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by

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Dr. Mathew Leitch	**-** Frank Luckai
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ABSTRACT

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Key Words: potassium, red pine, diameter, height, site quality, polymorphism, stomata, water, nutrient cycling, phloem, xylem, amelioration.

This thesis explores the relationship between the soil nutrient potassium and its effect on red pine growth. This thesis summarizes existing knowledge on differing soils impact on red pine and the lack of polymorphism. The importance of individual nutrient effects on growth determines the overall effect and optimization of amelioration. Individual nutrient effects on red pine growth are not available for mature red pine stands and are generally restricted to early growth. Although soil texture is not a direct influence on growth, nutrients in the soil impact growth behaviour. This study aims to compare two similar red pine stands in northwestern Ontario and determine the statistical difference in diameter and height growth. Stands height, diameter, and mortality were cumulatively measured in previous years. The top 15 cm of soil in each plot was measured and a Motte® soil sample test was completed to determine the pH, nitrogen, phosphorous, and potassium. The tree growth measurements were compared with soil samples taken randomly in each plot with Microsoft Excel and SPSS. Our findings showed an increase of 17-22% in diameter, 18- 24% in height, and a decrease of 11% for mortality. Our results showed a significant correlation between increased diameter and height growth with an increase in potassium levels. Our study revealed that red pine plantations could provide a higher amount of volume through the amelioration of harvested stands.

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I want to thank everyone who went out of there way to help and guide me through the complicated process of producing this thesis. My thesis supervisor Dr. Mathew Leitch and second reader Frank Luckai as well as Collin Bowlin; and Chris Stratton, were all extraordinary mentors, and their guidance was critical in the development, and I could not have done it without them.

INTRODUCTION

Red pine (*Pinus resinosa*) is an integral part of northwestern Ontario's culture and identity. The open understory has historically been a favourite site for establishing settlements or camps, while uses for the lumber include furnish or straight poles (OMNR 1998; Farrar 1995). Natural red pine height growth is an essential indicator of site quality and a significant variable in growth prediction models (Alban et al. 1987). While the diameter or volume growth is vital for harvesting, differing soils' prediction equations do not differ significantly (Alban et al. 1987). Other studies have concluded variables such as nutrients, moisture, and season time have essential effects on the growth of red pine (Alban et al. 1987; Gagnon 1965; Charles 2001; OMNR 1989; Buxbaum 2005; Boyle 2017). However, potassium in mature stands focused on the upper 15 cm of soil has not yet been studied.

This study aims to compare two red pine plantation stands at similar stocking and deduce the soil nutrient's role in diameter and height growth. One stand on the Jones Road in Kenora, Ontario, was planted by high school students in 1967 and cleaned and pruned in 1988 by the OMNR. The stand is approximately 7 ha in an area underlain by well-drained fine sands with a slight slope increasing northward, little else is known. The second site location is along the 25th side road in Thunder Bay, Ontario. Established on an abandoned farm field by the OMNR, the second location contains a deep, fine sandy loam glaciolacustrine deposit with upper soil horizons enriched with organic matter (Maley and Bowling 1993). Both stands had plots established by OMNR standards and repeatedly measured over the years; however, the Thunder Bay area had significantly more dedication and resources. The Jones Road stand had eight 0.01 ha circular plots randomly located marked with paint and measured in 2000, 2008 and 2020. The

Thunder Bay stand was organized into multiple blocks with varying species and spacings. Three blocks (2, 9 and 12) were chosen at spacings 1.8m x 1.8m; each tree was individually measured approximately every five years.

Red pine has become a popular plantation species, with many stands now scattered across Northwestern Ontario. Many of these stands have been forgotten and have passed the optimal rotation age of 40 years at close spacings (1.8m x 1.8m) (Maley and Bowling 1993). It was hypothesized that wood supply gaps that existed prior in the Dryden Crown Forest and North Central Region were fixed by an influx of lower grade red pine (Maley and Bowling 1993). With the short-term rise in the cost of wood due to the coronavirus outbreak and the long-term damage of central Europe lumber from the spruce bark beetle (*Dendroctonus rufipennis*) (Taylor 2020), perhaps it is time to utilize these plantations soon. Red pine plantations can provide more merchantable volume than most conifers (Maley and Bowling 1993), which could hypothetically be increased with amelioration. The traditionally low fertility level of sandy soil that red pine grows (OMNR 1998; Maley and Bowling 1993; Farrar 1995) could be added to improve yields (Buxbaum 2005).

Fertilizer use has increased over the last decade, yet optimization of amelioration in northwestern Ontario red pine stands has not occurred.

OBJECTIVES

This thesis aims to compare the compiled data collected by the OMNR and Neal Hissa with potassium levels in the first 15 cm of soil. This thesis will provide evidence of potassium's direct influence on red pine growth. The examination of soil nutrients and the effects on red pine growth has occurred previously; however, the focus on potassium's impact has not. Focus on potassium could better optimize red pine growth, increasing its viability for commercial consumption.

HYPOTHESIS

Potassium has a direct influence on the increase in red pine diameter and height growth.

LITERATURE REVIEW

RED PINE

Red pine (*Pinus resinosa*) is an integral part of Northwestern Ontario's culture and identity. The open understory has historically been a favourite site for establishing settlements or camps, while the trees are desired for furnishing or straight poles (OMNR 1998; Maley and Bowling 1993). Red pine's natural range is a narrow strip approximately 2,400km by 800km extending from Manitoba's southeast corner to Nova Scotia with isolated patches in Newfoundland (OMNR 1998; Farrar 1995). Red pine stands naturally grow on nutrient-poor dry sandy sites of glaciofluvial, aeolian or lacustrine origin with a pH between 4.5 and 6.0 in the upper 25 cm (OMNR 1998; Alban et al. 1987; Farrar 1995). Red pine stands typically have uniform potassium (k) concentrations with depth, whereas calcium (C) doubles with depth and nitrate concentrations below detection (N) (Keller 2006). The root system is moderately deep (Farrar 1995) and has been found to cycle nutrients between the foliage and surface soil horizons (Buxbaum 2005). New crops of needles emerge in July, spraying small concentrations of phenylmercuric acetate (PMA) decreases both transpiration and growth (Turner and Waggoner 1968). PMA usage also contracts the bole due to the lag in absorption by the roots over the atmosphere's loss with a closed stoma (Turner and Waggoner). Height growth occurs early in the growing season, making it less affected by drought, while the diameter or volume growth occurs well into the drought-prone fall (Alban et al. 1987). Drought periods with varying duration during the growing season have resulted in a zone of narrow-diameter latewood tracheids and formations of a false ring (Larson 1963). Soil texture has been determined not to affect the diameter growth or soil water storage (Alban et al. 1987; Maley and Bowling 1993). Fire is essential to red pine regeneration; it provides vegetation and insect competition control, opens the overstory and the high ash concentrations in the seedbed substrate help germination (OMNR 1998; Farrar 1995). The specialized ecological requirements of red pine have led to a fractured population and a significant loss of genetic diversity (Mosseler 1992; Maley and Bowling 1993). This genetic bottleneck resulted in the rapid loss of heterozygosity and allelic variation due to self-pollination reliance (Mosseler 1992). Due to human logging and forest fire control, red pine is considered an "eroded" level 2 species (a minimal natural occurrence) (Maley and Bowling 1993).

PLANTATION

Plantation establishments facilitate natural forest regeneration by creating the necessary microclimate and soil conditions (Malay and Bowling 1993). Red pine plantations produce more merchantable volume than most conifers; however, they comprise less than 5% of the Northwestern region's planting program (Maley and Bowling 1993). Plantation experiments with red pine concluded that wider spacings increased mean diameter while height was unaffected (Maley and Bowling 1993). 1.8m x 1.8m spacings found that red pine quickly reached full utilization at 40 years of age (Maley and Bowling 1993). Problems with establishing red pine plantations are mainly that quality seed crops only occur every 3-7 years and bumper crops every 10-12 years, and the high susceptibility to frost damage (Maley and Bowling 1993).

AMELIORATION

Trees are believed to improve nutrient availability, accelerate horizon development and differentiation, reduce soil bulk density, increase fertility and acidification in impoverished soils (Nowak et al. 1991; McPherson and Timmer 2002; Crous 2007). Soil degradation through improper land use practices impacts upper horizons more than lower horizons (McPherson and Timmer 2002; Crous 2007), providing a reason to apply fertilizer. Nutrient recovery in soil organic C, total N, available phosphorous (P), and exchangeable K, C and magnesium (Mg) status can occur within 75 years of red pine reforestation (McPherson and Timmer 2002). Unfertilized red pine stands have displayed recovery to a nutrient steady state achieved by fertilized stands (Charles et al. 2001).

The use of mineral fertilizers in forestry was previously restricted to nursery stock, seedlings or saplings; however, more attempts in Europe and America have been made to use fertilizers to promote increased growth of pole-size trees (Ingestad 1979; Crous 2007). Several years are required to demonstrate the beneficial effects of fertilization (Ingested, 1979; Crous, 2007). Mineral soils under fertilized red pine had significantly lower bulk densities than unfertilized plots, possibly due to the greater root mass (Charles et al. 2001; Crous 2007). No significant change in pH has been observed with added fertilizer in red pine stands (Charles et al. 2001). Diameter and height have significantly increased with fertilizer use (Ingestad 1979; Crous 2007). Diameter and height have been affected at different time points, with the diameter being affected significantly different years earlier than the height (Ingestad 1979). The beneficial effect of fertilizer on diameter and height has persisted years after application (Ingested 1979; Charles et al. 2001; Crous 2007). Mortality in red pine has been shown to decrease with the application of fertilizers (Ingested 1979). Residual P fertilizer has shown a more significant effect on the foliage, forest floor and soil nutrient content than residual K fertilizers (Crous 2007).

Species symptoms of severe nutrient deficiency vary; however, chlorosis, shortened needle length, early needle abscission, inferior growth, and tree death are common characteristics in pine (Charles et al. 2001). Although soil texture does not directly affect red pine growth (Alban et al. 1987; Maley and Bowling 1993), it can indirectly influence growth. Soil coarseness significantly increased soil pH in soil depths of 0-40cm (Lü et al. 2016). Soil coarseness is the primary process of decreasing soil organic matter and threatening sandy grasslands' productivity (Lü et al. 2016). Exchangeable Ca and Mg concentrations and soil available iron (Fe), manganese (Mn), and copper (Cu) significantly decreased with soil coarseness (Lü et al. 2016). Soil degradation generally involves decreased fertility, soil profile simplification and topsoil loss by wind erosion (McPherson and Timmer 2002). Nutrients such as N, C, Mg and K, as well as water, are essential production limiters (Baribault et al. 2010).

POTASSIUM

Although K is the second most abundant nutrient after N in plant photosynthetic tissues, their fundamental role in plant function, especially in water use efficiency and the economy is often overlooked (Sardans, and Peñuelas 2015; Buxbaum 2005; Keller 2006; Baribault et al. 2010). Higher K availability is also associated with decreased mortality and increased resistance to beetle infestation (Baribault et al. 2010). Young soils tend to have higher K and lower N availability than older soils (Sardans and Peñuelas 2015; Keller 2006; Nowak et al. 1991). K can be leached far easier than N or P resulting in the potential gradual depletion in older soils (Sardans and Peñuelas 2015; Charles et al. 2001; Keller 2006). Terrestrial ecosystems such as forests cycle K in several processes, increasing retention capacity (Sardans and Peñuelas 2015; Charles et al. 2001; Buxbaum 2005; Keller 2006; Nowak et al. 1991). Nutrient mobilization from the entire rooting zone into the upper soil horizons combined with litterfall, mineralization and cation exchange results in increased surface soil K concentrations (Charles et al. 2001; Keller 2006; Nowak et al. 1991). K concentrations are related to soil texture; subsoil layers with greater moisture retention also have higher K retention (Buxbaum 2005; Baribault et al. 2010). The evolutionary pressure to retain K in terrestrial ecosystems results in lower K soil-plant concentrations than N and P even when soil K concentrations are higher than N or P (Sardans and Peñuelas 2015). Decades past application of K fertilizer, K concentrations stayed in a steady-state (Charles et al. 2001; Nowak et al. 1991). Low soil K concentration has been found to limit tree growth and wood production (Charles et al. 2001; Baribault et al. 2010); applications of 112kg/ha K was found to produce optimal growth (Charles et al. 2001).

MATERIALS AND METHODS

STUDY AREA AND DESIGN

The Jones Road plantation is located in Kenora, Ontario and was established in 1987 by high school students and cleaned and pruned in 1988 (Figure 1). Eight locations were previously marked by paint by stewardship rangers working for the OMNR in 2000 and repainted and measured in 2008 before a land transfer with a private party (Table 1).

Table 1 GPS locations of Jones Road plots.

Jones Road	UTM	Easting	Northing
Plot 1	15U	0401848	5515457
plot 2	15U	0401869	5515446
Plot 3	15U	0401898	5515465
Plot 4	15U	0401901	5515431
Plot 5	15U	0401725	5515467
Plot 6	15U	0401827	5515420
Plot 7	15U	0401808	5515450
Plot 8	15U	0401853	5515391

The eight locations were placed randomly within the plantation away from the forest edge to properly represent the red pine plantation. Each location had a 0.01 ha circular plot established around a centre tree marked with two paint bands, with every tree inside the plot painted with a number to be remeasured in the following years. On August 24th and 25th, soil and tree data were collected at the Jones Road plantation with verbal permission from the private party. Diameter at breast height (DBH) was taken with a diameter tape and recorded under the tree number marked previously. Heights were taken from three random trees in each plot using a Suunto clinometer. Each plot had a soil sample taken 7.5 – 15 cm below the organic layer and placed in Ziplock bags marked for transportation. The soil was dried at room temperature with indirect sunlight for 24 hours and then sifted with a

0.06 mm holed flour sifter. Once the soil was prepared for testing, a LaMotte soil sample kit was used to determine the Nitrogen, Phosphorous, Potassium and pH levels for each plot.

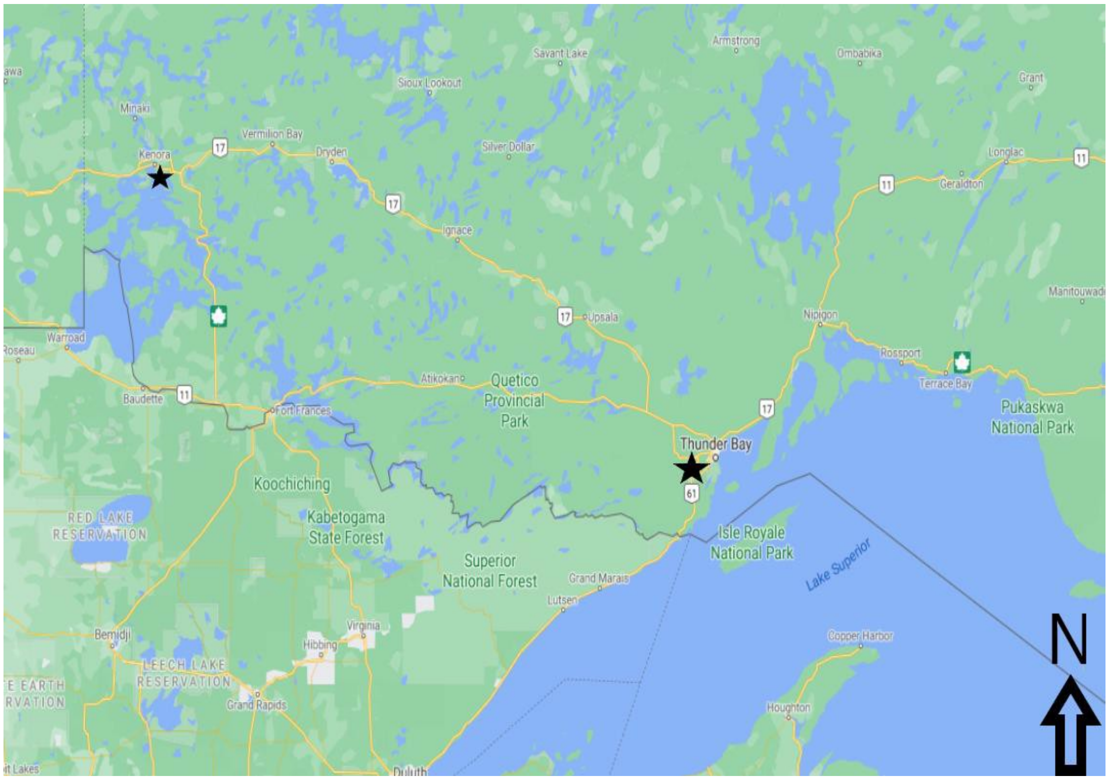

Figure 1 Locations of Jones Road and 25th side road plantations.

The 25^{th} side road plantation is located just outside Thunder Bay, Ontario and is owned by OMNR (Figure 1). Soil data was collected from the 25^{th} side road plantation on September $10^{th,}$ 2020; the OMNR provided heights, diameter and mortality. Soil data was collected from four random locations (Figure 2) within each red pine plantation and followed the same procedure as the soil collected from the Jones Road plantation.

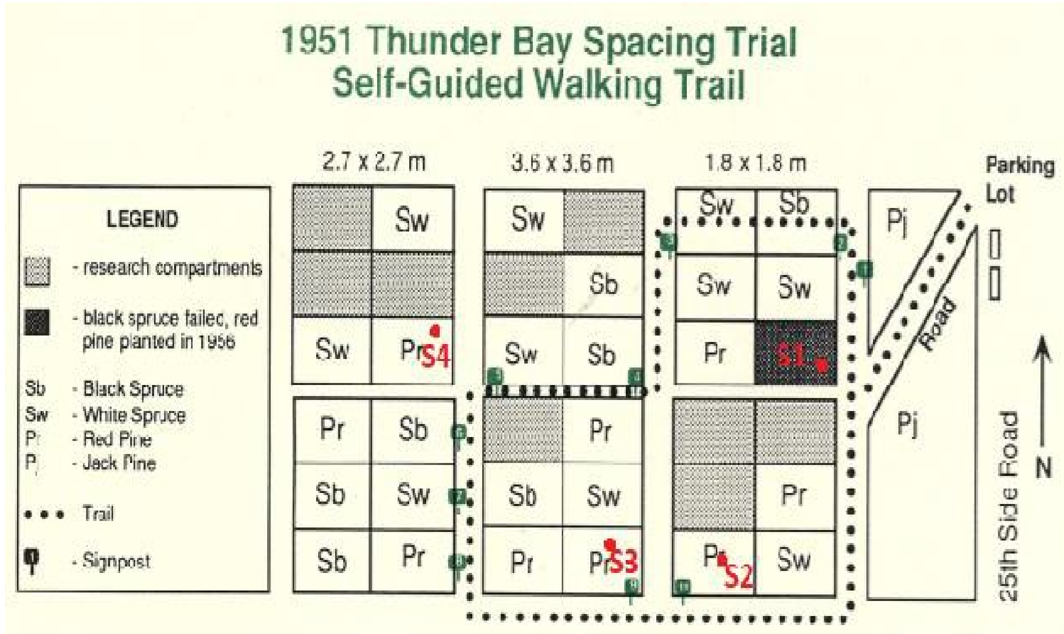

Figure 2. Soil sample locations at the 25th side road plantation (OMNR 1994).

MATERIALS

In this experiment, materials were: diameter tape, Suunto clinometer, GPS, 16 datasheets, LaMotte soil sample kit, distance tape measure.

STATISTICAL ANALYSIS

Data analysis was used to determine the significant difference in measurements between and within the two stands. Tree DBH, height and number of live stems per hectare (SPH) measurements conducted at similar ages were compared between the control plots (25th side road) and the Jones Road plantation. Analysis of DBH, height and SPH were performed using Microsoft Excel. F-test two sample for variance, T-test two-sample assuming equal and unequal variance and ANOVA single factor at 95% confidence intervals were used to calculate the significant difference in growth within and between plots. Individual plot measurements were examined and analyzed for standard deviation, range, median, mode, and mean.

RESULTS

Soil samples determined by the LaMotte soil kit showed trace amounts of nitrogen and phosphorous, pH levels of 5-5.5 in all samples (Table 2). Potassium levels at the Jones Road site fluctuated between very-low and low while the 25th side road fluctuated between medium and medium-low.

Table 2. Soil Sample Results.

Soil Sample	Nitrogen	Phosphorous	Potassium	pH
Jones Rd. 1	Trace	Trace	Low (18)	5
Jones Rd. 2	Trace	Trace	Low (17)	5
Jones Rd. 3	Trace	Trace	Low (17)	5.5
Jones Rd. 4	Trace	Trace	very-Low (20)	5.5
Jones Rd. 5	Trace	Trace	very-Low (20)	5
Jones Rd. 6	Trace	Trace	Low (18)	5
Jones Rd. 7	Trace	Trace	Low (18)	5.5
Jones Rd. 8	Trace	Trace	Low (18)	5
25th Side Rd. 1	Trace	Trace	Med-Low (16)	5
25th Side Rd. 2	Trace	Trace	Med (14)	5.5
25th Side Rd. 3	Trace	Trace	Med-Low (15)	5.5
25th Side Rd. 4	Trace	Trace	Med-Low (16)	5

The diameter at breast height measurements at the Jones Road site showed a significantly lesser mean and less variability at all ages than the 25th side road site. The

Jones Road site ranged from 6.7-22.1 cm, 8.8-23 cm, 9.1-27.4cm with means of 14.1 cm, 15.7 cm, and 17.9 cm at ages 33, 41, and 53, respectively (Figure 3).

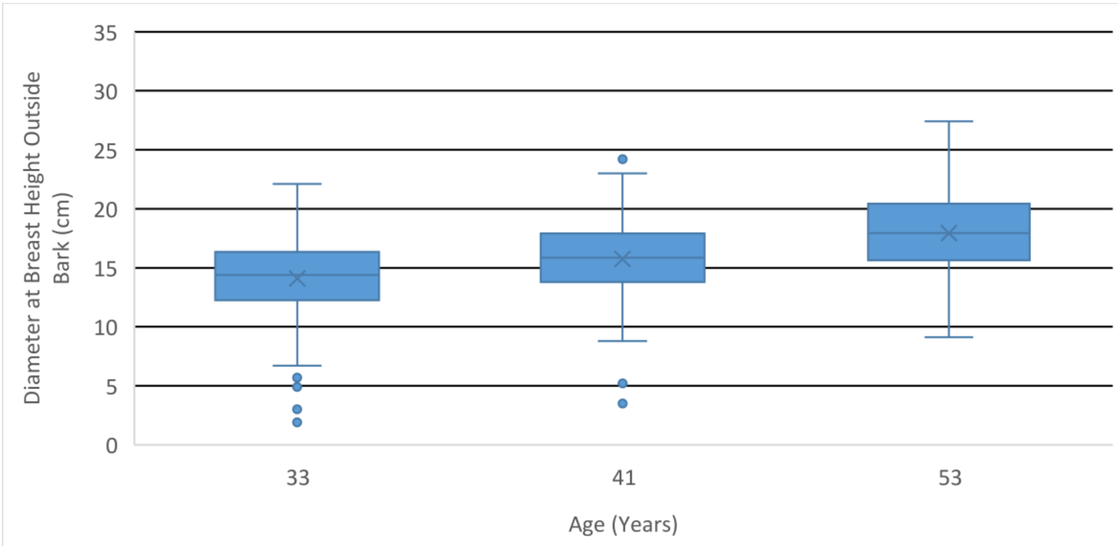

Figure 3. Jones Road diameter at breast height.

The 25th side road site had a greater range, variability of outliers and mean than the Jones Road site. T-test two-samples assuming equal variance concluded with a 95% confidence that the two stands DBH at all ages were significantly different. A Significant difference within the DBH means at age 57 of the 25th side road was also determined with a 95% confidence. The 25th side road site ranged from 8.0-22.0 cm, 9.9- 26.2 cm, 10-27.4 cm, 10.5-28.7 cm, 11.1-29.6 cm, 12.0-30.4 cm, 12.4-32.4 cm with means of 15.7 cm, 18.1 cm, 18.8 cm, 19.8 cm, 20.7 cm, 21.6 cm and 22.7 cm at ages 27, 33, 38, 43, 48, 52 and 57 respectively (Figure 4).

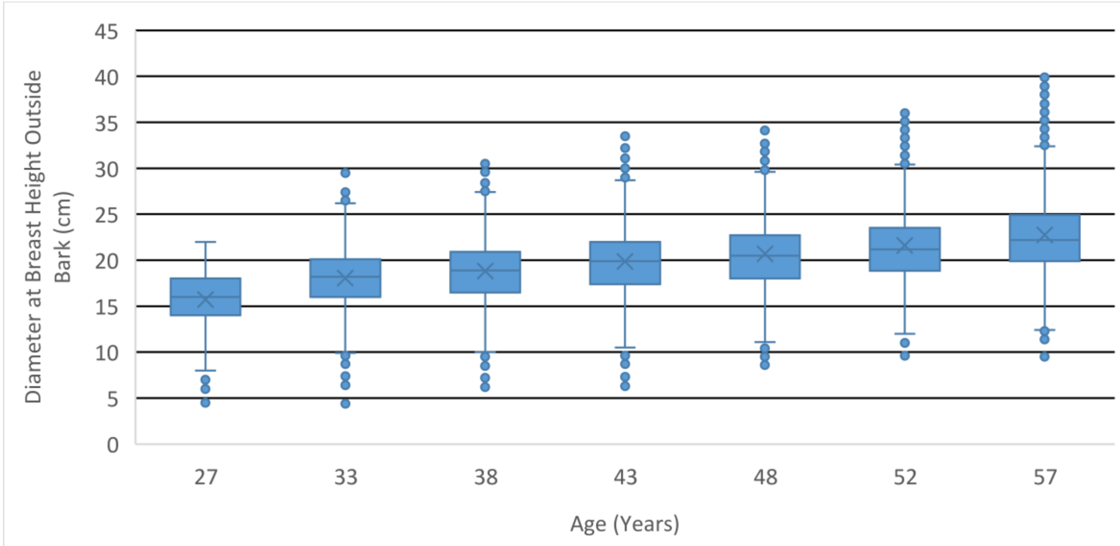

Figure 4. 25th side road diameter at breast height.

A significant difference within 95% confidence was found at all ages mean heights between the Jones Road and 25th side road sites. The 25th side road sites had an average of 8-24% increase in mean height compared to the Jones road site (Figure 5).

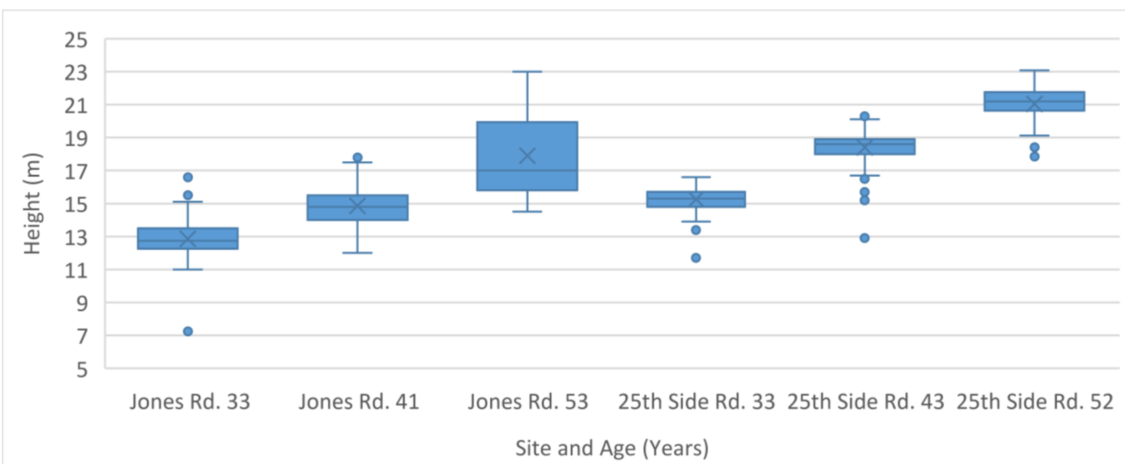

Figure 5. Height comparison between both sites.

The Jones Road and 25th side road stands had no significant difference SPH until ages 52-53, with 11% more stems occurring at the 25th side road (Table 3).

Table 3. Average stems per hectare.

AGE	Jones Rd. SPH	25th Side Rd. SPH	% Difference
0	2930	2930	0%
33	2563	2718	6%
41-42	2563	2701	5%
52-53	2325	2588	11%

DISCUSSION

Rapid growth relative to the boreal forest trees and little genetic difference in populations provides an excellent test subject for furthering nutrients' role in growth. Experimentation with Red pine is beneficial in land allocation as the sandy-low nutrient sites utilized have relatively low demand and could increase value with time (Charles et al. 2001; McPherson and Timmer 2002). Nutrient cycling and the relatively uniform potassium layers found in red pine stands allowed for cost and time-efficient soil examination methods as only the upper horizons are required (Buxbaum 2005; Keller 2006). As forestry advances and usable land diminishes to rising populations and climate change, Red pine's unique niche could be valuable if a justifiable market product ever becomes available in the future.

Soil samples were taken from the top 7.5 – 15 cm of the A-horizon and thus reliant on the nutrient cycling and research findings from other studies to interpret nutrient availability. Keller (2006) states that red pine stands typically have uniform potassium concentrations with depth and nitrate concentration below detection. Farrar's (1995) findings on Red pine's moderately deep root system and Buxbaum's (2005) findings on the nutrient cycling through the foliage and surface soil horizons allowed us to save time and costs by only sampling the accessible topsoil. The LaMotte soil sample kit found consistencies with other studies on soil and nutrient availability however was not as precise. Findings found trace amounts of nutrients in the Jones Road site, which provided a perfect control while the 25th side road site had near-optimal potassium levels of 112 kg/ha similar to Charles et al. (2001) findings.

In this study, potassium has been shown to act as a limiting factor in red pine stands, with a significant difference in the means of both height and diameter growth at all ages. Shoulders and Tiarks (1990) found similar results in a late-rotation fertilization study in southern slash pine (*Pinus elliottii*) plantations. Potassium effect on water use efficiency combined with sandy soils incapable of stable groundwater retention demonstrates the importance in Red pine stands. Carlson et al. (2014) determined potassium fertilizer ranking compared to other fertilizer was location-dependent due to differences in which potassium is held in the soil. The niche that Red pine fills in pioneering sandy, dry and nutrient-poor sites explains why water use efficiency plays such a prominent role in their growth. In such a harsh microclimate, to sustain life, water seems to play a vital role in plant growth, emphasizing every resource available. The soil K exchangeable pool being limited at the Jones Road site, such as with the Pleistocene terrace sites in Carlson et al. (2014), correlates with our study's findings.

Mortality was found to have a significant difference in the stand at age 52-53, with an 11% difference in means. This significant difference relates to increased resilience findings correlated with an increase in the soil k availability (Ingested 1979; Baribault et al. 2010). Previous differences of 6% and 5% were not found to be statistically significant. The Jones Road site was pruned at age 21, 12 years before the first measurements recorded. The pruning and cleaning could explain the initial difference of 6% at age 33 and 5% at ages 41-42 outside of potassium's role on mortality. The 25th side road site also had a significant amount of resources at its disposal with every tree recorded, while the Jones Road site used eight plots to extrapolate missing data. This theory would explain the identical SPH at ages 33 and 41-42 on the Jones Road site, while the 25th side road fluctuated by 17 SPH during the same period.

Significant increases in the diameter and height found in potassium fertilized red pine plantations correlated with our findings (Gagnon 1965). Although a delay in significant growth occurred within the first and second years in Gagnon's findings (1965), our study took place over a longer time frame and appears to contain similar results if their study was extended. Our findings showed a greater increase in diameter growth difference compared to the height at 33 years of age than later at ages 52 and 53. The increase in diameter growth before the height matches Gagnon (1965); this less pronounced immediate effect on height is hypothesized to be a result of potassium's connection on water retention and the growing season. We hypothesize that potassium influence on water retention affects the diameter growth greater than height because of the fall being prone to drought. Height growth occurs early in the growing season, making it less affected by drought, while the diameter continues to grow throughout the growing season (Alban et al. 1987). Larson (1963) found that with varying durations of drought, the formation of narrow-diameter latewood tracheds form, thus correlating the importance of water retention in the form of potassium in diameter growth.

This study's problems include the significant difference in means within the 25th side road age 57 DBH and the Jones Road's slight south aspect slope. The significant difference in DBH means within the 25th side road at age 57 can be explained by the widening gap between the struggling and thriving individual trees. As the trees grow, little advantages throughout the tree's lifetime accumulates with increasing resources being allocated to the more successful trees while struggling trees continue a downward spiral trend. This theory explains why at older ages, a significant difference emerges when the SPH also decreases. The Jones Road site's slight slope could be beneficial to the stand's growth; however, this slight advantage was not enough to significantly alter the results of the potassium role. Although the slope did not alter the growth as significantly as potassium did, its role should be considered, adding only further importance to soil nutrient levels.

CONCLUSION

In conclusion, our analysis of two red pine stands with differing potassium levels with similar soil characteristics showed a difference between the two stands in Northwestern Ontario. Using Microsoft Excel, we determined a significant difference with a 95% confidence in height and diameter growth at all ages. A significant difference with a 95% confidence in mortality after age 52-53 was also found. Optimal potassium levels at approximately 112 kg/ha demonstrated a direct influence as a limiting factor in red pine's productivity. This study's results answer the dilemma of how to increase productivity on nutrient-poor sites and the potential benefits of amelioration in Northwestern Ontario. Overall, the two stands' analysis provides a further explanation of the importance of nutrients, specifically potassium and their role in plant growth and mortality.

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APPENDICES

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2000	1	1	Pr	13.7		L
Jones Rd	2000	1	2	Pr	13.4		L
Jones Rd	2000	1	3	Pr	17.4		L
Jones Rd	2000	1	4	Pr	13.9		L
Jones Rd	2000	1	5	Pr	13		L
Jones Rd	2000	1	6	Pr	14.6		L
Jones Rd	2000	1	7	Pr	11.3	11.8	L
Jones Rd	2000	1	8	Pr	16.3		L
Jones Rd	2000	1	9	Pj	15.3		L
Jones Rd	2000	1	10	Pr	12.6		L
Jones Rd	2000	1	11	Pr	16.6	13	L
Jones Rd	2000	1	12	Pr	19		L
Jones Rd	2000	1	13	Pr	19.7		L
Jones Rd	2000	1	14	Pr	11.6		L
Jones Rd	2000	1	15	Pr	20.1		L
Jones Rd	2000	1	16	Pr	10.9		L
Jones Rd	2000	1	17	Pr	20.3	16.6	L
Jones Rd	2000	1	18	Pr	16.3		L
Jones Rd	2000	1	19	Pr	15.1		L
Jones Rd	2000	1	20	Pr	14.6		L
Jones Rd	2000	1	21	Pr	14.1		L
Jones Rd	2000	1	22	Pr	17.4	14.8	L
Jones Rd	2000	1	23	Pr	13.8		L
Jones Rd	2000	1	24	Pr	12.3	13.5	L
Jones Rd	2000	1	25	Pr	12.2		L
Jones Rd	2000	1	26	Pr	13.7		L
Jones Rd	2000	1	27	Pr	12.9		L
Jones Rd	2000	1	28	Pr	14.4		L
Jones Rd	2000	2	1	Pr	12.9		L
Jones Rd	2000	2	2	Pr	17.5	13.25	L
Jones Rd	2000	2	3	Pr	14		L
Jones Rd	2000	2	4	Pr	12		L
Jones Rd	2000	2	5	Pr	13.5	12.5	L
Jones Rd	2000	2	6	Pr	5.7	7.25	L
Jones Rd	2000	2	7	Pr	13.1		L
Jones Rd	2000	2	8	Pr	17		L
Jones Rd	2000	2	9	Pr	15.8		L
Jones Rd	2000	2	10	Pr	16.6	12.25	L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2000	2	11	Pr	15.3	11.5	L
Jones Rd	2000	2	12	Pr	11.7		L
Jones Rd	2000	2	13	Pr	15.1	11.5	L
Jones Rd	2000	2	14	Pr	14		L
Jones Rd	2000	2	15	Pr	15.8	12.5	L
Jones Rd	2000	2	16	Pr	14	12.25	L
Jones Rd	2000	2	17	Pr	14.5		L
Jones Rd	2000	2	18	Pr	13.9	12.5	L
Jones Rd	2000	2	19	Pr	16		L
Jones Rd	2000	2	20	Pr	16.7		L
Jones Rd	2000	2	21	Pr	16.7	11.25	L
Jones Rd	2000	2	22	Pr	13.7		L
Jones Rd	2000	3	1	Pr	11.2	13.25	L
Jones Rd	2000	3	2	Pr	14		L
Jones Rd	2000	3	3	Pr	10.3		L
Jones Rd	2000	3	4	Pr	14.2	12.5	L
Jones Rd	2000	3	5	Pr	13.8	11	L
Jones Rd	2000	3	6	Pr	10.9		L
Jones Rd	2000	3	7	Pr	13.4		L
Jones Rd	2000	3	8	Pr	11.5		L
Jones Rd	2000	3	9	Pr	10.5		L
Jones Rd	2000	3	10	Pr	11.8		L
Jones Rd	2000	3	11	Pr	13.4		L
Jones Rd	2000	3	12	Pr	14.1		L
Jones Rd	2000	3	13	Pr	14.9		L
Jones Rd	2000	3	14	Pr	13		L
Jones Rd	2000	3	15	Pr	13.1		L
Jones Rd	2000	3	16	Pr	9.8		L
Jones Rd	2000	3	17	Pr	14.7	12.75	L
Jones Rd	2000	3	18	Pr	15		L
Jones Rd	2000	3	19	Pr	13.2	13.75	L
Jones Rd	2000	3	20	Pr	14.9		L
Jones Rd	2000	3	21	Pr	15.8		L
Jones Rd	2000	3	22	Pr	13		L
Jones Rd	2000	3	23	Pr	16.8		L
Jones Rd	2000	3	24	Pr	14.3		L
Jones Rd	2000	3	25	Pr	13.5		L
Jones Rd	2000	3	26	Pr	15.4		L
Jones Rd	2000	3	27	Pr	16.7		L
Jones Rd	2000	4	1	Pr	13.8		L
Jones Rd	2000	4	2	Pr	15.2	12.25	L
Jones Rd	2000	4	3	Pr	13.8		L
Jones Rd	2000	4	4	Pr	11.3		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2000	4	5	Pr	13	11	L
Jones Rd	2000	4	6	Pr	13.3		L
Jones Rd	2000	4	7	Pr	11		L
Jones Rd	2000	4	8	Pr	14.8		L
Jones Rd	2000	4	9	Pr	14.6		L
Jones Rd	2000	4	10	Pr	12.3		L
Jones Rd	2000	4	11	Pr	14.75	13.25	L
Jones Rd	2000	4	12	Pr	11.6		L
Jones Rd	2000	4	13	Pr	9.8		L
Jones Rd	2000	4	14	Pr	11.2		L
Jones Rd	2000	4	15	Pr	12.15		L
Jones Rd	2000	4	16	Pr	14		L
Jones Rd	2000	4	17	Pr	11.1		L
Jones Rd	2000	4	18	Pr	12.35		L
Jones Rd	2000	4	19	Pr	14.6		L
Jones Rd	2000	4	20	Pr	12		L
Jones Rd	2000	4	21	Pr	9		L
Jones Rd	2000	4	22	Pr	16	12.5	L
Jones Rd	2000	4	23	Pr	10.6		L
Jones Rd	2000	4	24	Pr	11		L
Jones Rd	2000	4	25	Pr	11.9		L
Jones Rd	2000	4	26	Pr	12.5	12	L
Jones Rd	2000	4	27	Pr	16.3		L
Jones Rd	2000	5	1	Pr	13.8		L
Jones Rd	2000	5	2	Pr	22.1		L
Jones Rd	2000	5	3	Pr	15		L
Jones Rd	2000	5	4	Pr	9.2		L
Jones Rd	2000	5	5	Pr	13.4	13.75	L
Jones Rd	2000	5	6	Pr	19.4		L
Jones Rd	2000	5	7	Pr	8.8		L
Jones Rd	2000	5	8	Pj	21.3		L
Jones Rd	2000	5	9	Pr	16.2	13	L
Jones Rd	2000	5	10	Pr	14.2		L
Jones Rd	2000	5	11	Pr	16.5		L
Jones Rd	2000	5	12	Pr	9.1	12.5	L
Jones Rd	2000	5	13	Pr	17.3		L
Jones Rd	2000	5	14	Pr	16.7		L
Jones Rd	2000	5	15	Pr	14.7	14.75	L
Jones Rd	2000	5	16	Pr	14.8		L
Jones Rd	2000	5	17	Pr	15.1		L
Jones Rd	2000	5	18	Pr	18.1		L
Jones Rd	2000	5	19	Pr	14.9		L
Jones Rd	2000	5	20	Pr	5.8		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2000	5	21	Pr	18.8	15.1	L
Jones Rd	2000	5	22	Pr	18.3		L
Jones Rd	2000	5	23	Pr	8.9		L
Jones Rd	2000	5	24	Pr	17.4		L
Jones Rd	2000	5	25	Pr	7.9	13.37	L
Jones Rd	2000	5	26	Pr	15.6	14.51	L
Jones Rd	2000	5	27	Pr	17.7		L
Jones Rd	2000	5	28	Pr	7.2		L
Jones Rd	2000	5	29	Pr	21.4	15.5	L
Jones Rd	2000	5	30	Pr	18		L
Jones Rd	2000	6	1	Pr	12.4		L
Jones Rd	2000	6	2	Pr	15.5		L
Jones Rd	2000	6	3	Pr	11		L
Jones Rd	2000	6	4	Pr	17.9		L
Jones Rd	2000	6	5	Pr	12.2		L
Jones Rd	2000	6	6	Pr	14.8	12.75	L
Jones Rd	2000	6	7	Pr	15		L
Jones Rd	2000	6	8	Pr	17.4		L
Jones Rd	2000	6	9	Pr	15.3		L
Jones Rd	2000	6	10	Pr	16		L
Jones Rd	2000	6	11	Pr	19		L
Jones Rd	2000	6	12	Pr	14.4	13.5	L
Jones Rd	2000	6	13	Pr	14.2	13	L
Jones Rd	2000	6	14	Pr	14.9		L
Jones Rd	2000	6	15	Pr	10.5	11.5	L
Jones Rd	2000	6	16	Pr	14.4	13.75	L
Jones Rd	2000	6	17	Pr	2.5		L
Jones Rd	2000	6	18	Pr	17.3		L
Jones Rd	2000	6	19	Pr	6.7		L
Jones Rd	2000	6	20	Pr	18.9		L
Jones Rd	2000	6	21	Pr	17.1		L
Jones Rd	2000	7	1	Pr	14.6	12.5	L
Jones Rd	2000	7	2	Pr	14.5		L
Jones Rd	2000	7	3	Pr	16		L
Jones Rd	2000	7	4	Pr	4.9		L
Jones Rd	2000	7	5	Pr	13.3	14.5	L
Jones Rd	2000	7	6	Pr	11.9	13.25	L
Jones Rd	2000	7	7	Pr	8.5		L
Jones Rd	2000	7	8	Pr	11.1	12.75	L
Jones Rd	2000	7	9	Pr	13.8		L
Jones Rd	2000	7	10	Pr	13.9		L
Jones Rd	2000	7	11	Pr	15.4		L
Jones Rd	2000	7	12	Pr	11.5		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2000	7	13	Pr	13.1	12.5	L
Jones Rd	2000	7	14	Pr	15.7		L
Jones Rd	2000	7	15	Pr	16.4		L
Jones Rd	2000	7	16	Pr	14.4		L
Jones Rd	2000	7	17	Pr	18.35		L
Jones Rd	2000	7	18	Pr	17.8	12.75	L
Jones Rd	2000	7	19	Pr	19		L
Jones Rd	2000	7	20	Pr	8.9		L
Jones Rd	2000	7	21	Pr	18.5		L
Jones Rd	2000	7	22	Pr	14.9		L
Jones Rd	2000	7	23	Pr	8.4	10.5	L
Jones Rd	2000	7	24	Pr	1.9		L
Jones Rd	2000	7	25	Pr	2	3.05	L
Jones Rd	2000	7	26	Pr	17.1		L
Jones Rd	2000	8	1	Pr	15.8		L
Jones Rd	2000	8	2	Pr	17.5		L
Jones Rd	2000	8	3	Pr	19.1		L
Jones Rd	2000	8	4	Pr	15.7	13.25	L
Jones Rd	2000	8	5	Pr	15.5		L
Jones Rd	2000	8	6	Pr	19.1		L
Jones Rd	2000	8	7	Pr	14.1		L
Jones Rd	2000	8	8	Pr	12		L
Jones Rd	2000	8	9	Pr	8.1		L
Jones Rd	2000	8	10	Pr	18.7		L
Jones Rd	2000	8	11	Pr	17.4		L
Jones Rd	2000	8	12	Pr	17	14	L
Jones Rd	2000	8	13	Pr	16.3		L
Jones Rd	2000	8	14	Bw	3		L
Jones Rd	2000	8	15	Pr	17.2		L
Jones Rd	2000	8	16	Pr	10		L
Jones Rd	2000	8	17	Pr	14.2		L
Jones Rd	2000	8	18	Pr	18.4		L
Jones Rd	2000	8	19	Pr	17.5	14.75	L
Jones Rd	2000	8	20	Pr	15.1	15	L
Jones Rd	2000	8	21	Pr	16.9		L
Jones Rd	2000	8	22	Pr	17.8		L
Jones Rd	2000	8	23	Pr	16.6		L
Jones Rd	2000	8	24	Pr	16.3		L
Jones Rd	2008	1	1	Pr	15.2		L
Jones Rd	2008	1	2	Pr	14.9		L
Jones Rd	2008	1	3	Pr	20		L
Jones Rd	2008	1	4	Pr	17		L
Jones Rd	2008	1	5	Pr	16.5		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2008	1	6	Pr	16.2		L
Jones Rd	2008	1	7	Pr	12.3	12.9	L
Jones Rd	2008	1	8	Pr	17.6		L
Jones Rd	2008	1	9	Pj	16.9		L
Jones Rd	2008	1	10	Pr	12.9		L
Jones Rd	2008	1	11	Pr	18	15.5	L
Jones Rd	2008	1	12	Pr	20.2		L
Jones Rd	2008	1	13	Pr	21.6		L
Jones Rd	2008	1	14	Pr	12		L
Jones Rd	2008	1	15	Pr	22.6		L
Jones Rd	2008	1	16	Pr	11.6		L
Jones Rd	2008	1	17	Pr	22.3	17.8	L
Jones Rd	2008	1	18	Pr	17.4		L
Jones Rd	2008	1	19	Pr	17.1		L
Jones Rd	2008	1	20	Pr	15.7		L
Jones Rd	2008	1	21	Pr	15.1		L
Jones Rd	2008	1	22	Pr	19.8	17.5	L
Jones Rd	2008	1	23	Pr	15.4		L
Jones Rd	2008	1	24	Pr	15.3	15.3	L
Jones Rd	2008	1	25	Pr	13.9		L
Jones Rd	2008	1	26	Pr	14.1		L
Jones Rd	2008	1	27	Pr	14.8		L
Jones Rd	2008	1	28	Pr	15.7		L
Jones Rd	2008	2	1	Pr	13.5		L
Jones Rd	2008	2	2	Pr	19.5	16.1	L
Jones Rd	2008	2	3	Pr	14.7		L
Jones Rd	2008	2	4	Pr	12.3		L
Jones Rd	2008	2	5	Pr	15.5	13.8	L
Jones Rd	2008	2	6	Pr			DS
Jones Rd	2008	2	7	Pr	14.6		L
Jones Rd	2008	2	8	Pr	17.7		L
Jones Rd	2008	2	9	Pr	16		L
Jones Rd	2008	2	10	Pr	18	12.6	L
Jones Rd	2008	2	11	Pr	16.9	13.5	L
Jones Rd	2008	2	12	Pr	12.4		L
Jones Rd	2008	2	13	Pr	16.4	14	L
Jones Rd	2008	2	14	Pr	15.6		L
Jones Rd	2008	2	15	Pr	18	14.1	L
Jones Rd	2008	2	16	Pr	14.8	12.6	L
Jones Rd	2008	2	17	Pr	14.9		L
Jones Rd	2008	2	18	Pr	15.7	14.1	L
Jones Rd	2008	2	19	Pr	17.9		L
Jones Rd	2008	2	20	Pr	17.9		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2008	2	21	Pr	18.2	15.1	L
Jones Rd	2008	2	22	Pr	15		L
Jones Rd	2008	3	1	Pr	12.1	14.8	L
Jones Rd	2008	3	2	Pr	16		L
Jones Rd	2008	3	3	Pr	10.3		L
Jones Rd	2008	3	4	Pr	15.7	15	L
Jones Rd	2008	3	5	Pr	15.1	14.2	L
Jones Rd	2008	3	6	Pr	12.1		L
Jones Rd	2008	3	7	Pr	14.5		L
Jones Rd	2008	3	8	Pr	14.8		L
Jones Rd	2008	3	9	Pr	16.9		L
Jones Rd	2008	3	10	Pr	12.7		L
Jones Rd	2008	3	11	Pr	14		L
Jones Rd	2008	3	12	Pr	15.3		L
Jones Rd	2008	3	13	Pr	16		L
Jones Rd	2008	3	14	Pr	13.5		L
Jones Rd	2008	3	15	Pr	14		L
Jones Rd	2008	3	16	Pr	10.5		L
Jones Rd	2008	3	17	Pr	15.6	14.8	L
Jones Rd	2008	3	18	Pr	16.5		L
Jones Rd	2008	3	19	Pr	13.8	14.8	L
Jones Rd	2008	3	20	Pr	16.5		L
Jones Rd	2008	3	21	Pr	17.3		L
Jones Rd	2008	3	22	Pr	13.2		L
Jones Rd	2008	3	23	Pr	18.1		L
Jones Rd	2008	3	24	Pr	14.9		L
Jones Rd	2008	3	25	Pr	13.9		L
Jones Rd	2008	3	26	Pr	16.9		L
Jones Rd	2008	3	27	Pr	18.6		L
Jones Rd	2008	4	1	Pr	14.5		L
Jones Rd	2008	4	2	Pr	16.6	14..6	L
Jones Rd	2008	4	3	Pr	15		L
Jones Rd	2008	4	4	Pr	12		L
Jones Rd	2008	4	5	Pr	13.5	14.3	L
Jones Rd	2008	4	6	Pr	15.4		L
Jones Rd	2008	4	7	Pr	11.2		L
Jones Rd	2008	4	8	Pr	17.2		L
Jones Rd	2008	4	9	Pr	16.5		L
Jones Rd	2008	4	10	Pr	13.3		L
Jones Rd	2008	4	11	Pr	16	14.9	L
Jones Rd	2008	4	12	Pr	12.5		L
Jones Rd	2008	4	13	Pr	10.6		L
Jones Rd	2008	4	14	Pr	12		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2008	4	15	Pr	12.2		L
Jones Rd	2008	4	16	Pr	14.9		L
Jones Rd	2008	4	17	Pr	12.2		L
Jones Rd	2008	4	18	Pr	13.1		L
Jones Rd	2008	4	19	Pr	16.8		L
Jones Rd	2008	4	20	Pr	13.4		L
Jones Rd	2008	4	21	Pr	9.5		L
Jones Rd	2008	4	22	Pr	17	14.3	L
Jones Rd	2008	4	23	Pr	11.2		L
Jones Rd	2008	4	24	Pr	11.8		L
Jones Rd	2008	4	25	Pr	12.2		L
Jones Rd	2008	4	26	Pr	13.5	14.2	L
Jones Rd	2008	4	27	Pr	17.9		L
Jones Rd	2008	5	1	Pr	14.1		L
Jones Rd	2008	5	2	Pr	24.2		L
Jones Rd	2008	5	3	Pr	15.5		L
Jones Rd	2008	5	4	Pr	9.4		L
Jones Rd	2008	5	5	Pr	13.8	16.7	L
Jones Rd	2008	5	6	Pr	21.4		L
Jones Rd	2008	5	7	Pr			D
Jones Rd	2008	5	8	Pj	22.4		L
Jones Rd	2008	5	9	Pr	18.4	17.8	L
Jones Rd	2008	5	10	Pr	15.2		L
Jones Rd	2008	5	11	Pr	16.7		L
Jones Rd	2008	5	12	Pr			DS
Jones Rd	2008	5	13	Pr	18		L
Jones Rd	2008	5	14	Pr	18.2		L
Jones Rd	2008	5	15	Pr	16.1	18	L
Jones Rd	2008	5	16	Pr	15.3		L
Jones Rd	2008	5	17	Pr	15.9		L
Jones Rd	2008	5	18	Pr	19.5		L
Jones Rd	2008	5	19	Pr	15.9		L
Jones Rd	2008	5	20	Pr			DS
Jones Rd	2008	5	21	Pr	19.9	17	L
Jones Rd	2008	5	22	Pr	20.1		L
Jones Rd	2008	5	23	Pr			DS
Jones Rd	2008	5	24	Pr	18.8		L
Jones Rd	2008	5	25	Pr			DS
Jones Rd	2008	5	26	Pr	15.7	15.3	L
Jones Rd	2008	5	27	Pr	18.6		L
Jones Rd	2008	5	28	Pr			DS
Jones Rd	2008	5	29	Pr	23	17.1	L
Jones Rd	2008	5	30	Pr	19.5		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2008	6	1	Pr	13.2		L
Jones Rd	2008	6	2	Pr	17.1		L
Jones Rd	2008	6	3	Pr	11.8		L
Jones Rd	2008	6	4	Pr	19.3		L
Jones Rd	2008	6	5	Pr	13		L
Jones Rd	2008	6	6	Pr	15.9	14.4	L
Jones Rd	2008	6	7	Pr	16		L
Jones Rd	2008	6	8	Pr	18.7		L
Jones Rd	2008	6	9	Pr	16.5		L
Jones Rd	2008	6	10	Pr	16.7		L
Jones Rd	2008	6	11	Pr	20.5		L
Jones Rd	2008	6	12	Pr	15.2	15.5	L
Jones Rd	2008	6	13	Pr	15.3	15.4	L
Jones Rd	2008	6	14	Pr	16		L
Jones Rd	2008	6	15	Pr	11	13.1	L
Jones Rd	2008	6	16	Pr	15.3	15.6	L
Jones Rd	2008	6	17	Pr			DS
Jones Rd	2008	6	18	Pr	18.8		L
Jones Rd	2008	6	19	Pr			DS
Jones Rd	2008	6	20	Pr	20.6		L
Jones Rd	2008	6	21	Pr	18		L
Jones Rd	2008	7	1	Pr	16	14.5	L
Jones Rd	2008	7	2	Pr	16.5		L
Jones Rd	2008	7	3	Pr	17.5		L
Jones Rd	2008	7	4	Pr	5.2		L
Jones Rd	2008	7	5	Pr	14	15.5	L
Jones Rd	2008	7	6	Pr	12.4	13.5	L
Jones Rd	2008	7	7	Pr	9.2		L
Jones Rd	2008	7	8	Pr	11.2	13	L
Jones Rd	2008	7	9	Pr	15.4		L
Jones Rd	2008	7	10	Pr	15.1		L
Jones Rd	2008	7	11	Pr	16.5		L
Jones Rd	2008	7	12	Pr	12.3		L
Jones Rd	2008	7	13	Pr	13.2	13.75	L
Jones Rd	2008	7	14	Pr	17.1		L
Jones Rd	2008	7	15	Pr	17.9		L
Jones Rd	2008	7	16	Pr	15.6		L
Jones Rd	2008	7	17	Pr	20.5		L
Jones Rd	2008	7	18	Pr	19	14.25	L
Jones Rd	2008	7	19	Pr	19.8		L
Jones Rd	2008	7	20	Pr	9.2		L
Jones Rd	2008	7	21	Pr	20		L
Jones Rd	2008	7	22	Pr	15.8		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2008	7	23	Pr	9	12	L
Jones Rd	2008	7	24	Pr			D
Jones Rd	2008	7	25	Pr			D
Jones Rd	2008	7	26	Pr	18.8		L
Jones Rd	2008	8	1	Pr	16.6		L
Jones Rd	2008	8	2	Pr	18.3		L
Jones Rd	2008	8	3	Pr	21.8		L
Jones Rd	2008	8	4	Pr	18	15.5	L
Jones Rd	2008	8	5	Pr	16.7		L
Jones Rd	2008	8	6	Pr	21		L
Jones Rd	2008	8	7	Pr	14.7		L
Jones Rd	2008	8	8	Pr	12.4		L
Jones Rd	2008	8	9	Pr	8.8		L
Jones Rd	2008	8	10	Pr	19.9		L
Jones Rd	2008	8	11	Pr	18.3		L
Jones Rd	2008	8	12	Pr	17.8	15.75	L
Jones Rd	2008	8	13	Pr	17.6		L
Jones Rd	2008	8	14	Bw	3.5		L
Jones Rd	2008	8	15	Pr	20		L
Jones Rd	2008	8	16	Pr	10		L
Jones Rd	2008	8	17	Pr	14.3		L
Jones Rd	2008	8	18	Pr	19		L
Jones Rd	2008	8	19	Pr	18.5	18.5	L
Jones Rd	2008	8	20	Pr	15.7	18.5	L
Jones Rd	2008	8	21	Pr	17.7		L
Jones Rd	2008	8	22	Pr	18.3		L
Jones Rd	2008	8	23	Pr	17.8		L
Jones Rd	2008	8	24	Pr	17.3		L
Jones Rd	2020	1	1	Pr	16.8		L
Jones Rd	2020	1	2	Pr	17.7	26	L
Jones Rd	2020	1	3	Pr	20.6		L
Jones Rd	2020	1	4	Pr	18.8		L
Jones Rd	2020	1	5	Pr	18.6		L
Jones Rd	2020	1	6	Pr	19.1		L
Jones Rd	2020	1	7	Pr	13.3		L
Jones Rd	2020	1	8	Pr	19.9		L
Jones Rd	2020	1	9	Pj	17.7		L
Jones Rd	2020	1	10	Pr	12.5		Dead
Jones Rd	2020	1	11	Pr	21		L
Jones Rd	2020	1	12	Pr	22.3		L
Jones Rd	2020	1	13	Pr	24.1		L
Jones Rd	2020	1	14	Pr	12.2		L
Jones Rd	2020	1	15	Pr	25.2	27	L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2020	1	16	Pr	12.1		L
Jones Rd	2020	1	17	Pr	23.7		L
Jones Rd	2020	1	18	Pr	20		L
Jones Rd	2020	1	19	Pr	20.4		L
Jones Rd	2020	1	20	Pr	17		L
Jones Rd	2020	1	21	Pr	16.4		L
Jones Rd	2020	1	22	Pr	22.8		L
Jones Rd	2020	1	23	Pr	17		L
Jones Rd	2020	1	24	Pr	14.9		L
Jones Rd	2020	1	25	Pr	15.2		L
Jones Rd	2020	1	26	Pr	16		L
Jones Rd	2020	1	27	Pr	16.9		L
Jones Rd	2020	1	28	Pr	17.6	25.2	L
Jones Rd	2020	2	1	Pr	14.6		L
Jones Rd	2020	2	2	Pr	22.9		L
Jones Rd	2020	2	3	Pr	17		L
Jones Rd	2020	2	4	Pr	16		L
Jones Rd	2020	2	5	Pr	17.2		L
Jones Rd	2020	2	6	Pr	22.6		L
Jones Rd	2020	2	7	Pr	16.3		L
Jones Rd	2020	2	8	Pr	20.1	22.5	L
Jones Rd	2020	2	9	Pr	17.6		L
Jones Rd	2020	2	10	Pr	19.5		L
Jones Rd	2020	2	11	Pr	19.1		L
Jones Rd	2020	2	12	Pr	13.3		L
Jones Rd	2020	2	13	Pr	18.5		L
Jones Rd	2020	2	14	Pr	18	22	L
Jones Rd	2020	2	15	Pr	20.9		L
Jones Rd	2020	2	16	Pr	17.1		L
Jones Rd	2020	2	17	Pr	16.4		L
Jones Rd	2020	2	18	Pr	16.1		L
Jones Rd	2020	2	19	Pr	17.9		L
Jones Rd	2020	2	20	Pr	20		L
Jones Rd	2020	2	21	Pr	20.6		L
Jones Rd	2020	2	22	Pr	17.5	24.7	L
Jones Rd	2020	3	1	Pr	13.1		L
Jones Rd	2020	3	2	Pr	18.8	23.5	L
Jones Rd	2020	3	3	Pr	10.3		L
Jones Rd	2020	3	4	Pr	18.2		L
Jones Rd	2020	3	5	Pr	16.7		L
Jones Rd	2020	3	6	Pr	12.2		L
Jones Rd	2020	3	7	Pr	16.6		L
Jones Rd	2020	3	8	Pr	13.8		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2020	3	9	Pr	18.3	22.7	L
Jones Rd	2020	3	10	Pr	14.1		L
Jones Rd	2020	3	11	Pr	15.2		L
Jones Rd	2020	3	12	Pr	17.1		L
Jones Rd	2020	3	13	Pr	18.6		L
Jones Rd	2020	3	14	Pr	15.3		L
Jones Rd	2020	3	15	Pr	15.5		L
Jones Rd	2020	3	16	Pr	10.9		Dead
Jones Rd	2020	3	17	Pr	17.2		L
Jones Rd	2020	3	18	Pr	19		L
Jones Rd	2020	3	19	Pr	14.3		L
Jones Rd	2020	3	20	Pr	19.5		L
Jones Rd	2020	3	21	Pr	20.9		L
Jones Rd	2020	3	22	Pr	14.7		L
Jones Rd	2020	3	23	Pr	20.7		L
Jones Rd	2020	3	24	Pr	16.5		L
Jones Rd	2020	3	25	Pr	15.7		L
Jones Rd	2020	3	26	Pr	20.3		L
Jones Rd	2020	3	27	Pr	21.8	26	L
Jones Rd	2020	4	1	Pr	15.7		L
Jones Rd	2020	4	2	Pr	19.1		L
Jones Rd	2020	4	3	Pr	16.3		L
Jones Rd	2020	4	4	Pr	12.8		L
Jones Rd	2020	4	5	Pr	14.8		L
Jones Rd	2020	4	6	Pr	18		L
Jones Rd	2020	4	7	Pr	12.2		L
Jones Rd	2020	4	8	Pr	19.5		L
Jones Rd	2020	4	9	Pr	17.9		L
Jones Rd	2020	4	10	Pr	14.2		L
Jones Rd	2020	4	11	Pr	18.9		L
Jones Rd	2020	4	12	Pr	13.2		L
Jones Rd	2020	4	13	Pr	11.3		L
Jones Rd	2020	4	14	Pr	13.1		L
Jones Rd	2020	4	15	Pr	13.4		L
Jones Rd	2020	4	16	Pr	17	23.4	L
Jones Rd	2020	4	17	Pr	13.9		L
Jones Rd	2020	4	18	Pr	14.5		L
Jones Rd	2020	4	19	Pr	19.8		L
Jones Rd	2020	4	20	Pr	14.6		L
Jones Rd	2020	4	21	Pr	9.9		L
Jones Rd	2020	4	22	Pr	19.1	23.5	L
Jones Rd	2020	4	23	Pr	12		L
Jones Rd	2020	4	24	Pr	12.6		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2020	4	25	Pr	12.6		L
Jones Rd	2020	4	26	Pr	15.7		L
Jones Rd	2020	4	27	Pr	20.2	21.5	L
Jones Rd	2020	5	1	Pr	15.1		L
Jones Rd	2020	5	2	Pr	27.4		L
Jones Rd	2020	5	3	Pr	17.5		L
Jones Rd	2020	5	4	Pr			Dead
Jones Rd	2020	5	5	Pr	14.2		L
Jones Rd	2020	5	6	Pr	24.5		L
Jones Rd	2020	5	7	Pr			Dead
Jones Rd	2020	5	8	Pj	24		L
Jones Rd	2020	5	9	Pr	21.9		L
Jones Rd	2020	5	10	Pr	17.1	25.5	L
Jones Rd	2020	5	11	Pr	18.1		L
Jones Rd	2020	5	12	Pr			Dead
Jones Rd	2020	5	13	Pr	21.2		L
Jones Rd	2020	5	14	Pr	19.1		L
Jones Rd	2020	5	15	Pr	17.7		L
Jones Rd	2020	5	16	Pr	17.5		L
Jones Rd	2020	5	17	Pr	16.6		L
Jones Rd	2020	5	18	Pr	22.1		L
Jones Rd	2020	5	19	Pr	17.3		L
Jones Rd	2020	5	20	Pr			Dead
Jones Rd	2020	5	21	Pr	22.1		L
Jones Rd	2020	5	22	Pr	22.6	26	L
Jones Rd	2020	5	23	Pr			Dead
Jones Rd	2020	5	24	Pr	21.3		L
Jones Rd	2020	5	25	Pr			Dead
Jones Rd	2020	5	26	Pr	17		L
Jones Rd	2020	5	27	Pr	20.6		L
Jones Rd	2020	5	28	Pr			Dead
Jones Rd	2020	5	29	Pr	26.2		L
Jones Rd	2020	5	30	Pr	21.9	27.75	L
Jones Rd	2020	6	1	Pr	14.6	22.25	L
Jones Rd	2020	6	2	Pr	19.6		L
Jones Rd	2020	6	3	Pr	12.1		L
Jones Rd	2020	6	4	Pr	21.9	25.25	L
Jones Rd	2020	6	5	Pr	14.4		L
Jones Rd	2020	6	6	Pr	16.6		L
Jones Rd	2020	6	7	Pr	18.2		L
Jones Rd	2020	6	8	Pr	20.9		L
Jones Rd	2020	6	9	Pr	18.2		L
Jones Rd	2020	6	10	Pr	18.5		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2020	6	11	Pr	23.5		L
Jones Rd	2020	6	12	Pr	16.9		L
Jones Rd	2020	6	13	Pr	17.4		L
Jones Rd	2020	6	14	Pr	18.2		L
Jones Rd	2020	6	15	Pr	11.2		L
Jones Rd	2020	6	16	Pr	17		L
Jones Rd	2020	6	17	Pr			Dead
Jones Rd	2020	6	18	Pr	21.4		L
Jones Rd	2020	6	19	Pr			Dead
Jones Rd	2020	6	20	Pr	23.9		L
Jones Rd	2020	6	21	Pr	19.4	22.75	L
Jones Rd	2020	7	1	Pr	18.9		L
Jones Rd	2020	7	2	Pr	20.9		L
Jones Rd	2020	7	3	Pr	21.2		L
Jones Rd	2020	7	4	Pr			Dead
Jones Rd	2020	7	5	Pr	15.2		L
Jones Rd	2020	7	6	Pr	12.5		L
Jones Rd	2020	7	7	Pr	9.8		L
Jones Rd	2020	7	8	Pr			Dead
Jones Rd	2020	7	9	Pr	16.2		L
Jones Rd	2020	7	10	Pr	17.2		L
Jones Rd	2020	7	11	Pr	18.7		L
Jones Rd	2020	7	12	Pr	12.8		L
Jones Rd	2020	7	13	Pr	13.9		L
Jones Rd	2020	7	14	Pr	19.5		L
Jones Rd	2020	7	15	Pr	20.9		L
Jones Rd	2020	7	16	Pr	17.6		L
Jones Rd	2020	7	17	Pr	24.3	25.75	L
Jones Rd	2020	7	18	Pr	20.5		L
Jones Rd	2020	7	19	Pr	22.6	24	L
Jones Rd	2020	7	20	Pr			Dead
Jones Rd	2020	7	21	Pr	23		L
Jones Rd	2020	7	22	Pr	18.1		L
Jones Rd	2020	7	23	Pr	9.1		L
Jones Rd	2020	7	24	Pr			Dead
Jones Rd	2020	7	25	Pr			Dead
Jones Rd	2020	7	26	Pr	22	23.25	L
Jones Rd	2020	8	1	Pr	17.4		L
Jones Rd	2020	8	2	Pr	20.7		L
Jones Rd	2020	8	3	Pr	23.8		L
Jones Rd	2020	8	4	Pr	20.4		L
Jones Rd	2020	8	5	Pr	18.9		L
Jones Rd	2020	8	6	Pr	23.2		L

Location	Year	Plot #	Tree #	Species	Dbh (cm)	Ht (m)	Status
Jones Rd	2020	8	7	Pr	16.1	22.5	L
Jones Rd	2020	8	8	Pr	13.3		L
Jones Rd	2020	8	9	Pr			Dead
Jones Rd	2020	8	10	Pr	22.8		L
Jones Rd	2020	8	11	Pr	19.5		L
Jones Rd	2020	8	12	Pr	21.1		L
Jones Rd	2020	8	13	Pr	20.4		L
Jones Rd	2020	8	14	Bw			Dead
Jones Rd	2020	8	15	Pr	21		L
Jones Rd	2020	8	16	Pr			Dead
Jones Rd	2020	8	17	Pr	15.4		L
Jones Rd	2020	8	18	Pr	21.3		L
Jones Rd	2020	8	19	Pr	20.4	24.25	L
Jones Rd	2020	8	20	Pr	17.2		L
Jones Rd	2020	8	21	Pr	19.5		L
Jones Rd	2020	8	22	Pr	19.7		L
Jones Rd	2020	8	23	Pr	20.2		L
Jones Rd	2020	8	24	Pr	19.1	24.25	L