.	.	.	.	.	.	.	N	L	N	D	U
B26	15	466	109.1	12.4	L	A	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B26	16	467	109.6	12.9	L	B	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B26	17	468	123.2	0.3	R	.	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B26	18	469	124.8	8.5	L	A	2.8	1	L	N	N	N	I	N	N	0	N	N	N	I	.
B26	19	470	125.0	8.9	L	B	1.6	2	L	N	N	N	A	A	N	0	N	N	N	I	.
B26	20	471	125.0	8.7	L	C	1.2	1	L	N	N	N	N	D	N	0	N	N	N	I	.
B27	1	472	0.0	0.0	I	A	2.5	1	L	N	N	N	A	N	I	0	N	N	N	I	.
B27	2	473	0.0	0.3	L	B	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	3	474	0.6	0.5	L	C	3.1	1	L	N	N	N	N	N	A	0	N	L	N	I	.
B27	4	475	0.8	0.0	L	D	3.5	1	L	N	N	N	N	A	N	0	N	L	N	I	.
B27	5	476	1.5	0.3	L	E	5.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	6	477	7.4	1.7	R	.	5.2	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	7	478	19.3	5.4	L	.	3.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	8	479	40.3	12.4	R	.	3.0	1	L	N	N	N	N	A	N	0	N	L	N	I	.
B27	9	480	130.3	12.0	R	A	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	10	481	130.4	11.9	R	B	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	11	482	130.6	12.2	R	C	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	12	483	135.9	9.0	R	.	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	13	484	138.8	7.3	R	.	1.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	14	485	139.6	13.2	R	A	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	15	486	140.0	13.4	R	B	3.0	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	16	487	140.0	13.0	R	C	1.0	3	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	17	488	144.6	4.2	L	A	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	18	489	145.0	4.2	L	B	1.6	2	L	N	N	N	N	D	N	0	N	N	N	I	.
B27	19	490	145.1	3.8	L	C	2.3	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	20	491	145.9	1.7	R	.	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	21	493	149.1	4.7	L	B	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	22	492	149.3	4.9	L	A	1.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B27	23	494	149.3	4.7	L	C	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	1	496	0.0	0.0	I	B	10.1	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B28	2	495	0.2	1.5	R	A	12.2	2	M	N	N	N	I	A	N	0	M	N	Y	I	.
B28	3	497	1.3	0.0	I	C	10.7	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
B28	4	498	52.3	11.1	L	.	5.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	5	501	62.5	5.8	L	A	8.1	1	L	N	N	N	N	A	N	0	L	N	N	I	.
B28	6	502	62.8	6.6	L	B	8.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	7	499	62.9	6.9	L	A	3.5	1	U	N	N	N	N	N	N	0	N	N	N	I	.
B28	8	500	63.3	6.4	L	B	7.0	1	L	N	N	N	N	A	N	0	N	L	N	H	.
B28	9	503	64.2	11.4	L	C	8.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	10	504	80.3	10.6	R	A	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	11	505	80.6	10.7	R	B	4.3	1	L	N	N	N	A	A	N	0	L	N	N	I	.
B28	12	506	81.6	10.3	R	C	5.8	1	L	N	N	N	A	A	N	0	L	N	N	I	.
B28	13	507	81.6	11.1	R	D	5.6	1	L	N	N	N	N	A	I	0	L	N	N	I	.
B28	14	509	112.8	12.4	L	B	2.4	3	L	I	N	N	N	A	N	30	N	N	N	H	.
B28	15	510	112.8	14.1	L	C	6.4	2	M	N	N	N	I	A	A	0	L	N	N	I	.
B28	16	508	113.1	12.1	L	A	0.7	8	U	N	N	N	N	N	N	0	N	M	N	H	.
B28	17	511	114.2	13.3	L	D	13.0	2	M	N	N	N	A	A	N	0	L	N	Y	I	.
B28	18	512	122.7	3.0	L	.	2.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	19	513	135.2	4.8	L	A	5.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	20	514	135.2	4.2	L	B	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	21	515	136.2	4.2	L	C	4.2	1	M	N	N	N	N	A	N	0	N	N	N	I	.
B28	22	516	136.7	4.1	L	D	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	23	517	149.0	13.0	R	A	4.1	2	L	N	N	N	N	A	N	0	N	N	N	I	.
B28	24	518	149.8	14.1	R	B	5.9	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B28	25	519	150.4	14.1	R	C	6.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	1	520	0.0	0.0	I	A	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	2	522	0.1	0.5	L	B	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	3	521	0.4	0.3	R	C	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B29	4	540	2.3	10.6	L		0.8	1	L	N	U	N	N	N	A	0	N	N	N	I	.
B29	5	523	3.3	3.8	R	A	3.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	6	524	3.6	4.3	R	B	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	7	539	3.6	13.0	L	.	1.7	1	L	N	N	N	N	N	N	0	N	N	N	I	.
B29	8	527	4.6	9.8	R	A	0.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	9	528	4.6	9.6	R	B	1.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	10	525	5.4	5.1	R	A	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	11	526	5.7	4.8	R	B	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	12	529	7.3	9.8	R	A	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	13	530	8.0	9.4	R	B	2.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	14	537	8.0	10.4	L	.	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	15	531	8.3	9.9	R	C	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	16	538	8.3	12.6	L	.	0.7	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	17	532	8.6	9.7	R	D	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	18	533	9.4	0.2	L	.	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	19	534	9.5	4.0	L	.	8.2	2	U	N	N	N	N	N	N	0	L	L	N	H	.
B29	20	536	11.3	8.8	L	.	6.2	4	U	N	N	N	N	N	N	0	M	M	N	H	.
B29	21	535	13.8	2.1	L	.	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	22	541	17.0	2.7	R	A	6.0	11	??	.	.	.	.	.	.	.	M	Y	Y	D	B
B29	23	542	17.0	0.9	R	B	6.3	11	??	.	.	.	.	.	.	.	M	M	Y	D	B
B29	24	543	17.3	2.1	L	A	10.0	11	??	.	.	.	.	.	.	.	M	N	Y	D	U
B29	25	544	17.7	2.2	L	B	5.3	11	??	.	.	.	.	.	.	.	N	L	Y	D	U
B29	26	545	26.6	5.5	L		8.4	2	L	N	N	I	N	N	I	60	N	M	Y	I	.
B29	27	546	29.7	5.3	L	.	2.0	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B29	28	547	30.3	4.9	L	A	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	29	548	30.4	4.3	L	B	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	30	549	36.2	9.7	L	A	0.9	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	31	551	36.5	10.2	L	C	8.2	2	L	N	N	I	N	N	I	10	L	N	Y	I	.
B29	32	552	36.8	10.1	L	D	5.5	3	M	N	A	N	A	A	A	70	M	M	Y	S	.
B29	33	550	37.5	10.2	L	B	0.6	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B29	34	553	37.6	10.8	L	E	1.1	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B29	35	554	38.2	10.2	L	F	2.6	3	L	I	N	N	N	N	N	100	N	L	N	I	.
B29	36	555	38.7	9.5	L	G	0.8	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	37	556	47.3	4.9	L	.	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	38	557	51.9	14.3	R	.	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	39	584	56.3	12.0	R	.	0.7	6	U	N	N	N	N	N	N	0	L	L	N	H	.
B29	40	558	59.2	11.0	R	.	0.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	41	565	61.6	14.3	L	.	0.4	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B29	42	560	65.3	5.8	L	A	8.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	43	559	65.8	3.8	L	.	6.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	44	561	66.1	6.2	L	B	8.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	45	562	66.6	7.0	L	C	8.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	46	563	66.6	5.8	L	D	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	47	564	67.4	11.0	R	.	1.6	2	U	N	N	N	N	N	N	0	M	H	N	H	.
B29	48	566	75.4	8.1	L	A	3.9	8	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	49	567	75.8	8.6	L	B	7.4	1	U	N	N	N	N	N	N	0	N	L	N	H	.
B29	50	568	76.5	9.4	L	C	2.5	5	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	51	569	105.2	13.6	R	.	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	52	570	119.8	10.2	R	.	6.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	53	571	125.7	4.7	R	A	5.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	54	573	126.1	4.9	R	C	5.8	2	L	N	N	N	I	N	D	0	N	L	N	I	.
B29	55	572	126.3	3.9	R	B	3.0	11	M	D	D	D	N	N	N	100	N	H	N	D	R
B29	56	574	129.4	15.0	L	A	6.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	57	575	130.7	14.6	L	B	9.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	58	576	136.5	10.6	L	.	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	59	579	140.0	2.7	R	A	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	60	580	140.3	2.7	R	B	1.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	61	577	141.6	5.9	L	A	0.8	1	L	I	N	N	N	N	N	100	N	N	N	I	.
B29	62	578	141.9	5.6	L	B	4.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	63	581	144.4	6.0	R	.	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	64	582	149.8	4.9	R	A	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B29	65	583	149.9	5.1	R	B	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	1	585	0.0	0.0	I	.	11.5	2	M	N	N	N	N	A	N	0	L	N	N	I	.
B30	2	586	0.6	8.1	R	.	1.9	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	3	587	9.8	8.4	R	.	5.2	1	L	N	N	N	N	A	N	0	N	N	N	I	.
B30	4	588	10.4	3.6	L	.	3.0	1	L	N	N	N	N	A	N	0	N	N	N	I	.
B30	5	589	10.7	7.0	L	A	2.3	1	L	N	N	N	D	N	N	0	N	N	N	I	.
B30	6	590	10.8	7.7	L	B	0.5	3	U	N	N	N	N	N	N	0	N	M	N	H	.
B30	7	593	16.8	7.4	R	A	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	8	594	17.1	7.8	R	B	1.0	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	9	591	17.2	12.3	L	.	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	10	592	19.0	8.4	L	.	0.7	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	11	595	23.3	1.2	R	.	2.3	1	U	N	N	N	N	N	N	0	N	M	N	H	.
B30	12	596	26.5	8.4	R	A	2.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	13	597	26.9	8.6	R	B	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	14	598	34.8	14.3	R	.	1.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	15	599	39.3	2.8	L	.	3.4	2	U	N	N	N	N	N	N	0	L	L	N	H	.

Plot	Tree No.	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
B30	16	600	41.1	6.1	L	.	1.7	2	L	N	N	N	N	I	N	0	L	L	N	I	.
B30	17	608	42.3	4.7	L	B	1.8	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	18	607	42.4	5.0	L	A	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	19	609	43.6	1.2	L	A	2.5	1	L	N	N	N	N	I	N	0	N	N	N	I	.
B30	20	601	43.7	8.9	L	A	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	21	610	43.7	0.7	L	B	3.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	22	602	43.8	9.2	L	B	0.7	1	U	N	N	N	N	N	N	0	L	N	N	H	.
B30	23	603	43.9	9.5	L	C	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	24	605	43.9	8.9	L	E	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	25	606	44.0	6.5	L	.	2.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	26	604	44.5	9.0	L	D	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	27	612	46.8	10.9	L	B	0.9	3	U	N	N	N	N	N	N	0	L	L	N	H	.
B30	28	611	47.1	10.3	L	A	2.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	29	613	55.7	7.2	R	A	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	30	616	56.3	6.4	R	D	3.4	1	M	N	A	N	.	.	.	100	L	L	N	S	.
B30	31	614	56.8	7.2	R	B	5.3	4	M	N	A	A	.	.	.	80	M	H	N	S	.
B30	32	615	56.9	6.4	R	C	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	33	618	58.8	11.8	L	.	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	34	619	59.8	12.3	L	.	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	35	617	61.0	10.5	L	.	1.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	36	620	82.8	6.8	R	.	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	37	634	87.3	1.0	L	.	2.4	1	L	N	N	N	N	N	A	0	N	N	N	I	.
B30	38	621	95.9	2.7	L	.	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	39	622	97.1	11.8	L	.	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	40	623	106.1	4.3	L	A	0.8	3	U	N	N	N	N	N	N	0	N	L	N	H	.
B30	41	624	106.2	4.6	L	B	2.0	2	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	42	625	106.3	5.0	L	C	2.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	43	626	106.6	4.5	L	D	3.6	3	U	N	N	N	N	N	N	0	N	L	N	H	.
B30	44	627	107.1	4.5	L	E	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	45	628	114.0	9.8	L	A	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	46	629	114.0	10.3	L	B	2.7	1	L	N	N	N	I	N	N	0	N	N	N	I	.
B30	47	631	114.3	9.9	L	D	5.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	48	630	114.5	10.7	L	C	1.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	49	632	127.3	5.2	L	.	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
B30	50	633	129.0	1.0	L	.	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L1	1	635	0.0	0.0	I	A	4.7	1	L	N	N	N	A	N	N	0	N	L	Y	S	.
L1	2	637	1.2	0.5	R	C	7.2	11	L	N	N	N	D	N	N	0	N	L	Y	D	B
L1	3	638	1.8	2.0	R	D	4.9	11	?	.	.	.	.	.	.	0	H	H	Y	D	B
L1	4	639	2.3	6.3	R	.	2.4	5	U	N	N	N	N	N	N	0	L	H	N	H	.
L1	5	636	5.0	1.3	R	B	5.2	11	L	N	N	N	D	N	N	0	N	M	Y	D	B
L1	6	640	6.6	1.4	R	.	4.0	2	L	N	N	N	I	I	N	0	N	N	N	I	.
L1	7	641	17.5	3.7	R	A	6.1	11	M	D	N	N	D	.	.	90	N	L	Y	D	B
L1	8	642	17.5	7.9	R	B	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L1	9	643	23.6	5.8	L	A	7.2	6	L	I	N	N	N	N	N	100	M	L	N	I	.
L1	10	644	24.3	6.0	L	B	7.5	2	L	N	N	N	I	N	I	0	L	L	N	I	.
L1	11	645	28.9	6.7	L	.	5.5	3	M	I	N	N	.	.	.	100	N	M	N	I	.
L1	12	646	31.3	2.2	L	.	6.0	1	M	N	N	N	A	I	N	0	N	N	N	I	.
L1	13	647	38.6	9.5	R	.	0.0	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L1	14	648	43.5	2.8	R	A	3.1	2	L	N	N	N	A	I	N	0	N	N	N	I	.
L1	15	649	44.2	2.3	R	B	1.4	10	L	N	N	N	D	N	N	0	N	N	N	S	.
L1	16	650	50.1	2.4	R	.	1.1	8	L	N	I	N	.	.	.	100	N	M	N	S	.
L1	17	651	54.3	0.9	R	.	3.0	4	L	N	N	N	N	N	A	0	N	N	N	I	.
L1	18	652	59.3	5.9	L	A	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L1	19	653	59.6	6.1	L	B	0.8	2	L	N	N	N	N	D	D	0	N	N	N	I	.
L1	20	654	76.2	1.7	R	.	1.0	8	L	N	N	N	N	D	D	0	N	L	N	I	.
L1	21	656	86.3	2.8	L	A	2.2	2	L	I	N	N	.	.	.	100	N	L	N	I	.
L1	22	655	96.0	4.0	L	.	6.3	1	M	N	N	N	I	A	N	0	L	N	N	I	.
L1	23	657	96.9	2.7	L	B	2.8	3	M	N	N	N	I	I	N	0	N	N	N	I	.
L1	24	658	103.5	0.2	R	.	2.2	6	L	D	N	N	N	N	N	100	N	L	N	I	.
L1	25	660	111.1	9.6	L	.	8.5	2	L	N	N	N	I	I	N	0	L	L	N	I	.
L1	26	659	111.6	4.2	L	.	7.1	1	L	N	N	N	I	N	N	0	N	N	N	I	.
L1	27	661	113.5	4.7	R	.	5.2	1	L	N	N	N	N	D	N	0	N	N	Y	I	.
L1	28	662	120.0	11.2	R	.	8.5	1	L	N	N	N	D	N	N	0	L	N	N	I	.
L1	29	667	123.1	11.0	L	A	7.0	1	M	N	N	N	N	I	I	0	M	N	N	I	.
L1	30	668	124.1	10.8	L	B	1.8	6	L	N	D	N	N	N	D	100	M	L	N	I	.
L1	31	663	127.7	1.7	R	A	2.1	5	L	N	N	N	I	N	N	0	L	N	N	I	.
L1	32	664	128.2	1.7	R	B	3.1	5	L	N	N	N	A	I	N	0	N	N	N	I	.
L1	33	665	128.7	4.3	L	A	3.2	11	L	D	N	N	.	.	.	100	N	L	Y	D	B
L1	34	666	128.8	3.6	L	B	4.6	11	L	D	N	N	.	.	.	100	N	M	Y	D	B
L2	1	669	0.0	0.0	I	.	3.6	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L2	2	670	5.3	14.6	L	.	3.5	1	L	N	N	N	N	N	A	0	N	N	N	I	.
L2	3	671	86.7	10.9	R	A	1.8	1	L	N	I	N	A	N	N	25	N	L	N	I	.
L2	4	672	87.0	10.4	R	B	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L2	5	673	89.3	9.8	R	A	0.8	1	L	N	N	D	U	N	N	50	N	N	N	I	.
L2	6	674	89.3	9.8	R	B	1.7	8	L	I	N	N	.	.	.	100	N	N	N	I	.
L2	7	675	141.4	8.9	L	.	7.2	1	M	N	N	N	I	I	N	0	L	N	Y	I	.
L3	1	676	0.0	0.0	I	A	1.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
L3	2	677	0.5	0.0	I	B	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L3	3	678	0.9	0.4	R	C	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L3	4	679	6.3	1.3	L	A	1.7	9	M	N	N	A	.	.	.	100	H	H	N	S	.
L3	5	680	6.3	1.6	L	B	1.5	1	L	A	N	N	.	.	A	50	N	N	N	I	.
L3	6	682	32.0	10.0	L	A	3.5	2	M	N	N	N	A	A	A	0	L	N	N	S	.
L3	7	683	32.4	9.8	L	B	3.0	5	M	N	I	N	N	N	N	100	N	N	N	S	.
L3	8	684	32.6	9.6	L	C	3.2	7	H	I	I	I	I	I	I	100	N	N	N	S	.
L3	9	685	88.0	5.8	R	.	9.1	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
L3	10	687	111.3	12.6	L	.	3.9	1	L	N	N	N	N	A	A	0	N	N	N	I	.
L3	11	686	111.8	10.4	L	.	1.7	11	L	N	N	D	.	.	.	100	N	M	N	D	R
L3	12	688	126.4	7.7	L	.	3.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L4	1	681	0.0	0.0	I	A	3.7	1	U	N	N	N	N	N	N	0	N	N	N	U	.
L4	2	689	0.6	0.2	L	B	3.7	2	U	N	N	N	N	N	N	0	L	L	N	U	.
L4	3	690	1.3	0.4	L	C	4.3	1	U	N	N	N	N	N	N	0	N	N	N	U	.
L4	4	691	10.8	1.1	L	A	4.6	11	M	N	D	D	.	.	.	100	L	M	N	R	R
L4	5	692	11.6	1.5	L	B	3.8	9	M	D	I	I	.	.	.	100	H	H	N	S	.
L4	6	693	82.3	11.8	R	A	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L4	7	694	83.3	12.5	R	B	2.5	1	L	N	N	N	N	D	D	0	N	N	N	I	.
L4	8	695	83.4	11.7	R	C	5.4	9	M	I	N	N	.	.	.	100	H	H	N	S	.
L4	9	696	83.8	12.7	R	D	2.5	9	M	N	N	I	.	.	.	100	N	N	N	I	.
L4	10	698	84.9	2.0	L	A	7.7	3	M	N	I	A	.	.	.	60	H	H	N	S	.
L4	11	697	85.1	11.5	R	E	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L4	12	699	86.6	3.7	L	B	8.2	7	M	N	I	N	.	I	I	100	H	H	N	S	.
L4	13	701	108.3	8.0	L	A	2.0	2	U	N	N	N	N	N	N	0	N	N	N	S	.
L4	14	700	108.7	1.7	L	.	3.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L4	15	702	109.7	8.5	L	B	6.6	11	M	N	D	N	D	D	D	100	N	L	N	D	R
L4	16	703	109.9	9.8	L	C	9.3	11	H	D	D	D	.	.	.	100	M	M	N	D	R
L4	17	706	110.4	6.2	R	B	4.0	11	M	N	N	D	.	.	.	100	M	H	N	D	R
L4	18	704	110.6	10.6	L	D	8.4	11	M	D	D	D	.	.	.	100	M	M	N	D	R
L4	19	705	110.9	5.7	R	A	3.2	11	M	N	N	D	.	.	.	100	N	H	N	D	R
L4	20	707	111.3	6.3	R	C	4.5	1	L	N	N	N	N	A	A	0	L	N	N	I	.
L5	1	708	0.0	0.0	I	A	9.2	11	M	D	D	D	.	.	.	100	M	L	Y	R	R
L5	2	709	0.7	0.7	L	B	3.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	3	710	4.2	14.8	L	A	1.7	1	L	N	N	N	N	N	D	0	N	L	N	I	.
L5	4	711	4.7	14.9	L	B	3.0	1	L	N	N	N	N	D	N	0	L	L	N	I	.
L5	5	712	4.8	14.5	L	C	2.6	1	L	N	N	I	.	.	.	25	L	N	N	I	.
L5	6	713	5.4	14.8	L	D	0.9	1	L	I	N	N	.	.	.	15	N	N	N	I	.
L5	7	714	5.7	15.0	L	E	1.5	1	U	N	N	N	N	N	N	0	N	L	N	I	.
L5	8	715	19.3	13.8	L	A	2.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	9	716	20.1	13.8	L	B	2.5	2	U	N	N	N	N	N	N	0	N	L	N	H	.
L5	10	717	20.5	13.4	L	C	3.2	6	M	N	A	N	.	.	.	100	H	H	N	H	.
L5	11	718	31.0	9.8	R	.	3.0	1	L	N	N	N	N	D	N	0	N	N	N	S	.
L5	12	719	59.1	7.4	L	.	1.8	1	L	N	N	I	.	.	A	80	N	N	N	I	.
L5	13	720	63.4	9.0	L	A	3.4	1	L	N	N	D	.	.	D	33	N	N	N	I	.
L5	14	721	64.1	9.0	L	B	3.9	1	L	N	N	N	N	I	N	0	N	N	N	I	.
L5	15	722	66.3	93.0	L	C	3.5	1	L	N	I	N	N	I	N	20	N	M	N	I	.
L5	16	723	79.4	4.4	R	A	2.5	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	17	724	79.9	4.5	R	B	3.6	3	L	N	N	N	I	N	N	0	N	L	N	I	.
L5	18	725	80.1	3.9	R	C	3.5	11	L	D	N	N	N	N	N	0	N	L	N	D	R
L5	19	726	98.5	9.3	L	A	2.2	2	U	N	N	N	N	N	N	0	N	L	N	H	.
L5	20	727	98.5	9.0	L	B	4.0	9	M	N	N	I	.	.	.	100	N	H	N	S	.
L5	21	731	99.1	9.8	L	F	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	22	728	99.2	8.6	L	C	3.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	23	732	99.3	9.1	L	G	2.8	1	L	N	N	N	N	N	D	0	N	N	N	I	.
L5	24	730	99.8	9.2	L	E	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	25	729	100.0	8.6	L	D	2.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	26	735	113.2	7.0	R	C	0.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	27	733	113.3	6.5	R	A	4.9	8	H	N	A	N	.	.	.	100	H	H	N	S	.
L5	28	734	114.3	6.2	R	B	8.3	1	L	N	N	N	N	I	A	0	N	N	N	I	.
L5	29	736	128.0	6.8	L	.	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	30	737	133.1	3.8	R	A	5.7	1	L	N	N	N	N	A	A	0	L	N	N	I	.
L5	31	738	133.5	3.1	R	B	2.6	5	L	N	A	N	.	.	.	100	L	H	N	S	.
L5	32	739	137.3	2.4	L	.	4.9	1	M	N	N	N	N	I	A	100	N	N	N	I	.
L5	33	740	139.8	14.3	R	A	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	34	741	140.3	13.8	R	B	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	35	743	140.8	14.6	R	D	2.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L5	36	742	141.1	13.6	R	C	2.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	1	744	0.0	0.0	.	A	3.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	2	745	1.3	0.0	.	B	4.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	3	749	1.4	10.3	L	A	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	4	750	1.8	10.4	L	B	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	5	746	3.9	1.8	L	A	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	6	747	4.2	2.0	L	B	1.9	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L6	7	748	4.4	2.2	L	C	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	8	751	10.9	0.4	R	A	2.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	9	753	11.6	0.8	L	C	5.0	8	M	D	I	N	.	.	.	100	M	M	N	S	.
L6	10	752	11.8	1.0	L	B	3.9	2	L	N	N	N	I	I	N	0	L	N	N	I	.

Plot	No.	TreeTag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
L6	11	754	16.5	4.2	L	A	5.7	3	L	N	N	N	N	A	N	0	N	N	N	I	.
L6	12	756	16.8	1.2	L	.	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	13	755	17.7	4.5	L	B	1.3	10	L	N	D	A	.	.	.	80	M	H	N	S	.
L6	14	757	22.8	3.2	R	A	2.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	15	758	23.3	3.3	R	B	1.7	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	16	759	23.8	2.0	R	C	8.9	1	M	N	N	N	A	I	I	.	N	N	N	I	.
L6	17	760	29.3	3.2	L	A	4.9	10	L	N	I	N	.	.	.	100	L	H	N	S	.
L6	18	761	29.5	3.7	L	B	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	19	762	29.8	3.3	L	C	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	20	763	29.8	2.8	L	D	3.7	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L6	21	764	39.4	5.0	R	A	10.7	2	M	N	I	N	N	N	N	50	L	N	N	I	.
L6	22	765	40.7	4.7	R	B	7.8	2	L	I	N	N	.	.	.	20	L	L	N	I	.
L6	23	767	42.0	0.3	L		4.5	1	L	N	N	N	N	I	N	0	N	N	N	I	.
L6	24	766	42.6	4.7	R	C	6.6	1	L	N	N	N	I	I	N	0	L	N	N	I	.
L6	25	768	49.5	2.4	L	.	3.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	26	769	55.6	1.1	L		2.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	27	55.6	57.2	6.1	L	A	5.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	28	771	57.8	6.5	L	B	6.0	8	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	29	772	65.9	8.6	R	.	7.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	30	778	69.7	2.6	L	A	1.1	11	L	N	N	D	.	.	.	100	N	M	N	D	R
L6	31	779	71.6	3.4	L	B	5.8	8	L	N	A	N	.	.	.	100	N	M	N	S	.
L6	32	773	71.7	6.7	R	A	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	33	774	72.0	6.8	R	B	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	34	775	72.3	6.7	R	C	3.0	3	L	N	N	N	D	N	N	0	L	N	N	I	.
L6	35	776	72.6	6.7	R	D	3.1	6	L	N	N	A	.	.	.	100	L	N	N	S	.
L6	36	777	72.6	6.2	R	E	5.6	3	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	37	780	76.3	1.0	R	.	3.7	11	L	N	N	D	.	.	.	100	M	M	N	D	R
L6	38	781	98.6	11.1	R	A	2.3	9	M	N	N	I	.	.	.	100	L	M	N	S	.
L6	39	782	99.7	10.4	R	B	3.7	6	M	N	N	I	.	.	.	100	M	H	Y	S	.
L6	40	784	100.1	11.5	R	D	4.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	41	783	100.2	10.6	R	C	4.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	42	785	108.7	7.9	L	.	6.1	1	L	N	I	A	.	.	A	65	L	N	N	I	.
L6	43	787	119.8	13.8	L	B	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	44	786	119.9	13.2	L	A	1.2	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	45	788	120.3	13.8	L	C	3.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	46	789	120.9	14.0	L	D	4.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	47	795	123.2	6.8	R	A	5.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	48	796	123.4	8.2	R	B	5.9	11	L	N	N	I	.	.	.	100	H	H	N	S	.
L6	49	790	123.5	4.3	L	A	1.3	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L6	50	797	124.2	8.2	R	C	6.1	5	U	N	N	N	N	N	N	0	N	N	N	S	.
L6	51	792	124.3	3.3	L	C	0.7	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L6	52	791	124.4	5.2	L	B	3.5	2	U	N	N	N	N	N	N	0	L	N	N	H	.
L6	53	793	125.3	3.6	R	A	4.5	3	L	N	A	N	.	.	.	100	N	M	N	S	.
L6	54	794	125.8	3.7	R	B	7.2	1	L	N	N	N	I	I	N	0	L	N	N	I	.
L6	55	799	133.9	5.8	R	A	3.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	56	798	134.0	0.2	L	.	3.7	6	M	N	I	N	.	.	.	100	L	M	N	S	.
L6	57	800	134.5	5.2	R	B	6.8	2	M	N	I	N	.	.	.	100	N	M	N	S	.
L6	58	801	135.0	4.7	R	C	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	59	802	135.6	6.1	R	D	4.5	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L6	60	803	135.6	5.3	R	E	1.2	5	L	A	N	N	.	.	.	100	N	M	N	I	.
L6	61	806	135.9	4.3	R	H	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	62	804	136.0	5.5	R	F	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	63	805	136.3	4.9	R	G	6.1	4	L	N	I	N	.	.	.	100	L	M	N	S	.
L6	64	809	136.3	5.6	R	K	3.0	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	65	807	136.4	4.3	R	I	2.4	1	L	N	N	N	A	N	N	0	N	N	N	I	.
L6	66	808	136.6	4.9	R	J	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	67	810	136.8	5.9	R	L	7.2	2	M	N	N	I	I	I	I	25	N	N	N	I	.
L6	68	811	139.1	1.7	R	A	3.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	69	812	139.4	1.0	R	B	4.7	8	M	I	I	I	.	.	.	100	M	H	N	S	.
L6	70	813	142.8	12.9	L	A	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	71	814	143.0	12.9	L	B	1.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	72	815	143.4	13.0	L	C	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	73	816	143.8	12.8	L	D	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L6	74	817	148.5	5.4	L	A	1.9	1	U	N	N	N	N	N	N	0	L	N	N	I	.
L6	75	818	148.6	5.0	L	B	7.3	3	M	N	N	A	.	.	.	100	N	M	Y	S	.
L6	76	819	148.6	5.7	L	C	1.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	1	820	0.0	0.0	I	.	3.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	2	822	6.5	9.8	R	B	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	3	821	6.9	8.7	R	A	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	4	823	6.9	9.2	R	C	3.2	11	L	N	N	D	.	.	.	100	L	L	N	D	R
L7	5	824	7.4	8.4	R	D	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	6	825	11.0	10.0	R	A	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	7	826	11.3	10.0	R	B	2.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	8	827	19.5	10.4	R	A	6.0	1	L	N	A	N	.	.	.	33	N	N	N	I	.
L7	9	828	20.3	10.0	R	B	3.1	11	??	.	.	.	.	.	.	0	N	N	N	D	U
L7	10	830	21.3	1.7	R	B	2.8	1	L	N	N	N	N	D	N	0	N	N	N	I	.
L7	11	829	21.6	1.4	R	A	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.

Plot	No.	TreeTag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
L7	12	831	21.9	2.0	R	C	6.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	13	833	22.0	3.9	L	.	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	14	832	22.3	2.3	R	D	2.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	15	834	28.0	14.5	L	A	3.2	1	U	N	N	N	N	N	N	0	L	N	N	H	.
L7	16	835	28.4	14.6	L	B	3.5	5	L	I	I	N	.	.	.	100	M	M	N	I	.
L7	17	836	29.1	15.0	L	C	10.4	1	L	N	N	N	A	N	N	0	N	N	N	I	.
L7	18	837	38.3	3.8	R	.	3.5	8	L	I	I	N	.	.	.	100	N	M	N	I	.
L7	19	838	78.8	3.3	L	.	5.4	1	L	N	N	N	N	N	I	0	N	N	N	I	.
L7	20	839	83.2	1.2	L	.	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	21	840	85.1	2.5	R	.	1.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	22	841	95.5	2.3	R	A	0.9	7	L	N	N	A	.	.	.	100	M	M	N	S	.
L7	23	842	95.8	2.3	R	B	4.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	24	843	97.5	2.6	R	C	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	25	844	97.6	2.4	R	D	2.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	26	845	103.1	2.0	R	.	4.0	5	L	N	I	N	.	.	.	100	N	.	N	S	.
L7	27	846	113.3	4.8	R	A	4.7	4	L	N	I	N	.	.	.	100	N	.	N	S	.
L7	28	847	113.8	5.0	R	B	4.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	29	848	119.8	4.9	R	A	1.4	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L7	30	849	120.0	5.2	R	B	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L7	31	850	120.3	5.0	R	C	3.4	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L7	32	851	146.2	4.0	R	A	6.3	1	M	N	N	A	I	A	.	15	L	N	N	S	.
L7	33	852	147.6	4.2	R	B	3.5	1	M	N	N	A	.	.	.	65	N	L	N	S	.
L8	1	853	0.0	1.2	L	A	10.4	2	L	N	I	N	N	I	N	30	L	N	N	I	.
L8	2	854	0.0	0.0	I	B	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	3	855	0.0	13.2	L	A	5.6	4	L	I	I	N	.	.	.	100	M	M	N	S	.
L8	4	856	0.1	14.9	L	B	3.6	2	L	N	I	N	.	.	.	75	M	N	N	S	.
L8	5	858	11.8	13.6	L	B	2.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	6	857	12.1	12.9	L	A	6.7	1	L	N	N	N	N	I	I	0	L	N	N	I	.
L8	7	859	22.6	10.9	L	.	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	8	860	25.6	1.5	R	.	1.8	1	U	N	N	N	N	N	N	0	N	L	N	H	.
L8	9	861	29.3	12.8	R	.	8.0	3	M	N	I	N	.	.	.	80	L	M	Y	S	.
L8	10	862	30.0	12.5	R	A	5.9	2	L	N	N	N	I	N	N	0	L	N	N	I	.
L8	11	863	30.3	12.1	R	B	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	12	864	31.8	15.8	R	A	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	13	865	31.8	15.0	R	B	0.9	1	L	N	N	N	I	N	N	0	N	N	N	I	.
L8	14	866	32.3	15.3	R	C	1.0	8	L	N	N	I	.	.	.	100	N	L	N	S	.
L8	15	867	33.1	11.5	R	.	2.9	3	M	N	A	A	.	.	.	100	L	M	N	S	.
L8	16	871	50.5	10.4	R	D	1.6	1	L	N	N	N	A	N	N	0	N	L	N	I	.
L8	17	868	50.7	9.4	R	A	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	18	872	50.8	11.1	R	E	3.3	2	L	N	N	N	D	I	N	0	N	L	N	I	.
L8	19	870	51.1	10.7	R	C	2.1	2	U	N	N	N	N	N	N	0	N	L	N	H	.
L8	20	869	51.3	10.2	R	B	2.5	3	L	I	I	N	.	.	A	66	N	N	N	S	.
L8	21	873	61.8	10.7	R	A	2.3	9	L	N	N	A	.	.	.	100	N	M	N	S	.
L8	22	874	62.3	10.4	R	B	2.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	23	875	62.8	10.8	R	C	4.8	3	M	N	N	A	.	.	.	70	L	L	N	S	.
L8	24	876	69.0	13.0	R	A	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	25	877	69.0	12.7	R	B	1.4	1	L	A	N	N	.	.	.	100	N	N	N	I	.
L8	26	882	73.0	12.3	R	E	3.8	5	L	N	I	N	.	.	.	100	L	M	N	I	.
L8	27	878	73.3	11.2	R	A	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	28	880	73.4	11.6	R	C	6.7	6	M	I	N	I	.	.	.	100	L	M	N	S	.
L8	29	881	73.4	12.1	R	D	5.1	3	L	N	A	N	.	.	.	90	L	L	N	S	.
L8	30	879	73.7	11.1	R	B	1.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	31	883	80.8	4.4	L	A	1.6	1	L	N	N	A	.	.	.	40	N	N	N	I	.
L8	32	884	81.3	4.1	L	B	2.5	1	L	N	N	A	.	.	.	20	L	N	N	I	.
L8	33	885	81.7	3.9	L	C	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	34	886	94.1	2.4	L	A	6.4	2	M	N	A	N	.	I	I	65	L	M	N	S	.
L8	35	887	94.8	2.5	L	B	5.2	8	M	N	A	N	.	.	.	100	M	H	N	S	.
L8	36	888	101.7	6.1	R	A	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	37	889	102.0	5.1	R	B	3.6	2	L	N	I	N	.	.	.	25	N	N	N	I	.
L8	38	891	107.5	2.7	R	.	2.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L8	39	890	108.3	9.5	R	.	3.4	2	L	N	N	N	I	N	A	0	N	N	N	I	.
L8	40	893	135.1	2.9	L	B	5.7	1	L	N	N	N	N	I	N	0	N	N	N	I	.
L8	41	892	135.5	1.9	L	A	2.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	1	894	0.0	0.0	I	A	4.2	1	L	N	N	A	.	.	.	40	L	N	N	I	.
L9	2	895	1.3	0.0	I	B	8.3	1	L	N	I	N	.	A	.	20	L	N	N	I	.
L9	3	896	1.6	1.4	R	C	1.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	4	897	1.8	0.7	L	D	6.0	2	L	N	A	N	.	.	.	55	L	L	N	I	.
L9	5	898	37.8	5.6	L	A	2.3	1	L	N	N	N	N	N	I	0	N	N	N	I	.
L9	6	899	38.4	5.3	L	B	2.8	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L9	7	900	38.4	5.6	L	C	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	8	902	38.8	9.8	R	A	5.3	1	L	I	N	N	N	N	N	0	N	N	N	I	.
L9	9	903	39.1	9.8	R	B	0.8	1	L	N	N	N	.	.	.	80	N	N	N	S	.
L9	10	904	43.4	12.0	R	A	0.7	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	11	905	43.8	11.8	R	B	2.9	7	L	N	I	N	N	N	N	100	M	H	N	S	.
L9	12	906	45.7	11.2	R	A	2.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	13	907	46.2	10.9	R	B	3.0	1	L	N	N	N	N	N	D	0	N	N	N	I	.
L9	14	908	46.2	11.7	R	C	2.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
L9	15	909	47.0	11.1	R	A	3.4	1	L	N	N	N	N	I	N	0	N	N	N	I	.
L9	16	910	47.4	11.0	R	B	3.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	17	911	50.8	13.8	R	A	2.6	11	M	N	N	I	.	.	.	100	H	H	N	S	.
L9	18	912	51.3	13.8	R	B	3.8	2	M	N	A	N	.	.	.	100	L	L	N	S	.
L9	19	913	51.6	13.5	R	C	4.3	1	L	N	N	A	.	.	.	50	N	L	N	S	.
L9	20	914	65.7	3.7	L	.	1.8	1	L	N	N	N	N	I	N	0	N	N	N	I	.
L9	21	915	68.4	2.6	R	.	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	22	916	77.0	7.1	R	.	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	23	917	95.8	12.0	L	.	5.8	1	L	N	I	N	.	.	.	100	L	M	N	I	.
L9	24	918	111.0	5.5	R	A	4.0	10	M	N	I	I	.	.	.	100	H	H	N	S	.
L9	25	919	111.3	6.2	R	B	4.1	2	L	N	N	A	.	.	.	100	L	L	N	I	.
L9	26	921	111.8	5.6	R	D	1.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	27	920	112.0	6.2	R	C	7.4	1	L	N	N	N	N	I	N	100	L	L	N	I	.
L9	28	922	112.2	5.6	R	E	2.2	4	L	A	N	N	.	.	.	100	N	L	N	I	.
L9	29	923	113.0	5.7	R	F	1.2	1	L	N	N	A	.	.	.	100	L	N	N	I	.
L9	30	924	120.7	5.9	L	.	5.9	2	L	N	I	A	.	.	.	100	M	M	N	S	.
L9	31	925	133.2	1.7	R	A	1.3	2	L	N	A	N	.	.	.	100	N	N	N	I	.
L9	32	926	133.3	1.8	R	B	3.0	1	L	N	A	N	.	.	.	60	L	N	N	I	.
L9	33	927	134.4	1.7	R	C	2.1	7	M	N	A	A	.	.	.	100	H	H	N	S	.
L9	34	929	135.1	5.9	R	B	8.2	1	L	N	N	A	.	.	.	100	L	M	N	I	.
L9	35	928	135.5	5.1	R	A	6.5	3	L	N	N	A	.	.	.	80	N	L	N	I	.
L9	36	930	147.3	9.3	R	A	1.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	37	931	147.8	8.9	R	B	4.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	38	932	148.3	9.3	R	C	5.1	1	L	N	I	N	.	.	.	100	L	M	N	I	.
L9	39	933	148.4	8.4	R	D	5.2	1	L	N	N	N	I	N	N	0	N	N	N	I	.
L9	40	934	148.8	9.1	R	E	2.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L9	41	935	149.1	9.3	R	F	3.2	11	M	I	I	I	.	.	.	100	L	M	N	S	.
L9	42	936	149.7	8.4	R	G	3.6	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L10	1	937	0.0	0.0	I	A	4.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	2	938	1.0	0.7	R	B	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	3	939	1.6	15.0	R	A	10.7	1	L	N	N	N	N	N	D	0	L	N	Y	I	.
L10	4	940	2.3	14.8	R	B	7.2	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
L10	5	941	13.3	11.7	L	.	1.3	2	L	N	N	N	D	N	N	0	N	N	N	I	.
L10	6	942	14.8	11.2	L	A	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	7	943	15.8	12.0	L	B	8.8	4	M	A	I	N	A	.	.	100	L	M	N	S	.
L10	8	944	17.9	5.2	L	.	6.0	1	L	N	N	N	N	I	A	0	N	N	N	I	.
L10	9	945	34.8	7.9	L	A	6.7	2	L	I	N	N	I	.	.	70	L	L	N	I	.
L10	10	946	35.6	7.7	L	B	8.9	2	M	U	U	N	.	.	.	50	L	L	N	I	.
L10	11	947	37.0	6.5	R	.	5.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	12	948	43.3	7.4	L	.	1.1	11	??	.	.	.	.	.	.	.	N	N	N	D	U
L10	13	949	45.7	12.6	L	A	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	14	950	46.5	12.6	L	B	1.5	3	U	N	N	N	N	N	N	0	L	N	N	H	.
L10	15	951	46.8	12.8	L	C	1.4	2	U	N	N	N	N	N	N	0	N	L	N	H	.
L10	16	952	46.9	12.5	L	D	2.5	3	L	I	N	N	.	.	.	100	N	L	N	I	.
L10	17	976	50.4	6.8	L	.	9.3	2	L	I	N	N	.	.	.	100	N	N	N	I	.
L10	18	953	50.8	14.8	L	A	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	19	954	51.4	14.6	L	B	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	20	955	52.0	14.8	L	C	0.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	21	956	52.3	14.7	L	D	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	22	957	52.3	13.1	L	A	6.9	1	U	N	N	N	N	N	N	0	N	L	N	H	.
L10	23	958	53.6	12.6	L	B	9.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	24	959	57.9	10.7	L	A	2.9	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L10	25	960	58.8	10.7	L	B	6.8	2	L	N	N	N	N	I	A	0	L	N	Y	I	.
L10	26	961	124.6	8.8	R	A	9.1	1	M	N	N	N	N	I	A	0	L	N	N	I	.
L10	27	965	125.5	9.6	R	E	5.9	1	L	N	N	N	N	A	N	0	N	N	N	I	.
L10	28	962	125.8	7.7	R	B	2.3	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	29	963	126.1	7.9	R	C	1.4	2	L	N	N	N	N	N	A	0	N	N	N	I	.
L10	30	964	126.1	8.5	R	D	0.7	1	L	N	N	N	I	N	N	0	N	N	N	I	.
L10	31	966	130.5	10.2	L	.	3.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	32	967	135.4	9.4	R	A	5.1	1	L	N	N	N	I	N	A	0	N	N	N	I	.
L10	33	968	136.1	8.4	R	B	1.8	1	U	N	N	N	N	N	N	0	L	N	N	H	.
L10	34	969	136.1	9.2	R	C	4.2	11	??	.	.	.	.	.	.	.	H	H	N	D	R
L10	35	970	136.3	9.5	R	D	2.0	11	L	N	I	I	.	.	.	100	L	M	N	S	.
L10	36	973	136.3	9.7	R	G	0.6	2	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	37	974	136.3	9.3	R	H	1.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	38	972	136.4	10.1	R	F	5.0	4	U	N	N	N	N	N	N	0	N	N	N	H	.
L10	39	975	136.7	9.0	R	I	1.8	5	L	A	A	N	.	.	.	100	N	L	N	S	.
L10	40	971	136.8	9.5	R	E	4.5	11	??	.	.	.	.	.	.	.	H	H	N	D	R
D1	1	1	0.0	0.0	I	A	3.9	3	U	N	N	N	N	N	N	0	M	L	N	H	.
D1	2	2	0.9	0.3	L	B	5.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	3	3	10.5	10.3	L	A	3.5	3	U	N	N	N	N	N	N	0	M	M	N	H	.
D1	4	4	11.0	11.3	L	B	4.2	1	U	N	N	N	N	N	N	0	L	N	N	H	.
D1	5	5	11.6	10.0	L	C	4.6	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	6	6	46.8	9.9	R	.	13.1	11	U	N	N	N	N	N	N	0	N	N	Y	D	B
D1	7	7	52.6	5.5	R	.	9.1	11	U	N	N	N	N	N	N	0	N	N	Y	D	B
D1	8	8	54.5	14.1	R	.	10.2	11	U	N	N	N	N	N	N	0	M	M	Y	D	B
D1	9	9	55.0	8.9	L	A	11.7	11	M	.	.	.	.	.	.	0	M	N	Y	D	B

Plot	No.	TreeTag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
D1	10	10	55.0	11.1	L	B	7.2	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	11	11	61.7	14.5	R	A	1.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	12	12	61.9	14.6	R	B	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	13	13	64.3	9.2	R	A	6.4	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	14	14	64.3	8.5	R	B	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	16	15	70.1	10.7	R	B	7.3	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	17	16	70.8	10.7	R	C	7.8	1	U	N	N	N	N	N	N	0	N	N	Y	I	.
D1	15	17	72.3	9.6	R	A	1.6	1	U	N	N	N	N	N	N	0	N	L	N	H	.
D1	18	18	91.0	11.7	R	A	4.1	11	L	D	D	N	.	.	.	100	L	M	N	D	R
D1	19	19	91.3	12.6	R	B	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	20	20	97.4	11.6	R	.	3.0	11	L	N	D	N	.	.	.	100	N	M	N	D	R
D1	21	21	97.5	5.3	R	.	10.3	1	L	N	N	N	N	I	I	0	N	N	N	I	.
D1	22	22	102.9	12.9	L	.	9.3	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	23	23	112.0	14.3	L	A	14.5	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	24	24	112.0	15.0	L	B	6.5	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	25	25	112.4	15.5	L	C	1.6	8	L	D	N	N	.	.	.	100	L	L	N	S	.
D1	26	26	115.8	2.8	R	A	9.1	2	M	N	N	N	N	I	I	0	N	N	Y	I	.
D1	27	27	116.8	2.5	R	B	4.2	2	U	N	N	N	N	N	N	0	L	N	Y	H	.
D1	31	28	119.3	14.9	L	A	1.2	3	M	N	I	I	I	I	I	40	N	L	N	S	.
D1	32	29	119.5	15.0	L	B	1.0	1	L	N	N	N	N	N	D	0	N	N	N	I	.
D1	33	30	120.8	12.4	L	A	8.2	1	U	N	N	N	N	N	N	0	L	N	Y	H	.
D1	29	31	120.9	7.7	R	B	11.0	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	34	32	121.2	12.4	L	B	8.7	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	28	33	121.6	6.7	R	A	11.1	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	35	34	121.8	12.2	L	C	8.6	1	U	N	N	N	N	N	N	0	L	L	Y	H	.
D1	36	35	121.8	13.1	L	D	8.8	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	30	36	122.1	7.9	R	C	4.2	1	M	N	I	N	.	.	.	15	L	N	Y	I	.
D1	37	37	122.3	13.6	L	E	3.1	2	U	N	N	N	N	N	N	0	L	L	N	H	.
D1	38	38	140.1	8.9	L	A	0.8	9	U	N	N	N	N	N	N	0	N	L	N	H	.
D1	39	39	140.7	9.1	L	B	0.8	3	U	N	N	N	N	N	N	0	N	N	N	H	.
D1	40	40	141.5	8.9	L	C	8.0	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D1	41	41	142.3	8.5	L	D	2.0	2	U	N	N	N	N	N	N	0	N	N	N	H	.
D2	1	42	0.0	0.0	I	.	3.5	1	L	N	N	N	N	N	D	0	N	N	N	I	.
D2	2	44	9.7	7.7	L	B	0.8	1	U	N	N	N	N	N	N	0	N	L	N	H	.
D2	3	43	9.8	7.0	L	A	6.0	1	L	N	N	N	N	I	N	0	N	L	N	I	.
D2	4	45	10.3	7.3	L	C	1.3	1	U	N	N	N	N	N	N	0	N	L	N	H	.
D2	5	46	10.3	7.9	L	D	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D2	6	47	10.8	6.9	L	E	0.7	1	L	A	A	N	.	.	.	100	N	M	Y	S	.
D2	7	48	61.0	13.9	R	A	4.9	11	U	N	N	N	N	N	N	0	N	L	Y	D	F
D2	8	49	61.8	13.9	R	B	3.7	11	U	N	N	N	N	N	N	0	N	N	Y	D	F
D2	9	50	72.5	9.7	R	A	10.1	11	U	N	N	N	N	N	N	0	N	M	Y	D	B,F
D2	10	51	72.5	10.7	R	B	4.8	11	U	N	N	N	N	N	N	0	M	M	Y	D	B,F
D2	11	52	74.3	9.8	R	C	7.8	11	U	N	N	N	N	N	N	0	L	N	Y	D	B,F
D2	12	53	74.5	11.1	R	D	3.7	11	U	N	N	N	N	N	N	0	L	M	Y	D	B,F
D2	13	55	74.8	10.3	R	F	2.9	11	U	N	N	N	N	N	N	0	N	M	Y	D	B,F
D2	14	54	75.3	9.3	R	E	7.0	11	U	N	N	N	N	N	N	0	L	L	Y	D	B,F
D2	15	56	109.8	8.3	R	A	4.3	2	U	N	N	N	N	N	N	0	L	N	Y	H	.
D2	16	57	109.8	7.8	R	B	5.2	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D2	17	58	110.4	7.8	R	C	6.7	1	U	N	N	N	N	N	N	0	L	N	Y	H	.
D2	18	63	110.5	8.0	R	H	3.4	11	U	N	N	N	N	N	N	0	L	L	Y	D	B
D2	19	59	111.3	7.7	R	D	5.6	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D2	20	62	111.3	8.3	R	G	5.3	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D2	21	60	111.8	7.3	R	E	1.8	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D2	22	61	111.8	7.9	R	F	5.0	1	U	N	N	N	N	N	N	0	L	N	Y	H	.
D3	1	64	0.0	0.0	I	A	6.2	11	U	N	N	N	N	N	N	0	L	N	N	D	F
D3	2	65	0.6	0.0	I	B	6.5	11	U	N	N	N	N	N	N	0	L	N	N	D	F
D3	3	66	49.2	13.8	R	A	6.1	3	U	N	N	N	N	N	N	0	N	N	N	H	.
D3	4	67	50.2	14.7	R	B	6.9	11	U	N	N	N	N	N	N	0	N	M	Y	D	B
D3	5	68	51.6	13.3	R	C	2.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D3	6	69	62.0	5.2	R	A	8.3	3	U	N	N	N	N	N	N	0	N	N	Y	H	.
D3	7	70	62.6	4.5	R	B	5.2	2	U	N	N	N	N	N	N	0	N	L	Y	H	.
D3	8	71	66.6	6.7	L	A	7.9	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D3	9	72	67.4	6.7	L	B	8.3	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D4	1	74	0.0	0.0	I	.	0.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D4	2	75	0.0	4.5	R	A	4.2	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D4	3	76	1.3	4.3	R	B	8.1	2	M	N	N	N	N	I	N	0	N	N	Y	I	.
D4	4	77	1.6	3.3	R	C	3.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D4	5	78	2.3	2.0	L	A	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D4	6	80	2.5	1.5	L	C	1.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D4	7	79	2.6	1.9	L	B	3.5	1	L	N	N	N	N	N	D	0	N	N	N	I	.
D4	8	81	11.9	1.5	L	.	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D4	9	82	14.3	2.4	L	.	7.7	1	L	N	N	N	N	I	N	0	L	N	Y	I	.
D5	1	83	0.0	0.0	I	.	7.3	1	U	N	N	N	N	N	N	0	N	M	N	H	.
D5	2	84	25.8	0.0	L	.	7.4	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D5	3	87	44.1	0.6	R	B	7.2	11	U	N	N	N	N	N	N	0	N	N	Y	D	F
D5	4	86	54.4	1.7	R	A	7.3	11	U	N	N	N	N	N	N	0	N	N	Y	D	F
D5	5	89	54.6	2.6	R	D	7.0	11	U	N	N	N	N	N	N	0	N	N	Y	D	F

Plot No.	Tree	Tag	[2]Along Transect (ft.)	[3]From Transect (ft.)	[4]R / L	[5]Clump	DBH (in.)	[6]Canopy Kill Class	[7]WPBR Class	[8]Bole Cankers Top	Bole Cankers Mid	Bole Cankers Bottom	Branch Cankers Top	Branch Cankers Mid	Branch Cankers Bottom	Canker % Bole Girdle	[9]Bark Strip Branch	Bark Strip Bole	MPB	[10]Health	[11]Mortality
D5	6	88	56.0	1.4	R	C	5.8	11	U	N	N	N	N	N	N	0	N	N	Y	D	F
D5	7	90	68.5	2.0	R	A	5.0	11	U	N	N	N	N	N	N	0	N	N	N	D	F
D5	8	91	68.9	3.9	R	B	3.5	11	U	N	N	N	N	N	N	0	N	M	N	D	F
D5	9	92	76.3	5.0	R	.	7.9	11	L	N	N	D	N	N	N	0	N	N	Y	D	F
D5	10	93	80.2	9.3	L	.	5.4	11	U	N	N	N	N	N	N	0	N	L	N	D	F
D5	11	94	85.0	6.1	R	.	0.7	3	U	N	N	N	N	N	N	0	N	M	N	H	.
D5	12	95	87.3	5.3	R	.	2.4	11	U	N	N	N	N	N	N	0	N	N	N	D	F
D6	1	85	0.0	0.0	I	.	0.9	2	L	N	N	A	.	.	.	100	N	N	N	I	.
D6	2	98	4.9	6.1	R	.	0.6	2	U	N	N	N	N	N	N	0	L	N	N	H	.
D6	3	96	5.7	2.6	R	.	2.5	2	U	N	N	N	N	N	N	0	N	M	N	H	.
D6	4	97	6.6	1.0	L	.	1.2	1	U	N	N	N	N	N	N	0	N	L	N	H	.
D6	5	99	12.0	2.9	R	.	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	6	100	16.5	3.8	L	.	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	7	101	25.8	11.7	L	.	2.1	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	8	105	29.1	3.6	L	.	3.3	1	U	N	N	N	N	N	N	0	N	L	N	H	.
D6	9	102	29.6	12.7	L	A	2.2	11	U	N	N	N	N	N	N	0	N	N	N	D	F
D6	10	103	29.6	13.0	L	B	1.6	11	U	N	N	N	N	N	N	0	N	N	N	D	F
D6	11	104	30.8	6.8	L	.	1.6	11	U	N	N	N	N	N	N	0	N	N	N	D	F
D6	12	106	36.8	9.6	L	.	3.4	11	U	N	N	N	N	N	N	0	N	N	N	D	F
D6	13	119	52.2	12.5	R	.	1.1	1	U	N	N	N	N	N	N	0	N	L	N	H	.
D6	14	107	108.9	3.5	R	.	7.6	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D6	15	108	116.2	3.1	L	A	1.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	16	109	116.5	3.1	L	B	3.0	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	17	111	124.3	12.1	R	A	1.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	18	112	124.5	12.3	R	B	1.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	19	110	125.6	10.1	R	.	1.9	1	L	N	N	N	N	I	N	0	N	N	N	I	.
D6	20	113	132.0	7.5	R	A	1.3	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	21	114	132.2	7.4	R	B	1.8	2	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	22	115	134.3	4.2	R	A	0.9	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	23	116	134.5	4.1	R	B	0.8	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	24	117	134.8	3.9	R	C	1.5	1	U	N	N	N	N	N	N	0	N	N	N	H	.
D6	25	118	135.3	10.2	R	.	1.0	3	U	N	N	N	N	N	N	0	N	N	N	H	.
D7	1	120	0.0	0.0	I	.	4.6	3	U	N	N	N	N	N	N	0	L	N	N	H	.
D7	2	121	24.8	5.5	L	.	10.2	1	L	N	N	N	I	N	N	0	L	N	Y	I	.
D7	3	122	57.9	10.6	R	.	8.3	2	L	N	N	N	N	D	N	0	N	N	Y	I	.
D7	4	123	60.8	2.4	R	.	8.9	7	L	N	I	N	.	.	.	100	M	H	N	S	.
D7	5	124	61.8	6.8	R	A	7.0	1	U	N	N	N	N	N	N	0	N	L	N	H	.
D7	6	125	62.4	6.8	R	B	8.7	11	??	.	.	.	.	.	.	.	H	H	N	D	F
D7	7	126	64.0	2.9	L	A	9.6	1	L	N	N	N	N	I	N	0	L	N	Y	I	.
D7	8	127	65.1	3.1	L	B	10.9	1	L	N	N	N	I	N	N	0	L	N	Y	I	.
D7	9	128	101.4	1.7	L	A	4.9	11	U	N	N	N	N	N	N	0	N	N	Y	D	F
D7	10	129	102.1	2.4	L	B	6.8	11	U	N	N	N	N	N	N	0	N	N	Y	D	F
D7	11	130	115.3	10.4	L	.	9.2	1	U	N	N	N	N	N	N	0	N	N	Y	H	.
D7	12	131	130.3	3.9	R	.	11.9	11	L	N	N	N	N	D	N	0	L	N	Y	D	F