



BUILDING A CASE FOR SUSTAINABLE MANAGEMENT OF PRIVATE WOODLANDS

CASE STUDY: SOMERVILLE WOODLOT

What factors motivate private woodland owners to manage their woodlots sustainably? For some it is personal interest or stewardship ethic, while others may be more influenced by potential for economic returns.

This is one of several case studies profiling woodland owners who have not only demonstrated long-term stewardship of their forests, but have also documented financial returns over the years. The case studies have been undertaken, in part, to investigate if economic returns from woodlots can compare favourably with those from agriculture. Returns from these managed forests (mostly from timber sales but possibly including other activities such as production of maple syrup) have been compared to the income from agricultural crops on comparable land over the same period.

It is hoped these case studies will provide incentive for woodlot owners to manage their woodlots responsibly, either by demonstrating the potential for enhanced long-term financial returns or through the example of responsible stewardship provided by the woodland owners profiled in the case studies.

We appreciate the assistance of the woodland owners who have so generously shared their stories with us.

Part One: The John Somerville Woodlot Story

by Ron Wu-Winter, formerly Forestry Programs Manager, Ontario Forestry Association

It is only a few short miles from the boardroom of Somerville Nurseries to the forest property where John Somerville spent the first years of his life, a life during which John has been directly involved in most aspects of forestry in Ontario. From seedling production through to sawmilling, John has done it all.

John's earliest memories are of life beside the mill that his grandfather operated on a corner of the 'Welch' farm in what is now Mulmur Township in Dufferin County. He remembers the mill as a very busy place and how teams of horses hauled sleigh loads of logs down the hill to the mill beside the creek. He especially remembers the long 1 ½ mile walk to his first school. John's grandfather, Peter

Thomson Sr., bought the 500 acre property in 1918. Some of the timber that fed the Welch mill came from the property's woodlot and the nearby Berry-Robinson property that the family company purchased in the 1920's - woodlots that John and his family still own and manage today.

Although John moved off the Welch property when he was five, he was never far from a sawmill. He and his family had moved to Alliston where they had just built a new mill. It was the early 1930's and times were difficult. John recalls talk around the dinner table of a 'huge' \$10,000 loan. The loan seemed insurmountable, but the family mill survived the depression by selling hardwood chute blocks and pit

props to International Nickel of Sudbury for \$18 per 1000 f.b.m., as well as higher quality lumber to other customers.

As timber started to run out in the Alliston area, the family bought a mill and acquired 48,000 acres of crown timber limits northeast of Huntsville near the village of Kearney. They intended to produce chute blocks from hard maple but with the arrival of WWII, the money turned out to be in yellow birch. Yellow birch veneer and balsa wood were being used in the wartime production of De Haviland's "Mosquito Bombers." From barely breaking even in the depression, John tells of how the family's fortunes changed. "Birch veneer was selling at the unheard of price of \$200 per thousand (f.b.m.)," recalls John, "and we sold a lot of veneer logs from the Kearney timber limits." Although he never had the opportunity to fly a Mosquito Bomber, John actually trained with the Royal Canadian Air Force and graduated as a pilot in late 1944. He and his classmates were placed in a special reserve that did not see active duty before the war ended less than a year later.

Peter Thomson Sr. died in 1948 while John was studying forestry at the University of Toronto. John graduated the next year and in 1950, his uncles Peter and Greig Thomson, along with his mother and father, incorporated the family business as Peter Thomson & Sons Ltd. That same year, John married Jean Slack and they moved to the mill in Kearney. He describes the town at the time: "It was a god-forsaken place that incorporated just so that they'd be allowed to open a second beer parlour," John laughs, and quickly adds how much he enjoyed the people of Kearney and the lifestyle the area provided. John ran timber cruise lines and used the relatively new technology of aerial photos to prepare forest management plans for the mill's timber limits.

Around the same time, John started to plant Christmas trees in open areas on some of his grandfather's properties near Alliston. From 3500 Scots pine planted in the first year, Christmas tree production grew to become a major component of the family business. The original motivator in their decision to start a tree nursery was a lack of seedlings for Christmas tree production in the 1950's. Initially the company produced seedlings primarily for their own use, selling off some of the surplus.

In the early 1960's, several tragic incidents happened within the Thomson family. First, John's uncle Peter Thomson was killed in a hunting accident. In the fol-

lowing year Ernie Stamp, the manager of the Kearney mill, died from a heart attack, their accountant Larry Peaker died, and John's uncle Greig suffered a stroke. Within two short years, the company's key members were gone or unable to continue operating the business. In 1963, the company re-stabilized, with John and his cousin John Thomson assuming key management and ownership roles along with John's brother, Dave Somerville.

In 1978, the holding company that included the Christmas tree and seedling production components of the family business changed its name to better reflect its nature. Somerville Nurseries Ltd. operated side-by-side with Peter Thomson & Sons which continued in the lumber business until 1990. Christmas and landscape tree production, along with tree seedlings, are still the core businesses of Somerville Nurseries. They are currently Ontario's largest supplier of Christmas trees and also produce large tree stock for landscape use. In 1997, they started to increase their level of seedling production for outside sale. The company now produces around 3 million seedlings annually for use in reforestation and for their own Christmas and landscape tree production.

Like their great grandfather, grandparents and parents, all three of John's sons have chosen careers in which trees have a central role. Fred and Robert are directly involved in the daily operations of Somerville Nurseries - Fred Somerville as the company's president. Tom Somerville is currently the Manager of the Pesticide Technician Program for Ontario (2005).

Through all of the business transactions and growth of Somerville Nurseries, the Welch and Berry-Robinson woodlots have remained within the Thomson/Somerville family. Historical and current information from these two woodlots, is described in Part 2 of this study. During the interview for the MNR case study, John shared how the main objective for his woodlots has more or less remained the same over time: "To grow good timber and hopefully to sell it." However, he quickly added that they have always taken wildlife habitat into consideration, even before the term 'biodiversity' was in common use.

When asked what he would have done differently in his woodlots, he states that at times he should have watched logging operations more closely. During one of their harvests, tree skidding operations caused significant damage to some of the trees. Over a decade later, they are still dealing with the damaged trees and the loss of potential growth and revenue. John

also adds that he is always surprised by the range in offers on timber contracts, and underlines the importance of having bids from several purchasers.

Even after all of these years, John still enjoys the feeling he gets when walking through a good stand of hardwood. When asked about forestry as a profession, he returns to the enjoyment he finds in his woodlots. "If you're a forester, you'd better love the bush and being in it," he states. "Otherwise you may as well get out of it." Good advice from a man who has been working with trees and forests all of his life.

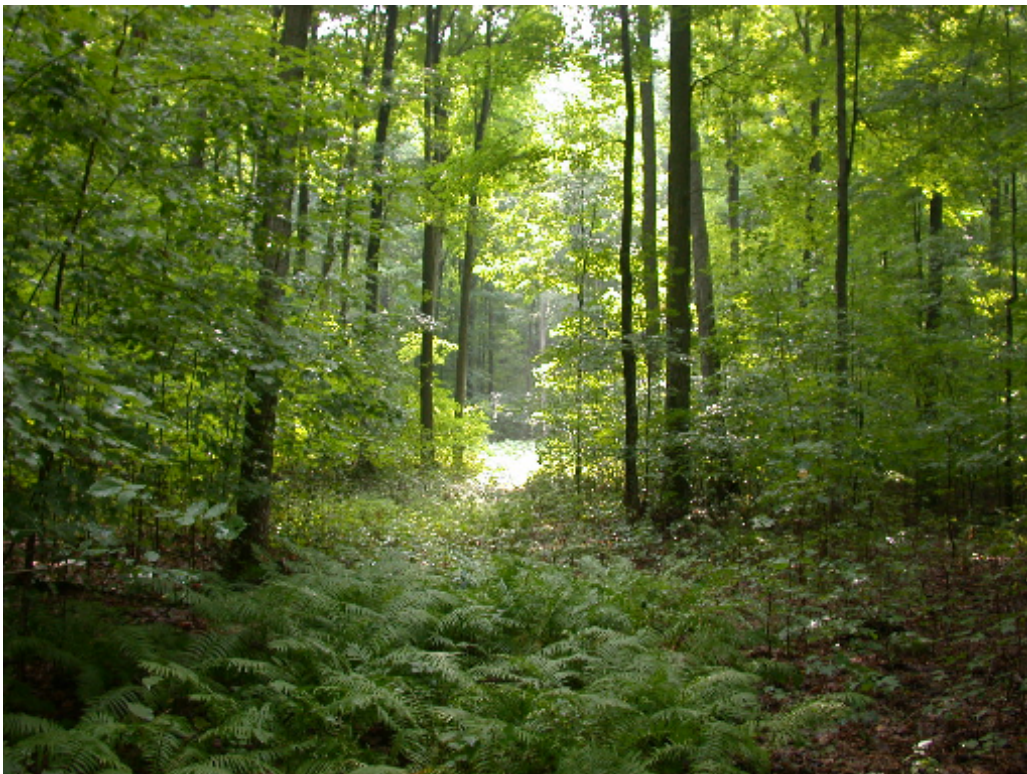
2012 Update

John has retired from active management of Somerville Nurseries. The family will continue to manage the forest sustainably to protect habitat and water values, as well as produce high-quality timber.



John Somerville with son Fred.

Forest scene in the Welch property



Is This Forest Being Managed in a Sustainable Way?

It has been asked if the forests profiled in these case studies are being managed sustainably, or if the growing stock may have been sacrificed in the interest of short term economic gain. In an effort to answer this question an inventory was carried out in several of the case study sites and the data compared to the recommended stand structure diagram for tolerant hardwoods in Site region 6E (which includes much of the area where these case studies are located). The stand structure diagram (see “Recommended” curve in Figure 1) represents the ideal size class distribution in an all age forest being managed under a single tree selection system, as is recommended for upland tolerant hardwood forests such as the one represented in this case study. The “y” axis represents the number of trees per unit of area, while the “x” axis represents the diameter at breast height (dbh) of the trees. The resulting curve, often referred to as a “Reverse J” curve, is representative of trees found in a well managed stand, i.e. many trees in the smaller size classes and progressively fewer as size increases.

The Berry Robinson woodlot, with a BA of 24m² per ha, has a large surplus of trees in the 30 to 45 cm size class. There were no trees greater than 55 cm. The stand is 72% sugar maple and 10% beech.

The Welch property has a slightly lower BA at 22 m² per ha. There is a large surplus of trees in the 25 to 35 cm size class and no trees greater than 50 cm. The stand is 75% sugar maple.

There were very few poor-quality standing trees in either forest, indicating recent harvests had been conducted following good forestry practices. As indicated in the 1956 study, previous harvests were diameter limit cuts, leaving large cull trees. Both properties have been harvested two to three times since then according to acceptable silvicultural practices. It appears that over a couple of harvest cycles most of the poor-quality trees were removed and the stand structure on both properties is approaching acceptable parameters for well-managed stands.

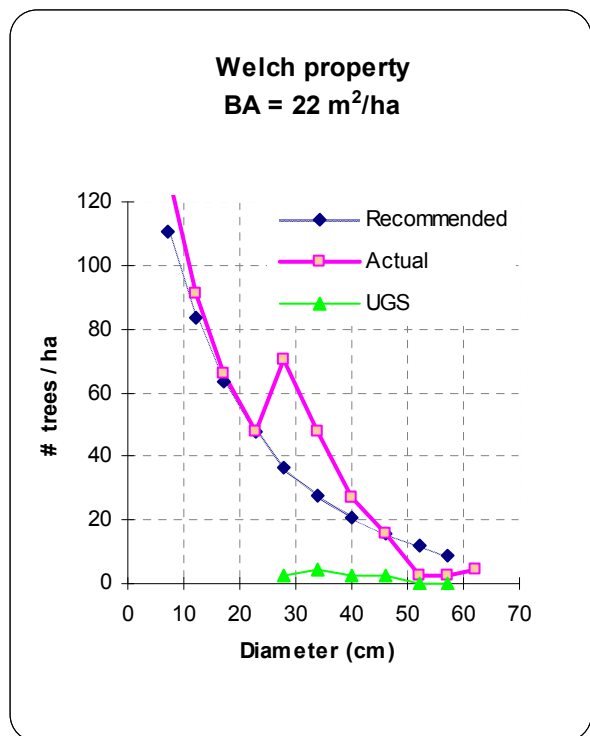
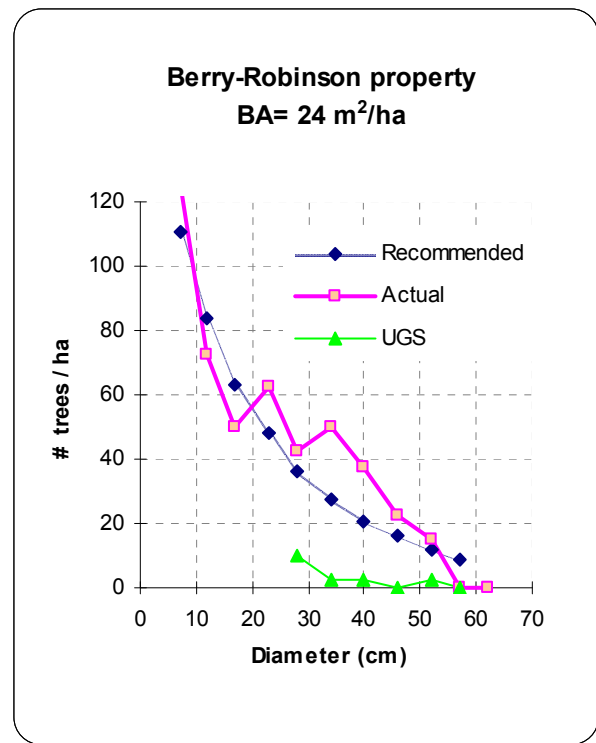


Figure 1. Forest structure on the two properties in 2005.

Part Two: Economic Comparison of Woodlot and Crop Production for the Somerville Case Study

This case study utilizes forest inventory and growth studies to illustrate how forest properties can be managed sustainably over a long period of time. Woodland data was not compared to returns from agricultural crops because complete forest harvest records were not available.

The Somerville's have commissioned a series of forest growth studies over the years. These studies show that forest growth is excellent, that growth has been maintained over a 50-year period, that quality improves with good silvicultural practices and that forest harvest can be sustained with good forestry management. Although the Somerville's own a number of forest properties, this report will consider only two; the Welch and the Berry-Robinson properties. Both are located in Mulmur Township, Dufferin County and both are upland hardwood forests with sugar maple the most dominant species.

Welch Property

The Welch property was acquired in 1918 and is about 441 acres (179 ha) in size. It is divided into 10 compartments for management purposes. It was also the site of the original family sawmill. Since the property was acquired, timber has been harvested in various locations throughout the property at intervals of about 25 years. The first Ministry of Natural Resources (MNR) marking, based on silvicultural standards, was done in 1987. Timber harvest following good forestry practices has occurred in the various Working Groups since then. The most recent harvest in Compartment 4 yielded 88,957 fbm of logs on 47 acres for \$63,868. The Welch property is under the Managed Forest Tax Incentive Program (MFTIP). The property management plan has detailed Working Group descriptions with long-and short-term objectives and corresponding strategies for plan implementation.

Growth Studies

Results of the 1956 study indicated the property had been 'logged over', within the last 20 years. This 'logging' was probably a heavy diameter limit cut (all merchantable trees over 12 inches dbh). Large cull trees were left. The study showed overall gross merchantable volume was 2604 fbm per acre on trees greater than 13 inches dbh (Table 1). There was, however, another 7550 fbm per acre (1360 ft³

per acre) in trees less than 13 inches dbh – a stand very well stocked in small sawlogs and poles. "The young hard maple stands were growing extremely well, the trees were tall and straight and represent an investment yielding a good return."

In 2004 another study was conducted on compartment W-2 of the Welch property (the same area studied in 1956). This stand was harvested in the winter of 1993-94 and again in the winter of 2003-04. See Table 2.

In 2004, typical tree age was 85 years. Basal area (BA) was 83 ft² per acre (19 m² per ha) on trees 4 inches dbh or larger. Ninety percent of the stand was sugar maple. From 1984 to 1994 the stand grew a total of 2230 fbm per acre (Table 2). From 1994 to 2004 (following harvest) the total growth was approximately 3070 fbm per acre. Volume harvested in 1994 and 2004 slightly exceeded indicated growth because a number of trees grew into the 13 inch size class and due to range of variation in measurements. Calculations to predict growth in the ten year period from 2004 to 2014 use a growth rate of 3,070 fbm per acre.

1956 Growth Study

The first growth study was conducted by Dave Love, forestry professor at the University of Toronto, for Greig Thompson, uncle of John Somerville. Sixteen Somerville properties (including the Welch and Berry Robinson sites) were surveyed to determine:

"the gross merchantable cubic foot volume of timber on those areas. The field work and compilation were designed to provide separate estimates for principal species and tree diameter groups. In addition to the cubic foot volume estimate, an approximation of the foot board measure (fbm) volume in trees 13 inches and over diameter breast height (dbh) was required. The gross merchantable board foot volume was determined from the gross merchantable cubic foot volume using a conversion factor of 180 ft³ equivalent to 1000 fbm."

On the Welch property there were at least 100 one-tenth acre sample plots established on good hardwood. On the Berry Robinson property 32 samples were taken on a 40 acre area.

Berry Robinson Property

The Berry Robinson property is 72 acres (29 ha). It was acquired in the 1920's and logged at that time; then logged again in the 40's and once more in the late 60's. These 'logging' activities were probably heavy diameter limit cuts (i.e. all merchantable trees over 12 inches). A number of large cull trees were left behind. In 1985, the MNR marked it for an improvement cut and marked it again according to good forestry practices in 1997 for a light commercial harvest. A recent harvest in 2007 realized \$130,000 or \$1,800 per acre. The Berry Robinson property is included in the MFTIP with long- and short-term objectives and a strategy for plan implementation.

Growth Studies

Results of the 1956 study showed an overall net volume of 1250 fbm per acre on trees greater than 13 inches dbh. There was, however, another 6220 fbm per acre (1120 ft³ per acre) volume present in trees less than 13 inches dbh. This indicates the stand was well stocked in small sawlog and polewood sized trees. See Table 1.

An informal operational survey on 'a number' of cut maple stumps was conducted following a 1997 harvest by Dave Rozycki, Forest Consultant for the Somerville properties. He determined that;

- mean annual diameter growth of the average tree was 0.23 inches, and;
- mean annual diameter growth during the 10 years preceding the 1997 harvest was 0.31 inches. Note: The growth rate of 0.31 inches per year was achieved following the improvement harvest in 1985. There was great variation in diameter growth between trees and within the same tree.

From these results Rozycki reported:

"The inventory of 1996 showed there were 70 trees per acre in the sawlog size class (12 inches dbh and larger). If we assume an average log length of 24 feet and average growth of .31 inches per year, then each tree would put on an average volume of 6.3 fbm per year – a total of 444 fbm per acre per year" for that 10-year period only.

Conclusion

In 1956, the Somervilles had the foresight to obtain a forest inventory and growth study on their forest properties. That first study and subsequent growth

2004 Growth Study

A study was undertaken by Silv-Econ Ltd., a forest consulting company from Newmarket. The objectives of this study, on compartment W-2 of the Welch property were to:

- estimate the ten-year forest growth response to a 1993-94 selection thinning
- compare increases in diameter growth and merchantable volume during the 1994-2004 period to that from 1984-1994, when no harvest had taken place for a number of years.
- estimate volume and value of timber in 2004 and 2014.

Fifty sugar maple trees were sampled – in sizes representative of the diameters of trees in the 2004 residual forest. Sample trees ranged between 6 and 25 inches dbh.

studies would guide their forest harvests for years to come. A management plan provided guidance to follow objectives and maintain a harvest cycle that optimizes growth.

The various studies showed growth rates of over 200 fbm per acre per year throughout the upland hardwood areas. This growth rate can vary depending on time between harvests and wood volume removed during harvest. Past studies throughout southern Ontario found upland hardwood forests can grow 200 to 400 fbm per acre per year depending on site quality and intensity of management.

The 2005 inventory showed a stand structures coming close to the recommended curve and with a surplus of trees in the 25 to 45 cm classes (Figure 1). These trees are mostly high quality and will provide high value in the next 40 years.

Numerous studies have shown that forests harvested under a series of diameter limit cuts tend to have a reduction of overall tree quality and lack of representation in larger size classes. It is evident from the Somerville properties that forests with a history of heavy diameter-limit harvests can recover over time. Correct tree selection that optimizes growth rates and improves quality will provide quality timber over a short time period (i.e. two or three cutting cycles). A harvest every 10 to 15 years can be expected following adoption of better management practices. In recent years the Somerville forests have become more productive income-generating forests due to improved silvicultural practices.

Table 1. Timber volume by species and size class on Welch and Berry Robinson properties in 1956.

Property	Maple		Beech		Ash		Other Hardwoods		Hemlock		Total Volume (various units)	
	4 - 12	13+	4 -12	13+	4 -12	13+	4 -12	13+	4 -12	13+	4 -12	13+
Welch												
Gross Volume (Ft ³ per acre)	580	170	50	80	60	20	140	110	60	90	890	470
<i>Gross Merchantable Volume (fbm per acre)</i>		<i>938</i>		<i>444</i>		<i>111</i>		<i>611</i>		<i>500</i>		<i>2604</i>
Berry-Robinson												
Gross Volume (Ft ³ per acre)	430	110	100	40	100	30	110	50	80	70	820	300
<i>Gross Merchantable Volume (fbm per acre)</i>		<i>600</i>		<i>225</i>		<i>175</i>		<i>275</i>		<i>400</i>		<i>1675</i>

Table 2. Summary of forest growth and harvest for the Welch property 1984 to 2014.

Year ending	1984	1994 pre harvest	1994 harvest	2004 harvest	2004 post harvest	2014 (estimate)
Dbh (inches)	12	13			15	
Average annual diameter growth at dbh (inches)	.13	.13			.14	
Total Volume of trees 13 inches dbh and greater (fbm per ac)	2638	4870			4618	7688
Harvest volume (fbm per ac)			1985	2100		
Yield (fbm per ac per 10 year)	2230		3070		3070*	

*Estimate is based on expected response from measurement.

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