



JAMES W. SEWALL COMPANY / Since 1880

FORESTRY & NATURAL RESOURCES CONSULTING LLC

## APPRAISAL REPORT

### SATT – Brazil Mato Grosso Teak Timber Rights

*Prepared for:*

**Stichting Administratie – en Trustkantoor Tectona (SATT)**

*Effective Date:*

**June 30, 2020**

*Prepared by:*

**Timothy Mack**

*Report Date:*

**October 22, 2020**

85312F

October 22, 2020

The Board of Directors  
Stichting Administratie- en Trustkantoor Tectona  
Bussummergrindweg 1 H, 1406 NZ Bussum

RE: SATT Fund Teak Appraisal

Dear Sirs:

We are pleased to submit this appraisal of the Stichting Administratie - en Trustkantoor Tectona (SATT) teak interests in Brazil. SATT owns the timber rights to existing teak stands located in 17 teak farms scattered across Mato Grosso State, Brazil. The interest totals 14,585 productive hectares.

The purpose of this appraisal is to provide an independent opinion of market value for the SATT interest in the overall project. SATT is our client and SATT and its investors are the sole intended users of this report. We understand SATT will use this appraisal for asset tracking and financial reporting purposes.

Based on our inspection of the property, and our investigation and analysis of market data, the market value of the SATT interest, as of June 30, 2020 is:

**\*\*\* USD FIFTY-EIGHT MILLION FOUR HUNDRED THOUSAND \*\*\***

**\*\*\* \$58,400,000\*\*\***

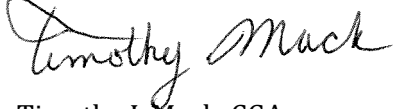
**(\$4,004 per net plantable hectare)**

**Market Value Range: \$51.5 to \$65.5 Million**

Overall value is down 18% from 2019. Reasons for the change are area is down 6.9% as a result of harvesting, changes to the starting inventory and lower log price assumptions. Downward influences are offset by reductions in costs.

This appraisal is documented in a USPAP appraisal report format with all prices and values stated in United States Dollars (USD), unless otherwise noted. The following report presents assumptions and limiting conditions, pertinent facts about the market and the subject property, and the reasoning leading to my conclusions. It conforms to the *Uniform Standards of Professional Appraisal Practice* (USPAP), the Appraisal Institute's Code of Professional Ethics and Standards of Professional Appraisal Practice. The signed Certification is attached as Appendix A.

Sincerely yours,



Timothy J. Mack, CGA  
Timberland Appraiser  
Sewall Forestry & Natural Resources Consulting

## EXECUTIVE SUMMARY

### SUBJECT PROPERTY

The subject is located in two areas, one clustered north of Cuiabá in the Jangada region of Mato Grosso and another around the small city of Cáceres in the Cáceres region. One farm lies in the Salto do Céu region. The property is highly parcelized, totaling 14,585 hectares.

### EFFECTIVE DATE OF APPRAISAL

June 30, 2020

### PURPOSE & INTENDED USE OF APPRAISAL

The purpose of the appraisal is to develop an opinion of market value for the SATT interest in teak timber rights.

### CLIENT AND INTENDED USERS

SATT is our client and SATT and their investors are the sole intended users of this appraisal. The intended use of the report is to estimate market value for tracking asset performance and financial reporting.

### HIGHEST AND BEST USE

Highest and best use is commercial timber production.

### PROPERTY RIGHTS APPRAISED

Property rights appraised are the SATT interest in rights to the existing teak crop across 17 farms in southern Brazil.

### VALUE CONCLUSION (USD)

Income Approach:	\$58,400,000
Final Value Conclusion:	\$58,400,000
Value per Plantable Hectare:	\$4,004

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Appendix A.	Certification and Qualifications of Appraiser
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## ASSUMPTIONS AND LIMITING CONDITIONS

1. Unless specified otherwise, this appraisal assumes that the subject properties are free of liens and encumbrances, in responsible ownership, and under competent management, with free and clear title. The appraiser assumes no responsibility for matters legal in nature, and infers no opinion of title.
2. The appraiser has taken legal descriptions and dimensions from sources thought to be authoritative, but neither assumes nor suggests responsibility for either. The appraiser has not surveyed the properties. Maps, drawings and pictures presented in this report are intended merely to assist the reader.
3. This report may not be used by any party other than the *client* and *intended users*, as so identified in this report, without the prior written consent of the appraiser. No portion of this report or addendum material may be photocopied and/or distributed to a third party without the prior written consent of the appraiser.
4. Possession of all or any part of this report, or a copy thereof, does not confer the right of publication. Neither all nor any part of this report may be conveyed to the public through advertising, public relations, news releases, sales brochures, or other media without the written consent and approval of the appraiser. Nor shall the appraiser, firm, or professional organization of which the appraiser is a member be identified without prior written consent of the appraiser.
5. This report may not be used for any purpose other than the purpose for which it was prepared. Its use is restricted to consideration of its entire contents.
6. The preparation of this report shall not obligate the appraiser to testify or appear in court unless prior arrangements have been made with the appraiser.
7. In the event that this valuation relates to a portion of real estate that is part of a larger interest in real estate:
  - a) The value reported is for only such real estate as outlined and should not be construed as applying with equal validity to other portions of a larger portion or interest;
  - b) The sum of values estimated for individual portions of real property may not equal the value of the entire property considered in its entirety.
8. Unless specified otherwise, the appraiser has not considered the existence of potentially hazardous material on the property used in the construction or maintenance of improvements, if any, or the existence of toxic wastes. The appraiser is not qualified to detect such substances. It is assumed that the property is free of hazardous waste as that term is defined under both federal and state statutes. The appraiser has not been provided with an environmental study, nor has the appraiser undertaken any environmental study. The reader is urged to consult experts in this field if appropriate.
9. The appraiser has not undertaken a soils analysis in conjunction with this study.
10. It is customary for clients to make available to the appraiser certain data that are relevant to the market value of the subject property. In cases where the income capitalization approach is applied, these data would include income and expense data for the past three years or more. Standards Rule 1-4 of the *Uniform Standards of Professional Appraisal Practice* states: "In developing a real property appraisal, an appraiser must collect, verify, and analyze...such comparable rental data as are available to estimate the market rental of the property; [and] such comparable operating expense data as are available to estimate the operating expenses of the property." Floresteca SA



(FSA) provided terms of the investment arrangement with SATT, but did not provide detailed revenue and cost information data for the property. Sewall's income and expense projections are based upon timber projections as supplied by FSA, as well as the terms of the investment, as described by FSA.

11. USPAP requires appraisers to report sales of the subject property within the past three years, and to analyze these sales in relation to current market value. SATT report no sales or additions to the property over the last three years.
12. The Uniform Standards of Professional Appraisal Practice (2020-2021 ed.) defines an **extraordinary assumption** as "an assignment-specific assumption as of the effective date regarding uncertain information used in the analysis which, if found to be false, could alter the appraiser's opinions or conclusions." We treat the following items as extraordinary assumptions for this appraisal:
  - a) The area and GIS information are extraordinarily assumed to be accurate.
  - b) The estimate of future growth rates provided for the property.
  - c) Estimates of current inventory.
  - d) COVID-19 continues to be a global problem as this report is prepared. Substantial turmoil has occurred in financial markets and due to the ongoing situation, it is difficult at this time to quantify its long-term or short-term effects on real estate markets or on the subject property. The value opinion contained in this appraisal is based on findings of market analysis available to the appraiser at the time of the assignment. In particular, we make the extraordinary assumption that the extent of market disruptions will be short-term in nature, resulting in what has been termed a "v-shaped" recovery.
13. The effective date for which this appraisal is valid is June 30, 2020. Accordingly, our estimates reflect our perception of what a prudent investor would expect to pay for the subject property on that date.
14. This appraisal is documented as an appraisal report as set forth in USPAP Standard 2.
15. The appraiser is not liable for any consequential or special damages arising from any error in the conduct or presentation of the appraisal. Any liability on the part of the appraiser or appraiser's firm is limited to the amount of fees actually collected for work conducted by the appraiser or appraiser's firm in connection with the appraisal.
16. All values unless otherwise noted are expressed in terms of United States dollars. Unless otherwise noted, all prices were converted at the rate of 1.000 USD = 5.367 BRL.
17. Acceptance of this report is subject to the understanding that Sewall's client indemnifies Sewall against any costs that Sewall incurs outside the scope of the assignment for which Sewall has been engaged. Such costs include labor and direct costs arising from: (a) extended discussions of our work product, provided these discussions do not arise from substandard performance by Sewall or by some other circumstance caused directly by Sewall, and provided these discussions could not have reasonably been anticipated by Sewall under the terms of our engagement; (b) requests for information, to the extent that such requests lie outside the scope of what would reasonably be expected of Sewall in performing the assignment; (c) re-work or additional analysis that lies beyond the scope of what would reasonably be expected of Sewall in performing the assignment; (d) compliance with audits of Sewall's client or any party or intended user connected with the client or the property that is the

subject of this assignment, and regardless of whether such audit is conducted by the client, a representative of the client, or some external party such as the Securities and Exchange Commission, and where compliance includes demands for information and/or testimony; and, (e) other unanticipated matters related to the original assignment. Should such costs arise, Sewall reserves the right to charge reasonable fees for labor (hourly or daily rates) and direct expenses, and to expect payment within 30 days of invoicing.

## 1. INTRODUCTION

The subject of this appraisal is a teak timber interest held by the Stichting Administratie - en Trustkantoor Tectona (SATT).

### PROPERTY IDENTIFICATION AND HISTORY

SATT owns an interest in a teak investment project initiated by Floresteca S.A. (FSA), in the mid-1990s. The overall project is estimated to total 14,585 hectares,<sup>1</sup> as of June 30, 2020, the effective date of appraisal. The interest is in 17 teak farms scattered across Mato Grosso State, Brazil (Figure 1.1).

FSA initiated the investment in the mid-1990s with numerous investment groups. Investors were sold rights to a single rotation of teak. The underlying land is owned by a combination of owners, including FSA. Investors own the rights to the timber until final harvest, at which time control of the land reverts to the landowners. FSA was responsible for establishing the farms and continues to manage them on behalf of the various owners, based on arrangements spelled out in the investment agreement described to Sewall.

### PROPERTY RIGHTS APPRAISED

Property rights appraised are the SATT interest in the rights to the existing teak crop located across 17 farms, as described in Table 1.1.

### PURPOSE OF THE APPRAISAL

The purpose of the appraisal is to develop an opinion of market value for the SATT interest in the teak timber rights described above.

### CLIENT, INTENDED USER AND INTENDED USE

SATT is our client and SATT and their investors are the sole intended users of this appraisal. The intended use of the report is to estimate market value for tracking asset performance and financial reporting.

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<sup>1</sup> There is ongoing harvesting on the property. The total area estimate is based on TRC estimates of harvesting complete as of the effective date.

**Figure 1.1. Property Location Map**

**Table 1.1. SATT Interests by Farm**

Region	Farm	Planting Year	As of 6/30/2020
			Total Planted Area
Cáceres	Bambu	1999	549.07
		2000	513.83
	Barranquinho	2002	970.20
		2003	12.95
		2004	1,021.00
	Cacimba	2002	571.03
		2003	10.19
	Duas Lagoas	2000	1,527.51
		2001	1,764.33
		2002	48.41
		2005	207.67
		2006	233.88
	Mutum	2007	539.18
	Sao Jose	2007	301.30
	Sao Miguel	2001	97.52
		2002	5.71
	Santa Maria do Jaru	2002	1,085.18
		2003	207.87
	Santa Maria do Jaru II	2008	99.87
	Santa Fe	2003	2,562.71
Jangada	Capim Branco	1999	170.53
	Sao Jose da Canastra	1998	
	Paiolandia	1997	297.92
		1998	93.95
	Paraiso	1997	396.58
	Serra das Araras	1999	105.01
	Vale Dourado	1999	48.59
Salto do Céu	Terra Santa	2004	1,143.17
<b>Total:</b>			<b>14,585.16</b>

Source: TRC

**IMPORTANT DATES**

Tim Mack of Sewall inspected the subject on July 16 to 19, 2019. Mr. Mack was accompanied by Cassiano Sasaki of TRC, FSA's contracted manager. Sewall has not inspected the property in support of the current assignment. The effective date of appraisal is June 30, 2020. Sewall completed the analysis on October 8, 2020 and the report on October 22, 2020.

## SCOPE OF WORK

For this appraisal, Sewall conducted the following tasks:

- Reviewed and analyzed data and materials provided by SATT and FSA;
- Interviewed representatives from FSA.
- Applied the income and cost approaches;
- Reconciled the values to arrive at a value conclusion;
- Prepared this appraisal report.

## EXTRAORDINARY ASSUMPTIONS

The Uniform Standards of Professional Appraisal Practice (2020-2021 ed.) defines an extraordinary assumption as “an assignment-specific assumption as of the effective date regarding uncertain information used in the analysis which, if found to be false, could alter the appraiser’s opinions or conclusions.”<sup>2</sup> Extraordinary assumptions presume as fact otherwise uncertain information about physical, legal, or economic characteristics of the subject property; or about conditions external to the property, such as market conditions or trends; or about the integrity of data used in an analysis. For this appraisal, we have made the following extraordinary assumptions:

1. The area and GIS information are extraordinarily assumed to be accurate.
2. The estimates of future growth rates provided for the property are accurate.
3. Estimates of current inventory, as derived from our Woodstock model developed for the property, are accurate.
4. COVID-19 continues to be a global problem as this report is prepared. Substantial turmoil has occurred in financial markets and due to the ongoing situation, it is difficult at this time to quantify its long-term or short-term effects on real estate markets or on the subject property. The value opinion contained in this appraisal is based on findings of market analysis available to the appraiser at the time of the assignment. In particular, we make the extraordinary assumption that the extent of market disruptions will be short-term in nature, resulting in what has been termed a “v-shaped” recovery.

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<sup>2</sup> Appraisal Institute. 2015. The Dictionary of Real Estate Appraisal, Sixth Edition, Chicago, IL, p. 83.

## DEFINITION OF MARKET VALUE

The Dictionary of Real Estate Appraisal, 6th Edition, states that “The most widely accepted components of market value are incorporated in the following definition: *“The most probable price, as of a specified date, in cash, or in terms equivalent to cash, or in other precisely revealed terms, for which the specified property rights should sell after reasonable exposure in a competitive market under all conditions requisite to a fair sale, with the buyer and seller each acting prudently, knowledgeably, and for self-interest, and assuming that neither is under undue duress.”*<sup>3</sup>

The Dictionary also cites the definition used by agencies that regulate federally insured financial institutions in the United States, and the definition used for this appraisal, as: *“The most probable price that a property should bring in a competitive and open market under all conditions requisite to a fair sale, the buyer and seller each acting prudently and knowledgeably, and assuming the price is not affected by undue stimulus. Implicit in this definition is the consummation of a sale as of a specified date and the passing of title from seller to buyer under conditions whereby:*

- Buyer and seller are typically motivated;
- Both parties are well informed or well advised, and acting in what they consider their best interests;
- A reasonable time is allowed for exposure in the open market;
- Payment is made in terms of cash in U.S. dollars or in terms of financial arrangements comparable thereto; and
- The price represents the normal consideration for the property sold unaffected by special or creative financing or sales concessions granted by anyone associated with the sale.”

(12 C.F.R. Part 34.42(g); 55 Federal Register 34696, August 24, 1990, as amended at 57 Federal Register 12202, April 9, 1992; 59 Federal Register 29499, June 7, 1994)<sup>4</sup>

The International Valuation Standards define “fair market value,” as: “The estimated amount for which a property should exchange on the date of valuation between a willing buyer and a willing seller in an arm's-length transaction after proper marketing wherein the parties had each acted knowledgeably, prudently, and without compulsion.”<sup>5</sup>

It is important to observe that the following elements are common to each of the foregoing definitions:

- Market value results when the parties are typically motivated, are generally well informed, and are acting in their own best interests;

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<sup>3</sup> Ibid. p. 141.

<sup>4</sup> Ibid, p. 142.

<sup>5</sup> International Valuation Standards Committee. 2011. International Valuation Standards 2011, Eighth Edition, London, U.K, p. 20.

- Market value results when the property is exposed to the market for a reasonable length of time;
- Payment is in cash or its equivalent.

Sewall's market value estimate is our opinion of the probable price obtainable in a market free of abnormal influences. A basic limitation of any appraisal is that it is an opinion of value, and is therefore not a guarantee that a property will sell at the appraised value.

## **APPRAISAL UNITS**

Unless otherwise stated, units reported for this appraisal are based on US dollars (USD) for value, hectares for area and cubic meters for volume. Where necessary, any prices provided in Brazilian Reais (BRL) have been converted to USD using an exchange rate of 5.367 BRL per USD.

## **APPRAISAL STANDARDS**

The complete appraisal process and resulting report were performed in accordance with the *Uniform Standards of Professional Appraisal Practice* ("USPAP"), the Appraisal Institute's Code of Professional Ethics and Standards of Professional Appraisal Practice.



## INVESTMENT TERMS

The terms of the investment agreement between SATT and FSA differ from conventional practices common to the timberland investment market. As such, they are worth enumerating, as they form the basis for assumptions used in our analysis. The following are key terms in the agreement, as described to Sewall by FSA:

- SATT owns the rights to the existing crop of timber on the various properties.
- FSA is responsible for managing the timber, including oversight of all harvest activity.
- FSA has entered into an agreement with Teak Resources Company (TRC) for the management of the assets and sales and purchase of the teak.
- SATT does not pay for any ongoing silvicultural or administrative costs related to the management of the property, as would be the case for most timberland investments. FSA is responsible for these costs, but will charge SATT with a one-time management fee of \$4,500 per hectare, plus \$600 per year per hectare in which a harvest cycle takes longer than 20 years, incurred at the time of final harvest. This cost is expected to adjust downward, based on revenues owed to SATT for past harvests.
- Harvest revenues are based on quarterly market surveys of roadside prices contracted with Consufor, a Brazilian consulting firm.
  - TRC buys logs from SATT from harvests at its own risk for its account.
  - SATT is paid on a residual stumpage basis, based on the Consufor roadside pricing, less harvest costs.
- SATT is required to pay for all final harvest costs, but not harvest costs from thinnings. Thinning costs are assumed to be included in the management fee described above.
- SATT must also pay all necessary costs to bring the property back to a pre-forestry condition following final harvest. This includes clearing the land of stumps (\$596 per hectare).
- SATT must pay FSA a 5% performance fee upon harvest of the trees. The performance fee is:
  - $5\% * (\text{Roadside Harvest Revenues} - \text{Harvest Costs} - \text{Land Clearing} - \text{Silvicultural and Overhead Fees})$
- Full rights to the land revert to FSA or the other underlying land owners following final harvest and stump clearing. SATT has no right to future rotations.

## CORONAVIRUS CONTEXT

From the perspective of an appraiser charged with estimating the market value of real property, the effective valuation date is all-important. For valuations effective June 30, 2020, uncertainty remained, as it still does, regarding the public health risks of the infectious coronavirus. What follows is Sewall's current perspective on the pandemic, as it relates to timberland valuation. While the situation has evolved between the effective date of appraisal and the present, our overall approach to timberland valuation has changed little since then. It is therefore reasonable to provide our current perspective on the ongoing pandemic as it relates to timberland investment, noting elsewhere in the report any instances where our valuation approach might differ between then and now.

We cannot assume away potential far-reaching effects of COVID-19. Stock markets around the world fell precipitously early on in the crisis, as did economic activity. The US and other countries experienced unemployment rates unheard of since the Great Depression, as service industries and other parts of the economy deemed unessential laid off employees. Second quarter GDP shrunk by over 30 percent on an annualized basis. Now seven months in to the crisis, current conditions are mixed. The stock markets have recovered in many countries, but unemployment, while improved, remains high.

The forest products industry is deemed an essential industry by governments in many, but not all, countries, meaning that work in this sector continues even while many non-essential industries remain closed or disrupted. While timber production continues, not all sectors have fared the same. Lumber has been surprisingly resilient. Many expected an initial housing demand shock resulting from the early lockdowns would doom the industry. However, an unexpected surge in stuck-at-home do-it-yourself projects seems to have bridged the gap. More recently, housing appears to have rebounded. This bodes well for lumber and panel producers that rely on housing for much of their demand. Results in the paper industry have been mixed. Packaging divisions are doing well, as consumers switch from in-store purchases to greater reliance on mail order. At the same time, producers of printing papers, which rely on schools and business, have suffered, as some countries' schools remain closed and businesses have curtailed demand for this type of paper.

There remains a general paucity of empirical data showing how timberland investment markets are responding to the pandemic. Most of what we know at this time remains anecdotal. US market participants Sewall has spoken with in recent months cite short-term timber price drops, but little change as to their perception of risk regarding the overall asset class. Several investors report increased difficulty accessing properties in support of due diligence efforts, mostly in response to pandemic-related travel restrictions put in place by some governments. While in-country travel is possible, international travel remains limited.

In the US, Molpus suspended its Castle offering in the Texas/Louisiana/Arkansas area at the outset of the pandemic with plans to re-offer it at a later date. However, this was early on and numerous other properties have been brought to market since with an expectation of second-half 2020 deals. Investors appear cautiously optimistic that market interruptions to-date resulting from the pandemic will be short-lived.

Our general sense is that most investors expect the overall economic recovery to be more V-shaped, as opposed to a long-term U-shaped recovery forecast by more pessimistic economists. First-half timberland sales volumes for 2020 were noticeably down, but activity is expected to recover as investors catch their breath and the economy continues to reopen. As noted, investors are cognizant of short-term timber prices, and we expect many will factor them into due diligence efforts in combination with some form of return-to-trend pricing forecasts going forward. However, we have yet to hear reports of increasing discount rates, which would signal an overall attitudinal shift toward the asset, as was experienced in the wake of the global financial crisis. This situation may change, should a serious second-wave of the virus, including increased deaths, hit in the fall, or should it take longer than expected to produce a vaccine, but right now, investors appear not to be worried along these lines.

## 2. MARKET DESCRIPTION

This year's report is an update to our 2019 comprehensive report. A more comprehensive description of overall international and Brazilian market factors can be found in last year's report.

### INTERNATIONAL TEAK SUPPLY

The global teak supply was once restricted to natural forests in India, Thailand, Myanmar and Indonesia. Because of the development of plantations in Latin America and Africa, there is an increased global supply of teak, as usage of the species has grown. However, due to over-exploitation, teak reserves in African countries are close to exhaustion. Therefore, that particular source of supply to the international market is expected to be significantly lower in coming years.

Global demand for teak, Covid-19 notwithstanding, is sufficient that all harvested volume currently finds its way to market. This has created an incentive for managers to overharvest naturally grown teak. As natural teak supplies dwindle, plantation investment has increased in an attempt to meet demand. Plantation-grown trees generally yield a relatively low density wood that lacks many of the qualities that make natural teak so unique and valuable (Keogh, 2008). Some have argued that because the global teak market is relatively small and specialized, a flood of lower-quality plantation-grown wood could potentially swamp the market and drive prices down. There is currently evidence for this reflected in the price of smaller thinning-aged logs, the supply for which has increased in recent years as Latin American plantation managers begin to thin maturing stands. However, while prices have softened for the smallest log grades, demand remains good for the larger sizes.

A price series for Myanmar's SG-4 export grade, one of the lower-end sawlog grades, commonly exported to India, shows that demand for natural teak, even low grade, has remained strong over the years. The trend supports an average real annual increase of over \$70 per hoppus ton (FOB) over the period. While the rate of increase has slowed over the last 10 years, it remains positive.

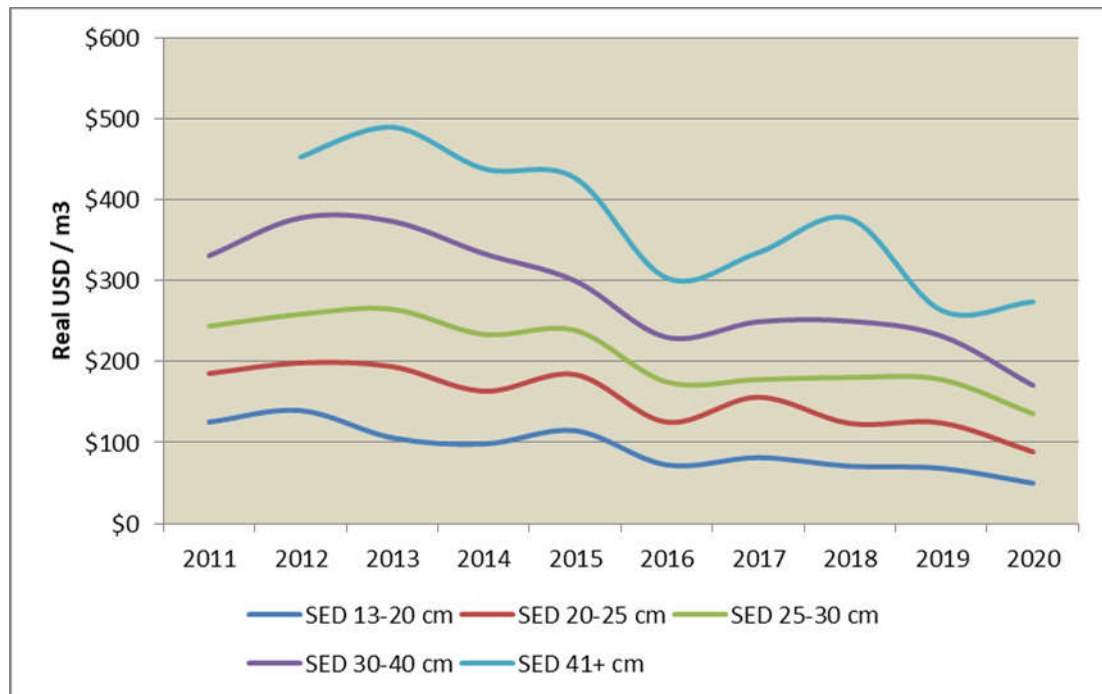
Closer to home, Central American prices<sup>6</sup> have declined in recent years. While the data are not Brazilian, they illustrate a trend common to all of Latin America. Figures 2.1 and 2.2 summarize teak pricing by log size for thinnings and final harvests since 2011. Prices for logs from thinnings have declined steadily since 2011. Many cite an overabundance of small logs in the market, as many of the early Central American plantations are now old enough

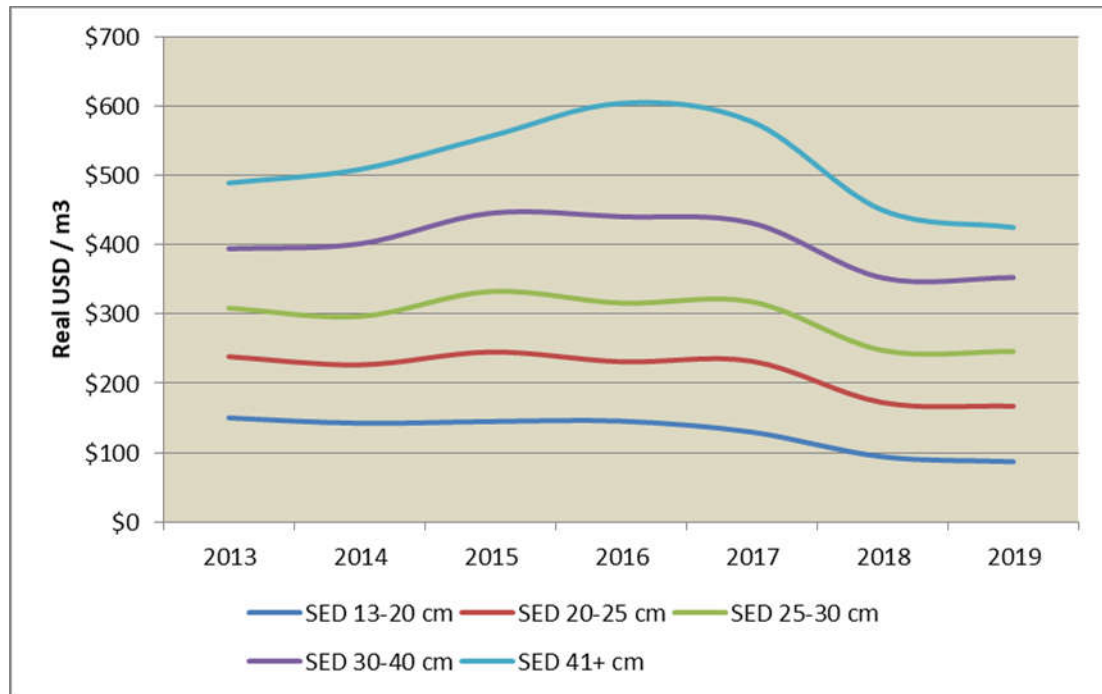
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<sup>6</sup> Sewall data for Brazil are not numerous enough to show and still protect the confidentiality of our sources.

for thinning. Declines in final harvest prices over the same period are less noticeable and may have stabilized in 2019. It is worth noting that log buyers prefer final harvest logs over thinned logs, as evident from the pricing. Older logs have superior wood qualities for which buyers are willing to pay more. Other factors affecting price are financial disruptions to the Indian economy over the last 2 to 3 years, leading to the devaluation of the Indian Rupee. This left Indian log buyers with less purchasing power, which may also have contributed to recent final harvest declines in 2019. The ongoing pandemic upended the market completely in the first half of 2020. Because of this, year-to-date pricing information remains sparse. More recently, some growers report log buyers are purchasing again in an effort to bolster depleted inventories back home in India. However, it is not clear that demand has fully returned to pre-pandemic levels.

**Figure 2.1. Central American Teak Price Trends - Thinnings**



**Figure 2.2. Central American Teak Price Trends - Thinnings**

Where are teak prices likely to go? There are two schools of thought on this. Those less bullish say that current teak plantations established across the globe have the potential to supply enough wood in excess of current consumption. Indeed, the trends depicted in Figures 2.1 and 2.2 seem to support such a view. Proponents of this view argue that the same market phenomenon currently impacting the smallest log sizes will eventually show up among the larger sizes. Optimists point to the loss of Myanmar logs and a growing Indian middle class as evidence that demand is likely to keep pace with supply over the long-run. Future consumption will come from middle-class Indian consumption, which at this point has plenty of upside potential.

Land-use competition is another factor to consider. Costa Rica and Ecuador are home to some of the earliest plantations in Latin America, many of which are now approaching final harvest age. It remains to be seen if all of these plantations will be returned to teak following harvest, especially smaller farms. Appraisal work by Sewall throughout Latin America finds that in some cases, highest and best use may no longer be for forestry. In other words, owners of such plantations might be better off selling the land following harvest to agricultural buyers, rather than continuing with teak management. This dynamic has the potential to play out more across Latin America if land prices continue to rise, mitigating the potential for future supply. This avenue of thought is supported by the fact that there has been a marked reduction in greenfield planting in recent years. Sewall is aware of only one investor in the region that is planting greenfield teak.

**Brazilian Teak Resource**

Most teak farms in Brazil are planted on former cattle grazing lands. Teak is generally found in the states of Mato Grosso, Pará, and Roraima. Teak investors include local business interests seeking tax shelters available from forestry investment to institutional timberland investment organizations. The emergence of teak as a commercial plantation species is part of a broader trend seen throughout Latin America, especially Central America, where teak farming has taken place over a long period of time in some areas.

Most teak growers produce teak for the export sawlog markets. Primary destinations include such Asian countries as India and Vietnam. The business model throughout much of Latin America is to sell logs roadside from thinnings and final harvests to teak buyers. Logs are loaded into containers roadside and hauled to a local port for shipment to Asia. TRC, the property's manager, is an exception to the rule. They have taken control of a larger portion of the supply chain. TRC is currently marketing logs directly to buyers in Asia, and selling logs directly to teak buyers there on a CIF basis in the various Asian ports. TRC has also developed a small sawmill in the Mato Grosso region in cooperation with other teak investors. Small logs from first thinnings are sawn into squares for export to Asia.

### 3. REGIONAL AND NEIGHBORHOOD DESCRIPTION

#### ECONOMIC NEIGHBORHOOD

##### Demographics

The subject property area is located in two primary groupings in southwestern Mato Grosso. A portion of the property is clustered north of the City of Cuiabá in the Jangada region. The rest of the property is located around the smaller city of Cáceres. Both regions are lightly populated, with only a few medium-sized towns. Mato Grosso as a state has one of the lowest population densities in Brazil; 2020 estimated population<sup>7</sup> was 3,526,220. The areas around the subject property are home to agricultural operations, including sugarcane, soybeans, and rice, as well as numerous cattle ranching operations. Cattle ranching dominates use.

##### Infrastructure

The primary public highways in the immediate vicinity of the properties in the Jangada region are BR-163 and MT-246, while BR-174, MT-174, MT-339, BR-070, and MT-343 serve the Cáceres region. Federal highways important in greater Mato Grosso include BR-163, which runs north from Cuiabá to Cachimbo in Amazonas, and BR-174, 264, 251 and 242. Most of the high-quality roads and thoroughfares are found in the southern and eastern parts of the state. The northwestern corner of Mato Grosso is very remote.

The region's paved highway infrastructure is somewhat limited, though unpaved local and state roads provide adequate access to most areas. In places, the local roads are poorly maintained and often clogged with slow-moving commercial traffic. Trucks transport over 75% of Brazil's cargo.

In general, Brazil's railroad infrastructure is incompletely developed. Several differing regional rail gauges were initially built and continue to disrupt continuous national rail service. Brazil has recently privatized its railway system, reportedly improving freight transport efficiencies. There is rail service planned across the state of Mato Grosso that would traverse the southern portion of the state, passing through Cuiabá.

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<sup>7</sup> <http://www.citypopulation.de/Brazil-MatoGrosso.html>



## Land Uses

In addition to the region's substantial cattle grazing, it supports scattered agriculture, primarily sugarcane, but also soybeans and cotton. Though subsistence farms and pastures may be located anywhere, most slopes support native timber growth. Few teak plantations, other than the subject property, are evident. Each of the properties is in an area devoted primarily to farming and ranching, unaffected by any urban or suburban influences. Though a low density of scattered rural residential uses exists along the public roads, no impending changes in land use are apparent.

## PHYSIOGRAPHIC NEIGHBORHOOD

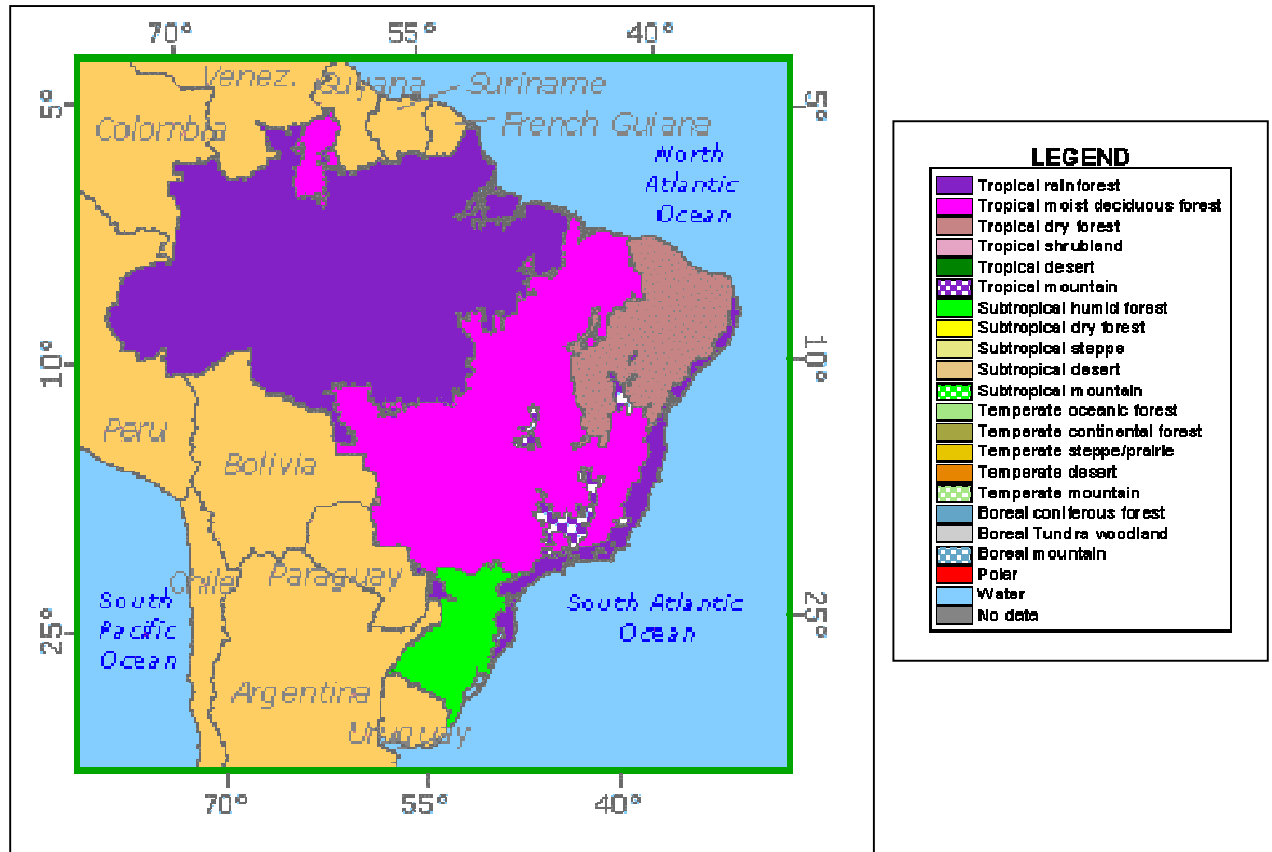
The physiographic neighborhood is defined by the locational and physical characteristics of the subject property's environs. It is important to understand how a subject property compares to similar properties with respect to several physical characteristics. Climate, topography and soils influence the relative values for similar properties within a physiographic neighborhood. Figure 3.1 depicts Brazil's ecological zones. The subject property is subject to a tropical wet and dry climate. The original vegetation here was mixed tropical forest, but much of this has been replaced by grasses of the genus *Brachiaria* that are used for cattle grazing.

### Climate

This region has a tropical wet and dry climate characterized by consistently high temperatures (above 18°C year-round) and pronounced wet and dry seasons. Mato Grosso state has a slightly lower average annual rainfall of approximately 1,600 millimeters as compared to Pará at 2,000 millimeters on average, another teak-growing region. The rainy season is somewhat shorter, running from early October to the end of April.

### Topography, Soils and Drainage

The region's topography is defined by a series of small mountain ranges in the southern portion of the state. These mountainous regions give rise to local relief that ranges from very steep to gently rolling. Areas in close proximity to river systems are much flatter. The northwestern reaches of Mato Grosso state, closer to the Amazon basin, become much more flat with shallow local relief.

**Figure 3.1. Ecological Zone Map**

## 4. PROPERTY DESCRIPTION

### PROPERTY SIZE AND CONFIGURATION

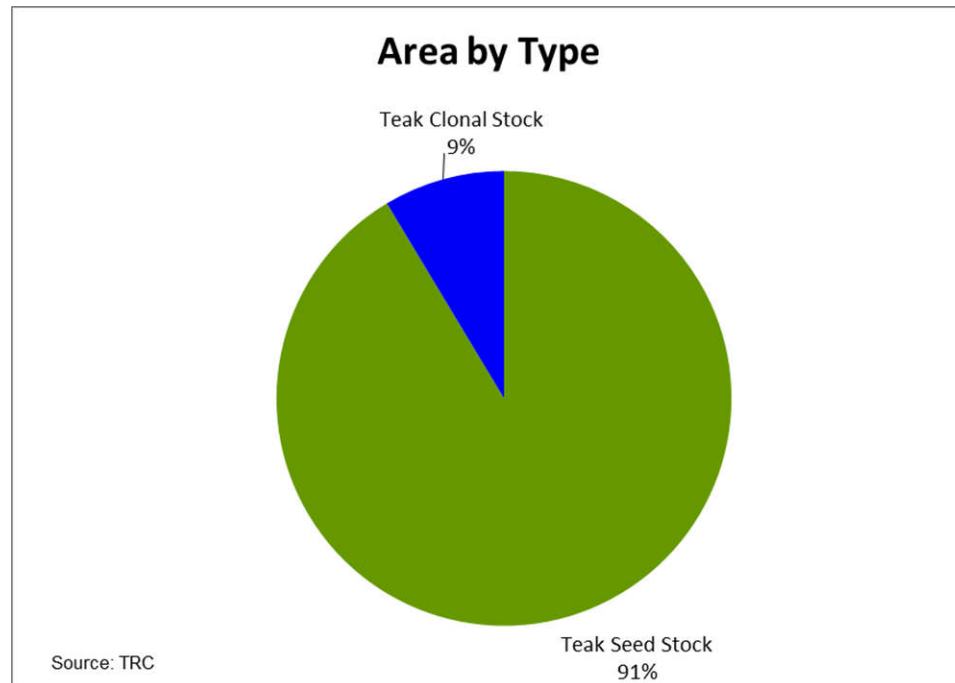
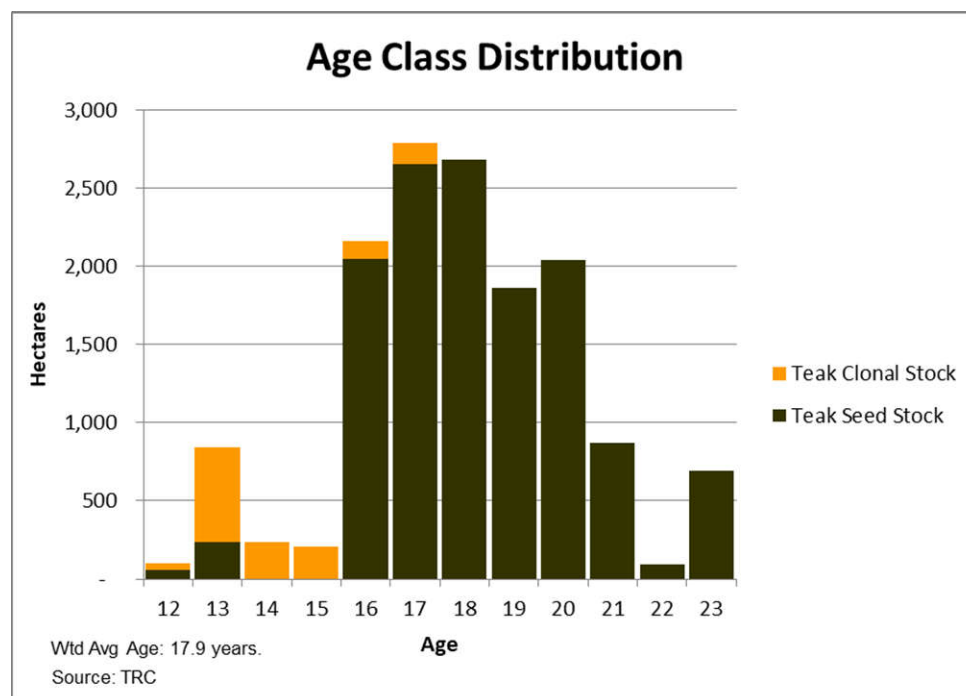
The subject is located in two areas, one clustered north of Cuiabá in the Jangada region and another around the small city of Cáceres in the Cáceres region. The property is highly parcelized, with the SATT interest effectively totaling 14,585 hectares of the gross area. Figure 1.1 summarizes the interest by region and farm. Overall size is down 6.7% from our 2019 appraisal. The reduction results from ongoing final harvesting in which the land is returned to underlying landowners.

The subject has a weighted average age of 17.9 years (Table 4.1). The majority of stands (91%) were planted with conventional seed stock, but there are some newer clonal plantings present (Figure 4.1). Most of the plantations are from 16 to 23 years old (Figure 4.2). Clonal plantings are more recent.

**Table 4.1. Property Age Class Summary**

<b>SATT - Brazilian Teak - June 30, 2020</b>			
<b>Species</b>	<b>Age</b>	<b>Hectares</b>	<b>Percent</b>
<b>Teak</b>			
Seeds	12	58	0.4%
	13	239	1.6%
	16	2,045	14.0%
	17	2,652	18.2%
	18	2,681	18.4%
	19	1,862	12.8%
	20	2,041	14.0%
	21	873	6.0%
	22	94	0.6%
	23	694	4.8%
<b>Teak Seed Stock</b>	<b>18.3</b>	<b>13,240</b>	<b>90.8%</b>
Clones	12	42	0.3%
	13	601	4.1%
	14	234	1.6%
	15	208	1.4%
	16	119	0.8%
	17	142	1.0%
<b>Teak Clonal Stock</b>	<b>14.1</b>	<b>1,345</b>	<b>9.2%</b>
<b>Established Teak</b>	<b>17.9</b>	<b>14,585</b>	<b>100.0%</b>
<b>Total Area:</b>		<b>14,585</b>	<b>100.0%</b>

Source: TRC

**Figure 4.1. Area by Genetic Material****Figure 4.2. Age Class Distribution**

## MERCHANTABLE TIMBER

Merchantable volume is estimated to be 861,099 cubic meters, or 63.1 cubic meters per merchantable hectare. Merchantable volume is based on stands 14 years and older for purposes of this appraisal. Gross timber value, the retail value of the timber regardless of liquidity constraints, is estimated to be \$65,709,736. The inventory is based on 2019 permanent sample point data provided by FSA. Volumes have been updated by Sewall to the effective date for this appraisal, based on growth and yield information reported by FSA.

**Table 4.2. Timber Volumes**

<b>SATT - Brazilian Teak - June 30, 2020</b>						
		<b>Hectares</b>	<b>m<sup>3</sup>/Ha</b>	<b>GTV/Hectare</b>		
<b>Planted Area</b>		<b>13,645</b>	<b>63.1</b>	<b>\$4,816</b>		
<b>Species</b>	<b>Product</b>	<b>Volume (m<sup>3</sup>)</b>	<b>% Volume</b>	<b>Unit Value</b>	<b>Total Value</b>	<b>% of Value</b>
Teak	Logs 18-20 cm	126,825	14.7%	\$ 9.00	\$1,141,428	1.7%
	Logs 20-25 cm	337,467	39.2%	\$ 41.00	\$13,836,142	21.1%
	Logs 25-30 cm	245,235	28.5%	\$ 90.00	\$22,071,175	33.6%
	Logs 30-40 cm	145,720	16.9%	\$ 185.00	\$26,958,263	41.0%
	Logs 40+ cm	5,851	0.7%	\$ 291.00	\$1,702,728	2.6%
	<b>Subtotal</b>	<b>861,099</b>	<b>100.0%</b>	<b>\$ 76.31</b>	<b>\$65,709,736</b>	<b>100.0%</b>
<b>Total:</b>		<b>861,099</b>	<b>100.0%</b>	<b>\$76.31</b>	<b>\$65,709,736</b>	<b>100.0%</b>

Source: Woodstock model starting inventory.

## SOILS

A detailed soils analysis has not been provided. This description is based entirely on the inspection of a representative portion of the property. The soils are for the most part alluvial in origin. Soil quality varies from farm to farm, which likely explains much of the variation observed among the plantations visited. Most of the wetter soils along the drains and streams are located in permanent reserve areas and are therefore not included in the productive portion of the properties.

## ACCESS

Each of the farms is well accessed by a network of public paved and dirt roads along with graded private dirt roads. Private interior roads appeared to be in good condition. The region supports a large amount of agriculture, including grazing and sugar cane production. It was evident during our inspection that the other landowners in the region helped in the maintenance of secondary roads. Overall, access was good.

## SILVICULTURE

Silviculture is intensive, as with other plantation species. Site preparation is typically a disc and subsoil (site-specific), followed by pre-emergent herbicide. Most of the seed stock was planted on a 3 x 3- (1,111 trees per hectare) or 3 x 2- (1,667 tph) meter basis; clones were planted predominately at a spacing of 3 x 4 (833 tph) meters. In the weeks following planting, young seedlings are manually cleared of competition in a small area around the plant using a hoe or spade. Once the seedlings are larger, much of the competition control can be accomplished with periodic mowing or herbicide applications.

Trees are pruned for quality during the early years of the rotation. Current pruning height is 5 meters. The property is managed on a 3- to 4-thinning regime. The ideal plan for seed-stock stands is for a pre-commercial thinning around age 4 years, followed by commercial thinnings around ages 8, 12, and 15 years. Clonal stands are scheduled for pre-commercial thinning at age 5 years, followed by commercial thinnings around ages 10 and 14 years. The purpose of this density-management regime is to ensure good tree form during early growth, and an ample collection of crop trees entering the middle portion of the rotation. The goal of the thinning regime is to produce approximately 150 to 160 trees per hectare for the final harvest, which is scheduled to occur beginning at age 20.

Many teak growers in Latin America are switching from traditional seedling stock to clonal stock for planting. The advantage of clonal stock is increased productivity, with yield gains estimated at 20% to 30%. Only 9% of the property is currently planted to clones. Differences between clones and seed stock planted side-by-side are visually striking. While clonal production has become commonplace among teak growers, the property has a low percentage of clonal stock because much of it was established prior to the emergence of clonal planting. Were it planted today, it would almost certainly be 100% clonal stock.

## FOREST RISKS

### Insects

One main insect possesses the ability to damage plantations in this region of Brazil: leaf cutter ants. Leaf cutter ants can be a problem in younger forest plantations, but are present in nearly all plantations. Control of leaf cutter ants is with spot insecticide treatments one to two times annually, usually early in the rotation. FSA reports having treated stands in the past for ants.

**Pathogens**

No obvious signs of disease were observed during our inspection. TRC reports some problem with disease in 2016 in some of the plantations at the Capim Branco and Bocaina farms. FSA conducted a series of sanitation harvests to capture mortality and eliminate the problem.

**Fire**

There is a defined wet and dry season in Mato Grosso. Annual rainfall averages 1,600 millimeters. During the dry season, which usually occurs in late May through September, there may be up to 3 months with little to no rainfall. During this dry season, wildfires are common, but are most frequently small and localized. FSA has implemented fire breaks both internally and externally surrounding many of the farms. Fire breaks, for the most part, were observed to be well-maintained. Agriculture and cattle farmers in the region use fire as an agricultural tool, so fire breaks on the property boundaries are essential. Overall, fire is of no greater threat to the subject than it would for any other timberland property in the region. The effects of recent fires were observed throughout the property during our recent inspection. Older teak trees are fire resistant. We observed no signs of fire-induced mortality during our recent visit.

**IMPROVEMENTS**

Building improvements on the property have not been considered in this valuation. Improvements consist primarily of encampments for forest workers and buildings for equipment storage and maintenance.

**PROPERTY TAXES**

The main taxes that apply to the subject are a variety of income taxes. The ICMS taxes, which are levied on state-to-state commerce within Brazil, do not apply to these farms since the ICMS does not apply, or gets credited back, on products destined for export. Fuelwood sales are local (within state) and therefore are not subject to the ICMS tax.

The property is also subject to property taxes (ITR), which SATT is responsible for paying. FSA did not provide property tax information for the subject. However, they do report that SATT's property tax obligation is covered under the management fee due at final harvest.

## **ZONING AND ENVIRONMENTAL ISSUES**

Forest management activities are subject to national land use restrictions that limit the area that can be converted to forest plantations. The legal reserves usually include buffers around water bodies, natural forest, and additional areas where the landowner has had to replant with native tree species. The property is fully planted and TRC reports that all necessary reserves are in place to meet the government's reserve requirements.

The property is Forest Stewardship Council-certified. FSA reports that certification does not necessarily garner higher prices, but it does gain access to markets, such as those in Europe, which might not otherwise accept the wood.



## 5. HIGHEST AND BEST USE ANALYSIS AND VALUATION PREMISES

### HIGHEST AND BEST USE ANALYSIS

Highest and best use (HBU) is the cornerstone of value in the appraisal process. *The Dictionary of Real Estate Appraisal* defines HBU as: “the reasonably probable use of property that results in the highest value. The four criteria that the highest and best use must meet are legal permissibility, physical possibility, financial feasibility, and maximum productivity” (*Appraisal Institute, 2015, p.109*).<sup>8</sup> The subject property is vacant timberland. Consequently, we will only consider the highest and best use “as vacant.”

For a use to pass as the HBU, it must be **legally permissible, physically possible, financially feasible, and maximally productive**. Above all, it must be supported by land use trends for similar property in the market area. Therefore, it must be plausible when considering the most likely buyers and the uses they anticipate. The actions of the marketplace must ultimately guide the appraiser’s HBU analysis.

Highest and best use analysis proceeds in two ways: an examination of the land as if vacant and of the property as improved. The first analysis is undertaken either with vacant land or when the existing improvements clearly have come to the end of their economic life. The second analysis addresses the present and possible future alternative uses of the property as currently improved. In both analyses, four categories of uses are sequentially examined:

1. Possible - Uses that are physically possible on a particular site considering its size, configuration, topography and geological characteristics.
2. Legally permissible - Uses allowed by zoning and other restrictive authority (town ordinance, deeds, etc.)
3. Feasible - Uses yielding positive economic returns.
4. Maximally productive – The use that maximizes property value.

Physically possible: The existing timber stands reveal that the subject properties are capable of producing timber; therefore, forestry is a physically possible use for the subject property. Because of its size and rural, somewhat remote location, the subject property is well suited for timber production. Other physically possible uses observed within the immediate neighborhood include sugar cane and cattle production.

Legally permissible: Despite the fact the other uses besides timber production exist within the neighborhood, legal uses of the appraised interest are limited to timber production, under the terms of the investment agreement between FSA and SATT.

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<sup>8</sup> In Federal condemnation, HBU is defined as “That use of property which may reasonably be expected to produce the greatest net return to the land over a given period of time. It is sometimes called the ‘optimum use’.”

Financially feasible: Because timber production is the only legal use of the property allowed under the terms of the investment agreement, timber production is by default the only financially feasible use of the property.

Maximally productive: Of the uses that meet the test of legally permissible, physically possible, and financially feasible, and with the presence of local and international timber export markets in the subject market area, the maximally productive use is estimated to be for teak production for local and international markets.

Likely buyers would come from both within and outside Brazil. Within Brazil, investment entities such as pension funds might have interest in the property. From outside, institutional investment managers, REITs (US), or pension funds would express interest.

Therefore, the highest and best use for the subject is for timber production.

## VALUATION PREMISES

Appraisal technique seeks to duplicate the process, conscious or unconscious, by which the typical buyer of the property would arrive at the price to be paid. That is, in appraising property, the appraiser must put himself in the shoes of the typical buyer. What process would this prospective purchaser use to arrive at the price to be paid? It is also important to consider the willing seller's viewpoint.

Appraisal theory holds that market value can be estimated in three ways: the cost approach, the income capitalization approach, and the sales comparison approach.

The **cost approach** consists of the summation of several elements, usually including bare land, pre-merchantable timber, and merchantable timber (and, if present, the depreciated replacement cost of improvements). It is founded on the principle of substitution; that is, a buyer would pay no more for the subject property than the cost to purchase a comparable parcel of land and replace improvements having similar utility. When applied to timberland, it can be useful if there are several distinct economic units that can be valued separately. The bare land component can be valued from sales of cutover land, or from land allocations in timberland sales. Timber is treated as an improvement, and is valued by comparing it with open market stumpage sales of similar timber. Other assets can also be valued separately.

The cost approach extracts the value of separate economic units from different sales transactions, and then “assembles” the value components into an indication of total property value. A difficulty with the cost approach is that it violates the “unit” rule by assuming that the property is purchased piecemeal instead of as a package of assets. Investors in South America

sometimes apply the cost approach to timberland properties, although more as a check on the income approach than as an independent basis for establishing acquisition price. When large quantities of land and slow-growing timber are involved, it often results in grossly inflated total values. However, applied to rapidly growing plantation forests in Brazil, it may produce credible results if projected timber value increases match or outpace the discount rate.

The **income capitalization approach** is based on the principle of anticipation, which states that value is derived from the anticipation of future benefits. It is most appropriate for properties that are regularly bought and sold based on their ability to generate a net operating income stream. Large commercial timberland properties fall into this category.

The **sales comparison approach**, also founded on the principle of substitution, holds that a buyer will pay no more for the property than the price at which he can obtain a substitute property having similar utility. Analysis is based on open market prices recently paid for similar properties in the market area. Purchase price allocations produce unit rates that may be applied to the subject property components. Where necessary, each sale's unit prices are adjusted to account for the influences of financing, interest conveyed, sale conditions, time (market conditions), location, physical characteristics, and other factors that drive sale price. The approach is particularly useful for commercial timberland in active, competitive markets.

## SUBJECT VALUATION METHODOLOGY

We have discussed market issues with most of the small group of timberland investors involved in this area of international investment. It is clear that most market participants rely primarily on the income approach when valuing international timberland investments. The institutional investors may appear to rely exclusively on it, but they nevertheless collect information about other transactions to ensure they remain competitive in their acquisition efforts. Thus, to emulate the process used by informed investors, we perform an income analysis.

To appropriately understand the data used to perform income projection, cost, or component, values must be analyzed. Because many investors often employ the cost approach as a check on DCF analysis when conducting due diligence, it is reasonable to do so in support of this appraisal. We therefore perform a cost approach for this appraisal.

Sewall has endeavored to utilize the sales comparison approach in this appraisal assignment. Sewall's interpretation of USPAP is that the appraiser should make a reasonable attempt to employ this relatively empirical valuation approach. Furthermore, investors participating in international timberland investments have expressed to Sewall a desire that, where relevant comparable sales data of sufficient quality exists, the sales

comparison analysis should be used. Sewall maintains a database of teak timberland sales from Central America,<sup>9</sup> which we have used for sales comparison analysis in the past. However, a major problem with the sales approach in this case is the nature of the interest appraised. The interest is a timber right to an existing timber rotation, excluding rights to the land. All of the teak transactions in the Sewall database involve fee simple interests, not timber rights. Therefore any use of these transactions, in the case of the subject, would be inappropriate. We therefore do not incorporate the sales approach for this appraisal.

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<sup>9</sup> We are also aware of several deal involving Brazilian properties, but neither buyers or sellers from these deals have volunteered sufficient data to incorporate them in our analyses.

## 6. COST APPROACH

The cost approach analysis uses unit rates from timberland transactions to derive unit values for bare land and open market stumpage sales to derive merchantable timber prices. A combination of cost forwarding and discounted cash flow analysis is used to derive pre-merchantable timber prices. Table 6.3 summarizes the results of the cost approach.

### LAND VALUE

The subject is the interest in the current timber crop; therefore, there is no need to value the land.

### LOCAL TIMBER PRICES

FSA reports that log prices paid to SATT for harvested timber are based on quarterly teak price surveys conducted by Consufor, based in Curitiba, Brazil. The Consufor survey focuses on non-FSA teak sales from around Mato Grosso. Consufor reports prices on a roadside basis in both BRL and USD. Table 6.1 summarizes the Consufor prices for the last 14 quarters. Revenues paid to SATT by FSA are essentially a residual stumpage rate, based on the Consufor price less harvesting costs.<sup>10</sup> Because the terms of the agreement are set by the Consufor study, the payment arrangement is analogous in many ways to a fiber supply agreement between a land base and a forest products mill, such as a sawmill or pulp mill. In such cases, the terms of the agreement are generally assigned to any potential buyer. It is our understanding that were the SATT interest to be sold, any potential buyer would be locked into the Consufor pricing mechanism. As such, Consufor prices are integral to any valuation of the interest, as they will dictate future revenues.

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<sup>10</sup> SATT is responsible for harvest costs for final harvests, but not at the time of thinnings. All thinning costs are included in the management cost fee SATT pays at the time of final harvest.

**Table 6.1. Consufor Roadside Pricing Survey Results**

Year	Quarter	Price by Log Size (m3 true)					
		18-20 cm	20-25 cm	25-30 cm	30-35 cm	35-40 cm	40+ cm
2017	Q1	\$40	\$94	\$109	\$200	\$304	\$366
	Q2	\$42	\$65	\$110	\$181	\$266	\$351
	Q3	\$34	\$60	\$112	\$181	\$268	\$353
	Q4	\$28	\$60	\$113	\$183	\$272	\$357
2018	Q1	\$28	\$60	\$112	\$180	\$267	\$349
	Q2	\$28	\$62	\$108	\$166	\$255	\$361
	Q3	\$26	\$57	\$105	\$160	\$234	\$304
	Q4	\$27	\$57	\$105	\$159	\$233	\$286
2019	Q1	\$28	\$60	\$109	\$158	\$229	\$282
	Q2	\$27	\$59	\$107	\$157	\$220	\$277
	Q3	\$26	\$64	\$110	\$159	\$222	\$280
	Q4	\$27	\$65	\$113	\$158	\$218	\$274
2020	Q1	\$25	\$65	\$116	\$169	\$214	\$261
	Q2	\$25	\$65	\$116	\$169	\$214	\$261
3-year Average (2017 through Q1 2020)		\$29	\$61	\$110	\$168	\$242	\$311

Source: Consufor Surveys

Note: Consufor reported Q2 2020 prices identical to Q1, because there was no harvesting occurring due to the pandemic.

The prices shown in Table 6.1 are on a roadside basis. Sewall's roadside pick is based on the 12-quarter average ending in Q1 2020. The cost approach relies on stumpage pricing, so we must adjust these prices to account for harvest and transport costs to roadside. Table 6.2 shows our final stumpage estimates based on the Consufor survey data and the harvest cost information provided by FSA.

**Table 6.2. Teak Stumpage Prices**

Diameter (cm)	Stumpage Thinning \$/m <sup>3</sup>	Stumpage Final Harveys \$/m <sup>3</sup>
<b>Current</b>		
<b>Roadside Pricing</b>		
Logs 18-20 cm	\$ 29	\$ 29
Logs 20-25 cm	\$ 61	\$ 61
Logs 25-30 cm	\$ 110	\$ 110
Logs 30-40 cm	\$ 205	\$ 205
Logs 40+ cm	\$ 311	\$ 311
<b>Stumpage</b>		
Harvest Costs (\$/m3)	\$ -	\$ (20.00)
Logs 18-20 cm	\$ 29.00	\$ 9.00
Logs 20-25 cm	\$ 61.00	\$ 41.00
Logs 25-30 cm	\$ 110.00	\$ 90.00
Logs 30-40 cm	\$ 205.00	\$ 185.00
Logs 40+ cm	\$ 311.00	\$ 291.00

Prices shown are for logs 18 centimeters and larger. TRC's Cassiano Sasaki reports that there are energy markets (biomass) in the area, but demand is sporadic, and that sales into such markets tend to be opportunistic. We therefore limit our analysis to log products. We model a minimum log diameter of 18 centimeters. Mr. Sasaki reports that the smallest logs are shipped to Floresteca's sawmill in Cáceras, where they are sawn into squares before shipment to India. He also reports that, based on haul distances from the subject farms to the mill, combined with logistics costs from the square mill to India, that it is not economical to export logs less than 18 centimeters in diameter.

## MERCHANTABLE TIMBER VALUE

Merchantable timber value is calculated by multiplying total standing merchantable timber by the stumpage values just described. In this case, merchantable timber is defined as belonging to stands age 14 years or older. Prices shown in Table 6.2 form the basis of the merchantable timber value reported in Table 6.3. Merchantable timber volumes shown in the table are based on inventory estimates taken from the Woodstock model developed for the income approach. Gross merchantable timber value is estimated at \$65,709,736, based on this calculation. Under normal circumstances, this would become our final estimate of merchantable timber value. However the SATT interest is unique in its cost-sharing arrangement. Besides harvesting costs at the time of final harvest, SATT must also pay a one-time management cost of \$3,354<sup>11</sup> per harvested hectare. SATT is also responsible for land clearing costs of \$596 per hectare to bring the land back to a pre-forestry condition. Finally, FSA is entitled to a 5% performance fee on roadside revenues, less harvest costs and the management fees. Assuming a liquidation scenario, it is therefore reasonable to subtract these costs from gross timber value to arrive at an adjusted timber value. Management, land clearing, and FSA incentive costs total \$54,481,671, resulting in final adjusted timber value of \$11,228,065.

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<sup>11</sup> Note that the base cost is \$4,500, but TRC owes SATT back revenues from prior harvest activity. The revenues are to be subtracted from the management cost, resulting in the reduced cost reported above.

**Table 6.3. Cost Approach**

SATT - Brazilian Teak - June 30, 2020							
MERCHANTABLE TIMBER:			Volume (m3)	Unit Value	Total \$		
Teak	Logs 18-20 cm		126,825	\$9.00	\$1,141,428		
	Logs 20-25 cm		337,467	\$41.00	\$13,836,142		
	Logs 25-30 cm		245,235	\$90.00	\$22,071,175		
	Logs 30-40 cm		145,720	\$185.00	\$26,958,263		
	Logs 40+ cm		5,851	\$291.00	\$1,702,728		
			861,099	\$76.31	\$65,709,736		
Management Costs			13,644.8	-\$3,353.54	-\$45,758,415		
Stump Clearing Costs			13,644.8	-\$596.00	-\$8,132,305		
TRC Performance Fee (Roadside price - harvest costs - management fee) * 5%					-\$590,951		
Subtotal Costs:					-\$54,481,671		
Adjusted Merchantable Timber:					\$11,228,065		
PRE-MERCHANTABLE PLANTATIONS:							
1: Per-acre value reconciled by giving 0% weight to the liquidation approach, 100% weight to the discounted revenue method, and 0% weight to the IRR approach.							
		Plantation Area (ha)	IRR Approach USD/ha	Cost Forwarding USD/ha	Discounted Revenues USD/ha	Reconciled USD/ha	Reconciled Total USD
Teak Seed Stock							
Age	12	58	\$0.00	\$0.00	\$5,730.51	\$5,730.51	\$333,057
Age	13	239	\$0.00	\$0.00	\$5,184.02	\$5,184.02	\$1,240,276
Teak Seed Stock		297.4				\$5,290.83	\$1,573,333
		Plantation Area (ha)	IRR Approach USD/ha	Cost Forwarding USD/ha	Discounted Revenues USD/ha	Reconciled USD/ha	Reconciled Total USD
Teak Clonal Stock							
Age	12	42	\$0.00	\$0.00	\$7,631.71	\$7,631.71	\$318,624
Age	13	601	\$0.00	\$0.00	\$8,490.28	\$8,490.28	\$5,104,612
Teak Clonal Stock		643.0				\$8,434.53	\$5,423,236
Total Pre-Merch		940.3				\$7,440.39	\$6,996,569
		Hectares	USD/Hectare				
Total Area		14,585	\$1,248				
Plantable Area		14,585	\$1,248				
					Rounded to	\$18,200,000	

It is highly unusual for a value this low to occur in the cost approach. There are several reasons for this:

1. The management cost arrangement in which SATT must pay a large one-time cost at the time of final harvest is unusual in that it is “back-loaded” and does not accurately reflect current costs. In most instances, timberland investors would have paid for management costs on an as-required basis over the life of a stand, thereby obviating the need for such a charge at final harvest. This cost factor is the leading contributor to such a low indication of value.
2. The same can be said for the land clearing cost, which is significant, but still less than the gross value of the timber.



3. A common problem with the cost approach is that it often treats the value of standing timber based on a “liquidation” basis. That is, it only recognizes the value of the timber based on its current condition. Teak stands always generate their maximum value at the very end of their rotation when their product mixes include higher proportions of larger, higher-value logs. As such, the approach almost always fails to recognize future value, thereby understating the intrinsic value of the investment.

Often one can argue that the conservative nature of the merchantable timber value calculation is offset by an overly optimistic view of liquidity, which assumes that all the timber could be harvested at once and placed into the market with no price impact. However, in this case, the magnitude of the management costs on the back end of the investment period largely overwhelms any value derived from the gross estimate of timber value, resulting in an unrealistically low value. An alternative would be to treat the merchantable timber similar to that of pre-merchantable timber, which factors in future value, as well as costs. However, to do so effectively reduces the cost approach to a simple DCF analysis. This would obviate any need for the approach in the first place, since we are already applying a DCF analysis within the income approach (described later).

## PLANTATION TIMBER VALUE

Although pre-merchantable timber is not large enough for harvest, the market allocates increasing amounts of value to it, particularly for well-maintained plantations. Numerous formulas have been used to develop pre-merchantable values, falling into the categories of historical cost (or cost forwarding), anticipated income and internal rate of return approaches.

We can estimate the value of plantation timber using three approaches. The first approach is discounted cash flow, where the expected net income from future harvest is discounted to the present. The anticipated income approach takes the view of the buyer, who anticipates realizing revenue at some future point from the stand of pre-merchantable timber. Here, the expected net income from future harvest is discounted to the present. For this analysis, we discount future cash flows at an 11.25% discount rate (refer to our discussion under the income approach for more on discount rates).

The historical cost or cost-forwarding approach accounts directly for the actual costs incurred in site preparation, planting, and other activities contributing to the establishment of the pre-merchantable stocking. These costs are carried forward at a real, pre-tax interest rate. This approach is attractive because it is straightforward in application and deals with historical fact rather than speculation. The primary pitfall of the historical cost approach is that it views the problem only from the perspective of the seller, who has borne the

regeneration costs. Because value reflects anticipated benefits, the buyer has no reason to be concerned with the costs borne by the seller. Another issue with the cost-forwarding approach is that it does not allow one to account for risk in analyzing the value of pre-merchantable stands.

The internal rate of return approach offers a middle ground between the seller's value (historical cost) and the buyer's value (anticipated income). Here, the internal rate of return from the cost of stand establishment to harvest is determined. The internal rate of return is then used in the pre-merchantable valuation process by compounding the establishment cost forward at that rate. This approach assumes that the buyer and seller have agreed to compromise. It also assumes that the buyer is satisfied with the cost of past management practices.

Once again, the nature of the terms of the investment agreement between FSA and SATT confounds the situation. SATT does not currently have any obligations to pay for management activities leading to the successful harvest of the trees. Because there are no up-front costs, it becomes impossible to employ either the cost-forwarding or the IRR method. We are therefore reduced to the use of the DCF analysis solely for purposes of valuing pre-merchantable timber. Table 6.3 shows the estimate for the pre-merchantable timber value of \$6,996,569, which is based on the DCF method.

## INDICATED VALUE BY THE COST APPROACH

Table 6.3 summarizes the results of the cost approach analysis. Based on this unit summation analysis, the estimated market value is \$18,200,000. Were it not for the negative value generated by the cost adjustments, the concluded value under the cost approach would be higher. Under normal appraisal conditions we would not have to adjust value downward for deferred management and clearing costs. These costs combined equal -\$54.5 million. It is worth noting that under normal conditions in which we would typically ignore these costs, the indicated value from the cost approach would be \$72.7

million. One could argue that this is the correct value, since it produces a value more in line with customary management practices and the charging of costs. However, insofar as the current estimate of value from the Cost Approach is much lower than we would expect, this fails to account for any influence on value resulting from the typical timing and allocation of management and clearing costs. This cost stream is one which any knowledgeable buyer would almost certainly factor into their due diligence.

The cost approach, because of the unique circumstances surrounding the SATT interest, does not produce a credible measure of value. Because of this, we do not factor it into our final estimate of value. We have, however, included discussion of it here for purposes of providing a comprehensive opinion of value. It is instructive, as it helps to highlight the unique nature of the investment.

## 7. INCOME CAPITALIZATION APPROACH

The Income Capitalization Approach (ICA) derives market value directly from the income-producing potential of the property. The format used in this appraisal is Discounted Cash Flow (DCF) analysis. The DCF analysis estimates net annual income for the subject property in each year of the projected holding period. The analysis is conducted on a real, pre-tax basis, designed to emulate typical investor behavior. It is Sewall's experience that most investors hold to this convention. The analysis assumes no taxes, other than property taxes. Because of this, a real, pre-tax market-derived discount rate is used to discount annual net incomes. Sewall worked with the timberland managers in estimating forest management costs and timber productivity estimates specific to the property. These data include timber rotations, silviculture, and management costs. Base timber prices are as discussed in the previous chapter (see Table 6.2).

### UNIT MEASURES

All financial values are expressed in USD. All volumes are presented in cubic meters and all area figures are hectares.

### DISCOUNTED CASH FLOW METHOD ASSUMPTIONS

The DCF process has several aspects that can vary, depending on country, region, property type and value definition. This section provides Sewall's approaches on timing convention, projection period and reversion value.

#### Timing Conventions

Each Woodstock planning period is one year in length (i.e., an annual period). Woodstock applies all actions (harvest and silvicultural activities) at one point in time during the planning period. When applying discount rates, Sewall assumes that cash flows occur at different points in time during the year. The following timing conventions are typically used for Southern Hemisphere DCF models. Sewall recognizes that revenues generated from harvesting can occur throughout the year. In order not to be too aggressive on the timing of the cash flows, harvest revenue is treated as mid-year. Costs are also assumed to occur at mid-year.

**Projection Period**

The projection period should reflect or account for the holding period anticipated by typical investors. In most cases where properties are held fee simple or future rotations are anticipated, we model a 20-year holding period. However, because this is a timber right with a finite lifespan, we model the investment to its natural conclusion.

**Inflation**

The appraisal analysis is presented in real terms. The cash flow projections and discount rates are therefore net of inflation.

**Reversion Value**

There is no need for a reversionary value, as the interest is subject to a finite term.

**Tax Considerations**

Forests can be valued either pre-tax or post-tax. Institutional capital makes up the bulk of current timberland investors. Such investors often analyze deals on a pre-tax basis. While this treatment often does not apply to offshore investments, deals are typically structured to mitigate most, or all, of the tax burden. Therefore, we model cash flows for the subject on a pre-tax basis.

Since our analysis is pre-tax, we employ a pre-tax discount rate. Producing a post-tax analysis would require using a lower discount rate that would more or less offset the outflow of cash included in the post-tax model, thus arriving at generally the same conclusion.

**YIELD TABLE GENERATION**

Growth and yield assumptions used for the DCF analysis are based on inventory information and yields provided by FSA for the subject. The inventory, based on a collection of Permanent Sample Points (PSPs), is taken every one to two years, with the most recent data measured in 2019. The FSA inventory includes volumes for logs from a small-end diameter (SED) from 4 centimeters on up. Not all log sizes in the inventory are commercially viable. TRC's Cassiano Sasaki reports that logs smaller than 18 centimeters are not currently economically usable. Our analysis, therefore, assumes a minimum SED of 18 centimeters. The inventory data provided for this year's appraisal has been updated to reflect growth from the time of last measurement to the effective date of appraisal.

FSA provided a collection of yield tables for the properties, based on PSP measurements. The yields were differentiated by genetic material (clones vs seeds) and site quality. Mean annual increment (MAI) ranges from under 5 cubic meters per hectare per year on the worst seed sites to over 13 on the best clonal sites.<sup>12</sup> Growth and yield was highly variable across the properties during our last inspection. Site 1 seed and clonal plantings looked good, while many of the Site 3 areas are in bad shape, and may not develop much beyond their current state. Differences between seed and clonal plantings were visually striking. In general, the clonal stock exhibits superior growth and form, which should translate into superior yield performance over the early seed-stock plantings. The growth projections provided for this year's appraisal remain unchanged from 2018.

Sewall used the starting inventory data in conjunction with the FSA yield tables to build a collection of yields for the property. The starting points for existing yields are based on the recent inventory data, adjusted for expected growth between the point of last measurement and the effective date of appraisal. Some stands were thinned since their last measurement, which was not reflected in the data. Sewall requested and FSA provided a list of these stands. Stocking in the inventory for these stands was adjusted to reflect a post-thinned condition, based on the information provided by FSA. The yields in the model therefore reflect all past and/or anticipated thinning as of the effective date of appraisal. The data were also adjusted to account for any final harvests anticipated between the time of last inventory and the effective date of appraisal. As such, the starting condition assumed by the model is our best effort to accurately portray the condition of the forest as of the effective date of appraisal. In summary, starting inventories for this year's appraisal have been updated since 2019, but the general growth assumptions used to project stands forward remain unchanged.

Stands were grown based on expected growth rates derived from their respective yield tables. In general, seed stands are assumed to receive commercial thinnings at 12 and 15 years, while clonal stands receive thinnings around ages 10 and 14 years. Actual thinning regimes chosen by the model depend on a stand-by-stand basis, based on their current condition. All stands are allowed an initial final harvest beginning at age 20, with a maximum final harvest age of 24 years. Woodstock was forced to harvest all stands. It may leave no stands uncut at the end of the optimization process.

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<sup>12</sup> Assuming a rotation age of 20 years and an SED of 18 centimeters.

Yields provided for the property by FSA appear reasonable, based on observations made during our last inspection of the property. However, a more rigorous analysis of the data was outside the scope of this assignment. In general, we find the yields associated with this property to be below average, based on the overall condition of the forest. The Woodstock model described here results in an average MAI of around 7 cubic meters per hectare per year. We would expect MAIs for normal properties within Latin America to range from 10 to 14 cubic meters per hectare per year; significantly higher than the subject MAI. The value difference between a property with an MAI of 7 versus 12 cubic meters, for example, is significant.

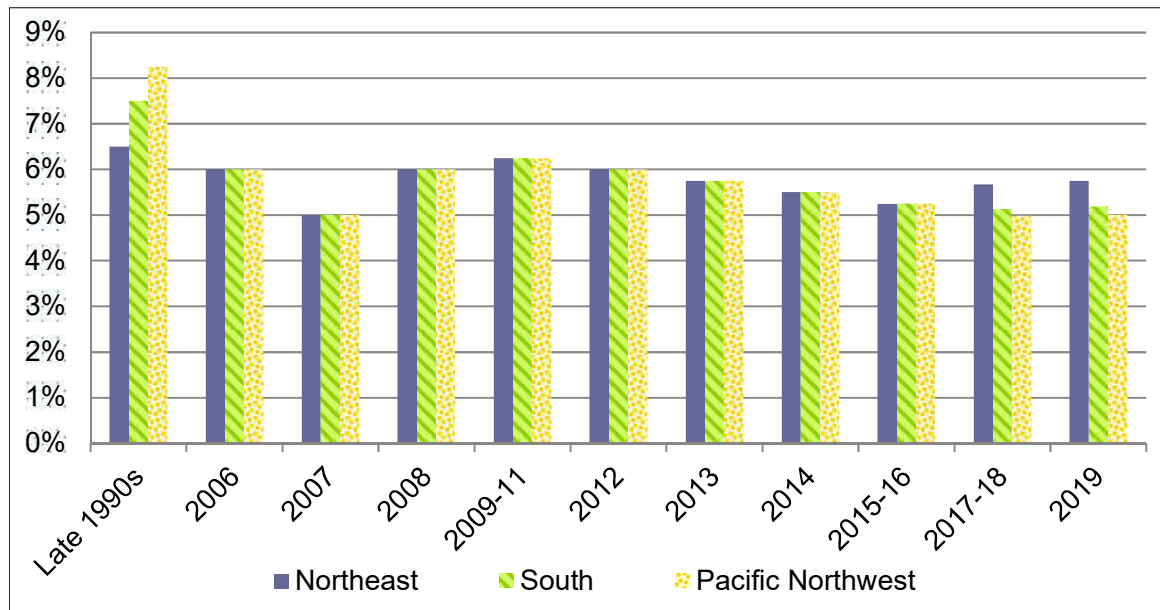
## DISCOUNT RATE

For this appraisal, Sewall applies a discount rate of 11.25 percent real (net of inflation). The real discount rate converts projected future cash flows into their net present value. A market basis for the discount rate helps produce a reasonable estimate of value, especially for a long-term investment in which the value is sensitive to the timing of cash flows.

### Evolution in Discount Rates

We first consider the evolution of discount rates applied to timberland valuations in the US for context. US timberland values previously peaked in 2008 in conjunction with compressed risk premia across the investment universe, as capital sought investments with better expected return than traditional assets that seemed overvalued. To be competitive, investors lowered discount rates for timberland as well, producing higher values.

Although timber prices were declining at the time, *expected* prices are often stickier because of the common assumption, based on observation of the past, that prices will return to prior levels. There was little variation in discount rates among timber regions and properties as purchasers assumed relatively little difference in risk regardless of US location (Figure 7.1).

**Figure 7.1. Mean Real (ex-Inflation) Discount Rate for US Timberland Since the 1990s**

Source: Sewall Investor Surveys

When the 2008 global financial crisis struck, there was considerable investor uncertainty, and timberland discount rates rose above 6.0 percent real. The bid-ask spread widened and “no-sales” characterized some offerings. Sewall’s representation of prospective buyers in their due diligence, various appraisal assignments and our analysis of significant transactions shed some light on the prevailing investment environment.

In 2010-11, discount rates for US investments changed little. However, by 2012, Sewall’s Investor Survey indicated discount rates fell by about  $\frac{1}{4}$  percentage point. A similar decline occurred in 2013, and by 2015, rates had dropped to pre-financial crisis levels. Investor Survey results in 2019 showed the median real discount rate subsided to 5.0 percent for the US generally, with some differences among the major regions.

We attribute the decline in rates since 2012 to a similar fall in prospective rates of return for mainstream investments, as well as relative demand for timberland. Optimism around fundamentals such as recovery in the housing market and strengthening log demand from China may now be wavering, though prices are buoyed by sales of comparable properties.



## Discount Rate Approaches

In selecting a discount rate, we consider the recent US 10-year Treasury yield as a proxy for a “risk-free” benchmark; we then review alternative indicators to see that an appropriate risk premium for the subject based on its asset type is added, implicitly or explicitly, to arrive at a discount rate that reflects the risk parameters of the specific timberland investment. For non-US timberland valuations, we provide a risk premium or discount to account for country risk as well.

There are three approaches that we considered to determine an appropriate discount rate for a timberland investment by a US dollar-based investor:

1. Implied discount rate based on transaction evidence
2. Sewall’s Investor Survey of market participants
3. Application of the Capital Asset Pricing Model (CAPM)

In the case of the last two, we begin with the US rate, treating it as our timberland benchmark for a well-established, low-risk, active market. For non-US timberland valuations such as the subject, we then add any risk premium to account for property-specific risk as well as country-specific risk.

### 1. Implied Discount Rate

Actual transactions can provide empirical evidence of market discount rates. Sewall can derive implied discount rates (IDRs) by one of two methods. First, we might ask a buyer the discount rate they applied to arrive at their acquisition price. The advantage to this approach is that it most directly reflects investor behavior regarding the transaction in question. Unfortunately, investors are generally reluctant to disclose their actual discount rate for a particular transaction. This is especially true for non-US deals. While most investors decline to disclose deal-specific rates, many are willing to opine on geographically specific generic rates, which in some ways can be more useful than deal-specific IDRs. More on this in the discussion of our annual investor survey below.

Second, we can compute the acquisition’s projected internal rate of return (IRR) as well as an IDR based on a known sale price and assumptions regarding projected expenses and revenues. In some cases, Sewall has direct experience in the acquisition due diligence for a bidder. By virtue of this, we are well-informed regarding the prospective cash flow profile of a property to then derive the IDR. However, even under these conditions, we may be limited to our own interpretation of the “correct” set of assumptions for the transactions. This is often due to the fact that investors may share data with the appraiser, while at the same time hold back the assumptions they apply to the data.

Regardless of the method employed, it is important to recognize that the buyer's discount rate is driven by their particular perception of risk, future prices and costs, projected timber yield, and sale of portions of the property, for example. There are a number of variables and assumptions to consider when estimating a discount rate. When not privy to the buyer's assumptions, it is necessary to estimate them to derive the implied discount rate.

Risk can be incorporated into an analysis by adjusting projected cash flows, the discount rate itself, or a combination of the two. Some investors account for risk by adjusting projected cash flows directly, so adjustments to the discount rate among projects will be relatively small compared to those who account for risk by adjusting the discount rate itself.

Unfortunately in this case we have inadequate data from which to derive an implied discount rate from the region.

## 2. Sewall Investor Survey

Sewall uses our Investor Survey as a key reference to gauge timberland market interest and issues. This is an effective way to capture investor sentiment and the relative risk profile that they ascribe to various investment regions and opportunities.

In 2019, Sewall received responses from 31 active timberland investment managers, most of which are US-based, and 27 replies applied to the US discount rate. We collected data around the "base" discount rate (real, pre-tax, before investment manager fees and expenses) currently required to purchase generic timberland investments in the US. Respondents could report a single rate for the US, or if they assumed regional differences, they could specify rates they would apply to the South, Northeast, Great Lakes States, Pacific Northwest, Inland Northwest, and Northern California.

Selected survey results are summarized below:

*What is the US base discount rate required for competitive bids?*

Mean 5.07%; Median 5.0%; Mode 5.0%; Range 4.0% to 6.5%

*Over the past 12 months, have discount rates stayed the same, risen, or fallen?*

Same (21) | Fallen (3) | Risen (2)

*By how much? Mean -0.04%; Median 0.0%; Mode 0.0%; Range -0.50% to +0.50%*

*Compared to 12 months ago, how difficult is it to raise capital?*

Same (14) | Harder (11) | Easier (0)

*How much committed capital is out there now?*

Mean \$2.8 billion; Median \$3 billion; Mode \$3 billion; Range \$1-5 billion

**Brazil Base Rate**

Respondents to our annual investor survey are asked to opine on appropriate discount rate premiums or discounts to be applied to the base US rate in order to build country-specific discount rates. Respondent risk premiums/discounts account for country-specific risks related to political, economic, and currency related factors.

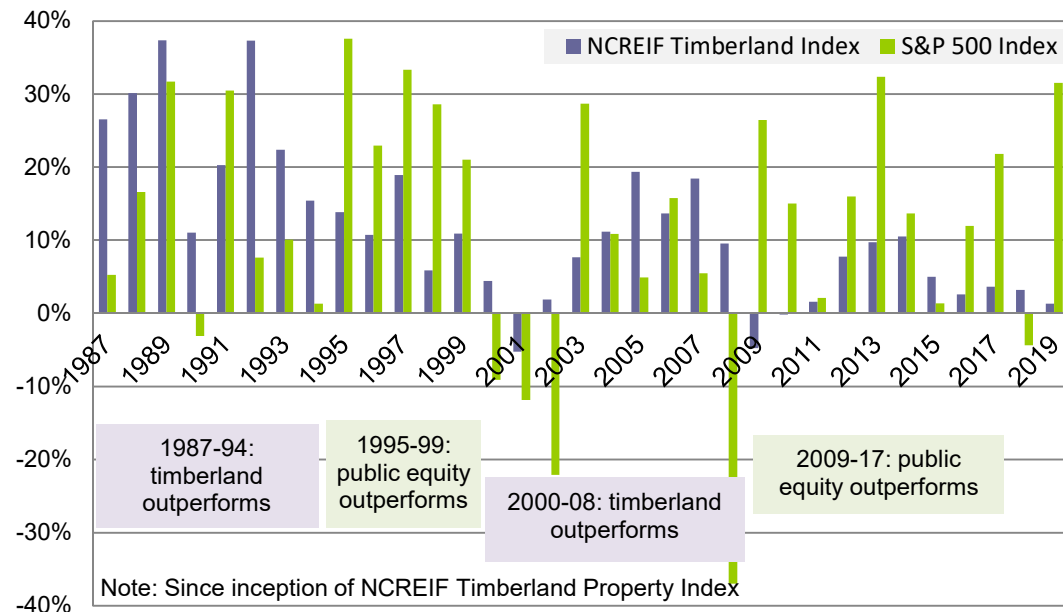
Brazil is one of the countries included in the survey. The mean response in 2019 was 5.35 percentage points, and the median 5.0 points for teak investment. Adding these rates to our 5.0% base US rate produces a Brazil discount rate of 10.35% and 10.0%, respectively. The full range in responses of 3.5 to 10.0 points was wide relative to the range in perceptions of other geographies. This indicative range produces a discount rate range of 8.5% to 15.0%, and thereby a midpoint of 11.75%. Comments indicated that distant end markets' sensitivity to transportation cost changes, as well as regulatory and political uncertainty, weighed on required return considerations for this investment type in Brazil.

**3. Capital Asset Pricing Model (CAPM)**

The advantage of the Investor Survey is that it provides direct input about investor sentiment regarding the subject market. The CAPM offers a quantitative, public equity-based alternative to investor surveys. The risk premium that CAPM derives is not a function of a project's stand-alone risk, but rather its contribution to a well-diversified investment portfolio. In other words, CAPM calculates the risk premium for an asset based on its performance relative to the overall equity market. As with the investor survey, we begin by analyzing US timberland investments in the context of the CAPM and expand our analysis to include risk for the subject geography.

**US Investment Performance Measures**

The US has a history of timberland investment going back to the 1980s via the NCREIF Timberland Property Index. As a starting point, total returns of the NCREIF Timberland Property Index and the Standard & Poor's 500 Index since inception of the Timberland series in 1987 show multi-year periods in which timberland has outperformed stocks, and vice-versa (Figure 7.2).

**Figure 7.2. NCREIF Timberland Property Index and S&P 500 Total Return Index**

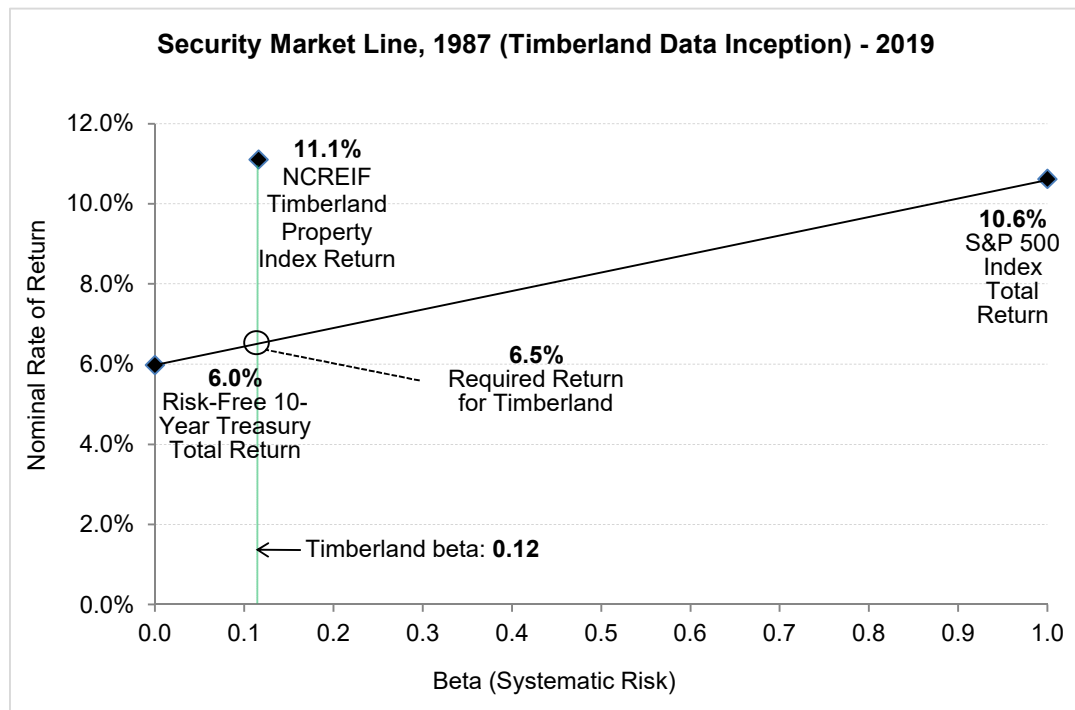
Source: NCREIF, St. Louis Fed

Subsequent to the market correction in 2008-10, discount rate compression and capital appreciation drove up US timberland and publicly traded equity returns markedly from 2011-2014. Timberland's positive returns look modest as public equities' prices charged higher through 2017. Timberland outperformed when publicly traded share values corrected in 2018, then underperformed when public equities soared in 2019.

The correlation between annual returns, one rationale for investor interest in timberland and best measured over long periods covering multiple business cycles, of US timberland and US public equities shown in the figure is just 0.19. US timberland's correlation with the Barclays US Aggregate Bond Index is 0.21 over the same period.

In Sewall's CAPM model (Figure 7.3), the Security Market Line shows how annualized rates of return correspond with volatility (beta).<sup>13</sup> The positive slope of the line indicates that, as volatility or risk rises, an investor should expect to receive a commensurately higher rate of return for accepting that risk. The risk-free rate of 6.0 percent is the average return on a 10-year government bond, to correspond with the typical minimum investment horizon for timberland, since inception of the NCREIF Timberland Property Index in 1987.

<sup>13</sup> Beta measures an asset's correlation with the overall equity market. A beta of 1.0 would represent perfect correlation; an asset with a beta of 0.9 would be expected to rise/fall 9% if the stock market increased/decreased by 10%.

**Figure 7.3. Capital Asset Pricing Model**

Sources: NCREIF, St. Louis Fed

The security market line indicates that, with a beta of 0.12, the return for timberland should have averaged 6.5 percent in nominal terms to fairly compensate for its risk. Actual returns are higher - the 1987 inception-to-date annualized return was 11.1 percent, suggesting excess return (or outperformance) of 4-5 percent per year over this time period. Some of the outperformance may be attributed to non-systematic factors (early-mover advantages, fortunate timing relative to events unique to the forest sector), while some outperformance could be more systematic (niche investment in which few investors have dedicated expertise, illiquidity premium, etc.). This risk/return relationship has bolstered timberland's attractiveness for investors.

Below is the CAPM equation that we apply for timberland in general:

$$R_a = R_f + \beta (R_m - R_f)$$

Elements of this equation are defined below.

$R_a$  = Required rate of return of the asset, or discount rate

$R_f$  = Expected risk-free *real* return rate

$\beta$  = Timberland beta (adjusted)

$R_m$  = Expected public equity market return rate

$R_m - R_f$  = Equity risk premium

$$R_a = R_f + \beta * (R_m - R_f)$$

$$\begin{aligned}
 &= 0.0\% + 0.3 * 5.65\% \\
 &= 0.0\% + 1.7\% \\
 &= 1.7\% \text{ real} \\
 &+ 0-1\% \text{ for lower liquidity} \\
 &+ 0-1\% \text{ for higher transaction costs} \\
 &\simeq 2-4\% \text{ total required return for core US timberland}
 \end{aligned}$$

With regard to the specific factors above:

- The risk-free rate ( $R_f$ ) applied is the average yield on long-term US Treasury securities. This rate has notably stepped down since the coronavirus came to the fore in March, from 0.5-1.2 percent in nominal terms, and -0.2-0.8 percent in real terms, through mid-May 2020.<sup>14</sup> We use 0 in the equation, considering the real long-term yield has been slightly negative steadily from early April through mid-May, the Federal Reserve Bank is actively trying to keep nominal interest rates near zero, and inflation turned negative.
- The US timberland beta is calculated at a relatively low 0.12. In private commercial real estate, rates of return may understate volatility due to a “lag effect” between when actual market conditions are reflected in the appraised values used to calculate rate of return. This theorized lag and smoothing effect on returns remains a subject of debate.<sup>15</sup> Our sense is that if this effect applied to timberland, the increased variability of rates of return would increase beta to approximately 0.2-0.4.
- The equity risk premium<sup>16</sup> ( $R_m - R_f$ ) is an updated estimate of 5.65 percent published as of May 2020. The equity risk premium (ERP) is in line with the 4-6 percent range typically cited in academic literature for the historic average ERP in the US; it has ranged from 2-6.5 percent since 1961 by this source’s methodology.
- At this point, the indicated *real* required return or discount rate is 1.7 percent, but so far does not account for more subjective items such as reduced liquidity and related high transaction costs associated with private-market assets (actual costs of purchase or sale may be higher, but consider an annualized rate). Our impression is that each of these factors could add 0-1 percentage point of required return, for a total of 2-4 percent on a real (net of inflation) basis.

Our impression is that CAPM has limited direct application to forward-looking discount rates for timberland assets; it is employed by some investors to confirm that implied or projected internal rates of return are reasonable.

<sup>14</sup> Treasury.gov, St. Louis Fed DGS10 and DLTIIT series

<sup>15</sup> Cheng, P., Z. Lin. and Y. Liu. Heterogeneous Information and Appraisal Smoothing. *Journal of Real Estate Research*, 2011, 33(4), 443-469.

<sup>16</sup> [http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/)

### Country-Specific Risk Measures

To quantify the risk associated with non-US investments relative to the US, Sewall's approach is to categorize the offshore risk elements according to: (1) forest-sector risk; (2) country macro-economic risk; and (3) unique, non-diversifiable property-specific risk not captured by 1 and 2. In the context of the CAPM equation expanded below, the corresponding factors that adjust for these three types of risk are as follows: timberland beta ( $\beta$ ) for forest sector risk; country-specific risk premium ( $RP_c$ ) for macro-economic risk; and  $z$  for unique, non-diversifiable risk. Sewall's goal is to provide as much transparency as possible regarding our logic at arriving at key inputs for the CAPM equation.

The 0.12 beta calculated (0.3 adjusted for possible lag effect) using NCREIF return data is quite low and represents a relatively lengthy and accepted performance history, in turn supported by the relatively deep timberland markets available to US investors and lower associated risk. In adjusting beta, a key lever in the CAPM equation, we make adjustments relative to the US timberland market. In the case of the subject property being appraised, the characteristics of its timberland sector and available market information suggests to Sewall an increase in beta to reflect increased risk.

Below is the CAPM equation that we apply specifically for the subject property:

$$R_a = R_f + \beta (R_m - R_f) + RP_c + z$$

Elements of this equation that apply to the subject property in Brazil are defined below:

- $R_a$  = Required rate of return of the asset, or discount rate
- $R_f$  = Expected risk-free *real* return rate
- $\beta$  = Timberland beta (adjusted)
- $R_m$  = Expected return of S&P 500 Total Return Index
- $R_m - R_f$  = Equity risk premium (ERP)
- $RP_c$  = Country-specific risk premium
- $z$  = Property-specific risk

$$\begin{aligned} R_a &= R_f + \beta * (R_m - R_f) + RP_c + z \\ &= 0.0\% + 1.0 * 5.65\% + RP_c + z \\ &= 0.0\% + 5.65\% + RP_c + z \\ &= 5.65\% + 3.53\% + z \\ &= 9.2\% \text{ (rounded) real} + z \end{aligned}$$

*We purposely start with US-based market metrics* and then adjust for country-specific factors that would apply to the geography involved. We also reference nearer-term market metrics relative to the effective date of the appraisal as more reflective of the current investment environment and options available to investors.

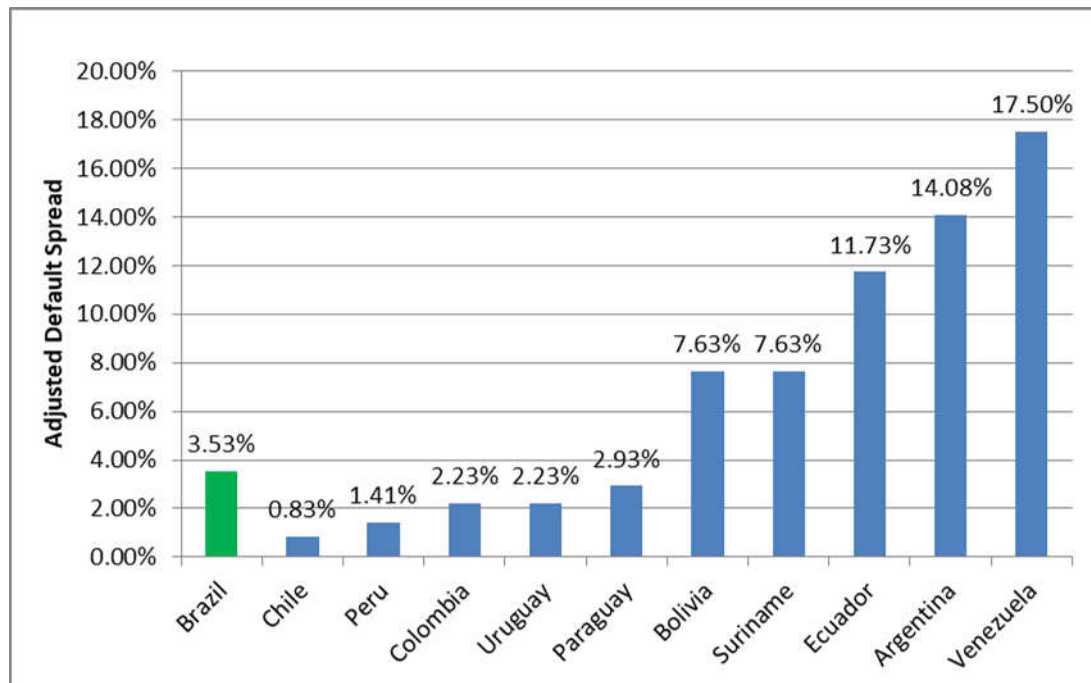
With regard to the specific factors above:

- As noted above, the risk-free rate ( $R_f$ ) applied is the real yield on long-term US Treasuries. We use 0.0 percent, considering conditions after onset of the coronavirus pandemic in 2020.
- Also discussed above, the US timberland beta ( $\beta$ ) is calculated at a relatively low 0.12, and we adjust it to 0.3 for potentially smoothed returns caused by appraisal-based return series. However, this reflects US timberland risk in isolation and US market exposure. We typically increase beta to a minimum of 0.5 for a non-US asset to account for the comparatively less robust domestic growth and yield models, timber consumption base, exposure of timber prices to export markets and the volatility of transportation economics, and the limited extent and uncertainty of information regarding timberland transactions and investment performance history.
- In the case of the subject property, we feel it is prudent to increase beta ( $\beta$ ) to 1.0 in total.
- The indicated equity risk premium is the same 5.65 percent applied for a US investment; it is an estimate based on both long-term investment performance history and the current price level of public equities.
- We add 3.53 percent for the country risk premium ( $RP_c$ ), as indicated by the CDS spread, discussed below.
- As already noted, CAPM analysis does not account for subjective items such as reduced liquidity and related high transaction costs associated with private-market assets, which could each add 0-1 percentage points of required return. Incorporating these leaves our CAPM analysis indicating a total required annualized return rate of 9.2-11.2 percent in real (net of inflation) terms.

The country risk premium for Brazil can be estimated by using a couple of established market measures as proxies. One is the credit default swap (CDS) spread, a common proxy for sovereign risk pricing in the debt market. In the swap market, it is effectively an insurance premium paid by the buyer (who holds sovereign debt) to ensure a loan payoff in the event of a default. Although it is limited to risk exposure within the debt market, it is a useful measure of perceived investment risk linked to economic growth and government economic policies. CDS spreads can be thought of as a debt-based risk metric that captures a country's economic risk as a cost of doing business in global capital markets.

Figure 7.3 compares the average CDS spread at the beginning of July 2020 for Brazil and its rated neighbors. Brazil's CDS spread of 3.53 points adjusted in relation to the US and countries of similar credit rating indicates a premium for country risk is warranted for a Brazil investment.



**Figure 7.3. Credit Default Swap Spreads**

Source: Damodaran Online; [http://pages.stern.nyu.edu/~adamodar/New\\_Home\\_Page/datafile/ctryprem.html](http://pages.stern.nyu.edu/~adamodar/New_Home_Page/datafile/ctryprem.html)

### Sovereign Debt Credit Rating

Another measure of risk is the credit ratings agencies which rate sovereign debt. The three major US ratings agencies each rate Brazil's sovereign debt as non-investment grade, and speculative. Brazil is perceived as presenting a debt investor with uncertainty regarding its ability to meet financial obligations, due to vulnerability to changes in circumstances. All reviews are recent, and ratings were unchanged.<sup>17</sup>

- Moody's Ba2 (Stable), May 2020
- Fitch BB- (Stable), May 2020
- S&P BB- (Stable), April 2020

### Subject Conclusion

Sewall's most recent 2019 investor survey supports a range of generic real discount rates for west-central Brazilian from 8.5-15.0% and indicates 10.0% using the median result of the survey. The CAPM suggests a real discount rate of 9.2-11.2%, though elements of it are determined subjectively. Based on the foregoing analysis, we conclude a generic rate for the region of 10.5%. It is not uncommon for experienced investors to couple their choice of discount rate with their assumptions, depending on how aggressive they may or may not be. For example an investor might adopt aggressive pricing assumptions, while at the same time employing a higher discount rate.

<sup>17</sup> <https://countryeconomy.com/ratings/brazil>, accessed 21 July 2020

However, we are not yet finished, because we must also consider any property-specific risk. The property is a timber right, not a fee simple interest. We regularly ask respondents to our annual investor survey how they treat discount rates in the case of partial interests such as leasehold arrangements or timber rights in relation to fee simple (freehold) interests. Some report no difference in their choice of rate, but most generally add a risk premium. This is not surprising, given the fact that investors under a leasehold agreement have less control over a property than those with a fee simple interest, which affords complete control. Investors in our most recent survey indicate applying a risk premium of 25 to 250 bps to leasehold properties, or in this case, a timber right. The mean response was 93 bps, with a median of 75 bps.

Based on these factors, it is therefore reasonable to assume a risk premium over and above our base Brazilian rate. We therefore conclude a real pre-tax rate for the subject of **11.25%**, by adding an additional risk premium of 75 basis points to our base Brazilian rate of 10.5%.

## **STUMPAGE REVENUES**

The basis for the roadside prices used in the Income Approach is as described under the Cost Approach chapter (see Table 6.2).

Investors vary in their approach to account for stumpage appreciation. Some investors tend to be conservative, choosing to model little or no real appreciation associated with stumpage prices. Often such investors will do so with a tendency towards lower discount rates. On the other end of the spectrum are investors who tend to be more bullish with regard to stumpage appreciation rates, but typically will offset this by applying higher discount rates.

We are aware of investors in Latin America that use either approach when modeling cash flows for teak. Many investors model zero appreciation, while others we have spoken with in the past have modeled as much as 4.5% per year. Appreciation periods also vary from short periods at the beginning of the cash flow model to indefinite appreciation periods lasting the entire investment horizon.

Most teak timberland investors we are aware of are currently assuming flat pricing going forward. This includes successful buyers. Markets have been flat to declining over the last several years and there is much discussion among those familiar with the market, with some suggesting prices will rise, while others are less optimistic. We chose to model flat pricing, reflecting current market trends.

## **COSTS**

We model costs based on information provided by FSA.

### **Harvest Costs**

SATT is responsible for all harvest costs for final harvest activities. FSA reports current rates vary from \$20 to \$24 per cubic meter, depending on harvest type. We assume a \$20 per cubic meter rate for clearcut harvesting, the only type of harvesting for which SATT is explicitly charged under the terms of the agreement.

### **Land Clearing Costs (Stumps)**

SATT is responsible for clearing the land of stumps following final harvests, thereby returning the land to pre-forestry condition. FSA reports clearing costs at BRL 3,200 per hectare, equivalent to \$596 per hectare at the prevailing exchange rate of 5.367 BRL per USD. We model this rate going forward following all final harvests. This rate is 28% lower than our last appraisal, largely due to the exchange rate. TRC reports that this cost in local currency are mostly unchanged. This change positively impacts value.

### **Silvicultural and Administrative Costs**

Normally we would explicitly model silvicultural costs for each stand by year, as well as annual fixed costs (administrative costs). However, due to the terms of the investment deal, SATT is not required to pay either of these costs at present. Instead, they must pay a one-time management cost fee at the time of final harvest, plus any land-clearing costs. However, this cost is expected to be offset by the fact FSA has not distributed past thinning revenues to SATT.

The full management fee for a 20-year-old stand at final harvest is \$4,500 per hectare, plus \$600 per hectare for each year a stand is held for harvest from ages 21 to 25. At the same time, outstanding thinning revenues, based on the 2019 Harvest Report, owed to SATT total approximately \$29.8 million, or \$2,042 per productive hectare.

We model an adjusted management fee in which we begin with the full fee and subtract from it outstanding thinning revenues, on a per-hectare basis, to arrive at a net management fee. For example, if a stand is harvested at age 22, the full management fee owed to FSA would be \$4,500 per hectare (through year 20), plus \$1,200 (years 21 and 22 at \$600 per hectare per year), less \$2,042, resulting in a net payment of \$3,658 per hectare.

Based on the optimized harvest schedule chosen by Woodstock, the average net management fee for the projection is \$3,354 per hectare, implying an average harvest age greater than 21 years. The DCF model allows for harvest ages past year 20. Because it is an optimization model, it chooses stands to be harvested older than year 20 when the marginal value gain from favorable log product shifts (larger logs) outpaces the marginal \$600-per-hectare management fee.

### **Property Taxes**

FSA reports that property taxes (ITR) are SATT's responsibility. However, they are incorporated into the one-time management fee described above. Therefore, there is no need to explicitly model them.

### **FSA Performance Fee**

SATT must pay FSA a performance fee of 5% based on the following formula:

$$5\% * (\text{Roadside Harvest Revenues} - \text{Harvest Costs} - \text{Land Clearing} - \text{Silvicultural and Overhead Fees})$$

We model this fee going forward.

## **MODEL CONSTRAINTS**

### **Harvest Age Considerations**

As described earlier for the yield table assumptions.

### **Harvest Flow Constraints**

The subject is small within the overall context of the larger teak market. Therefore, it would be theoretically possible to cut it as fast as possible. FSA reports that they currently have limited capacity to harvest the property all at once. Expectations are that they will be able to add additional harvest teams to accommodate future demand as existing stands become eligible for future harvest. We assume that this will be the case, allowing the model to choose stands for harvest purely on an economic basis.

Teak managers throughout Latin America report teak harvesting ground to a halt in the first half of 2020 in response to a combination of localized lockdowns and closures at Indian ports. Harvesting has reportedly resumed more recently throughout the region. FSA, the subject's manager, reports they resumed harvesting. Two other Central American managers interviewed by Sewall also report harvesting in the second half. It remains to be seen how long it will take for Indian demand for teak to recover, but two of the three managers we interviewed express optimism going forward, citing expectations that demand would return to normal in 2021.

Our analysis includes no adjustments to the discount rate for the pandemic. Nearly all investors we have interviewed since the beginning of the pandemic report no changes to discount rates in the assessment of properties. Some, however, have modeled short-term changes to price or harvest volumes in response to the potential risk. We therefore impose a harvest volume ceiling on the first year of the DCF model. We limit harvest volumes to 60,000 cubic meters for year one. This is approximately half of what the model would otherwise harvest if not constrained. This assumes a lingering impact on demand. We assume no adverse effects on pricing, noting that growers report that post-lockdown prices are generally holding on par with pre-pandemic levels.

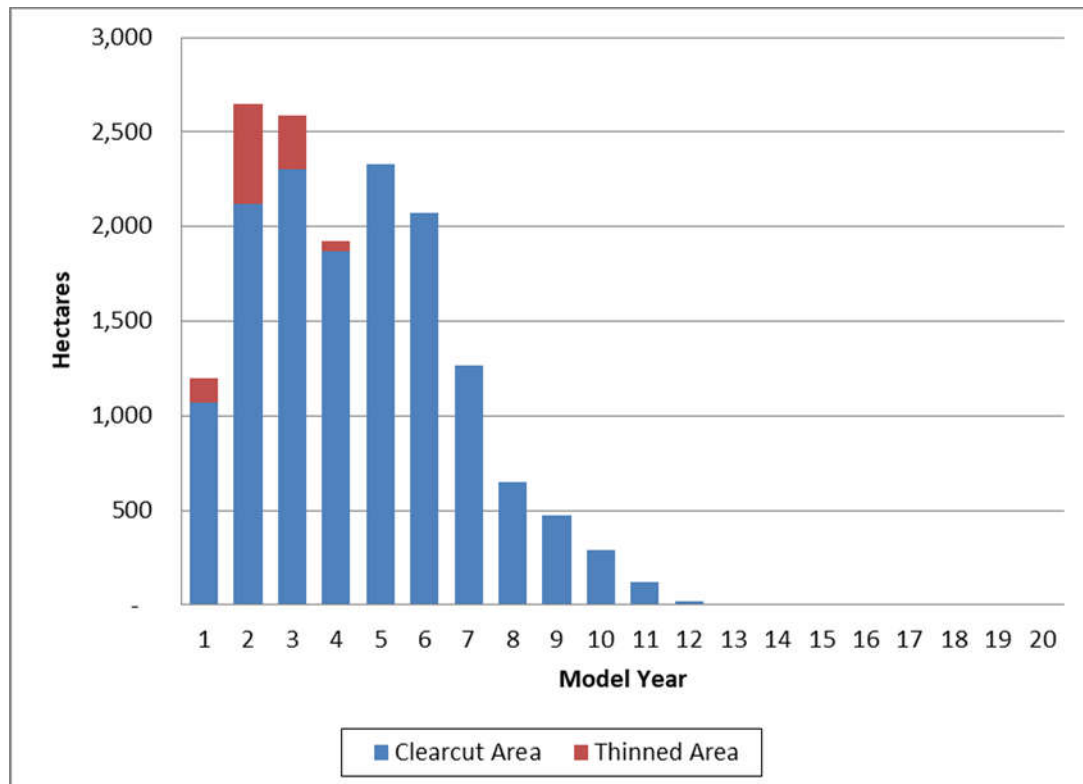
It is worth noting that, while this constraint negatively impacts value, at negative \$200,000, the magnitude of the change is small. This is because with or without the constraint, harvesting in the first year of the cash flow model was not expected to be high under any scenario. In short, the current age-class distribution of the property is such that it suffers minimally from the effects of the pandemic.

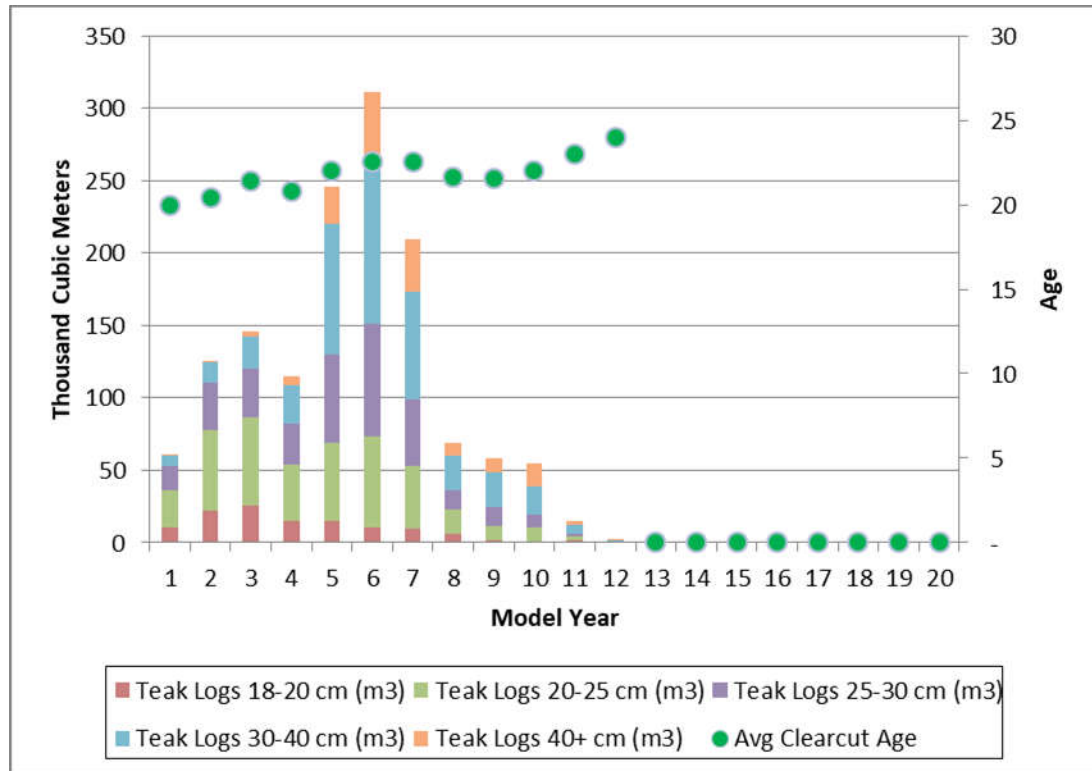
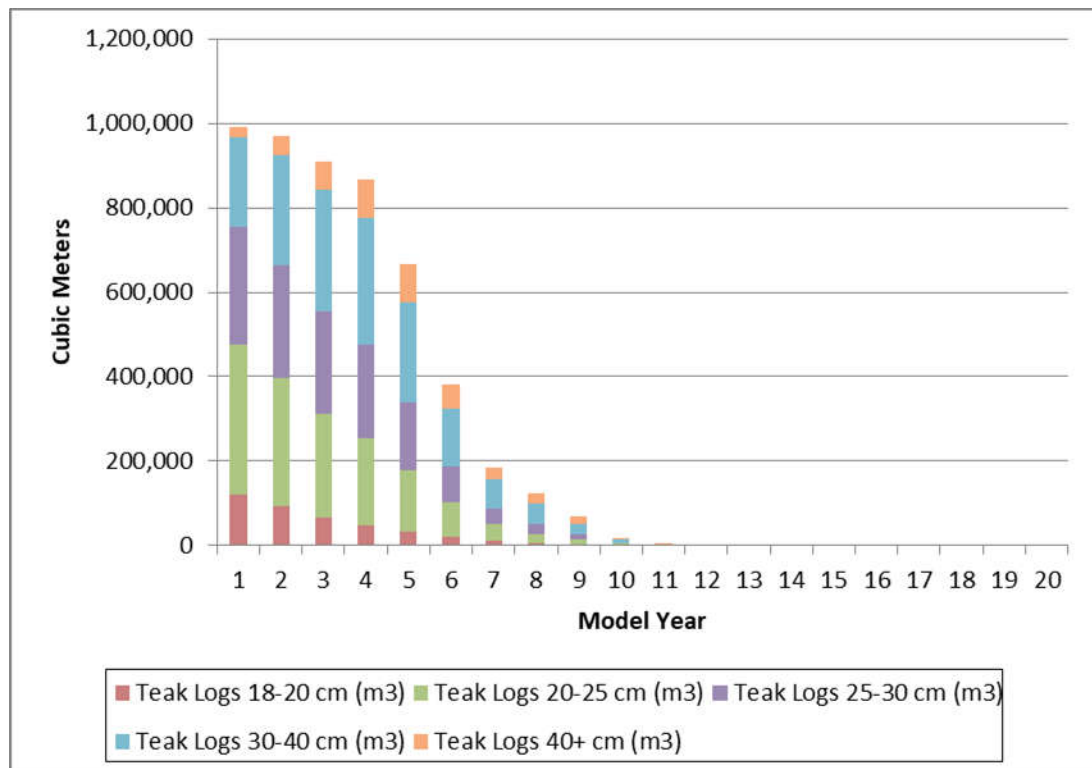
## RESULTS AND SENSITIVITY ANALYSIS

The cash flow model results in total undiscounted revenues of \$199 million over the investment horizon. Undiscounted costs over the same period total \$91 million, for a total undiscounted net income of \$108 million.

Figures 7.4 to 7.6 summarize harvest activity by area and volume, as well as projected inventories over the course of the planning horizon. The DCF model is sensitive to several key inputs, the most important being discount rate and pricing. We believe the most likely range is 10.25% to 12.25% real for the base discount rate. Table 7.1 summarizes the results of the DCF analysis and sensitivity analysis. Sensitivity analysis produces present values ranging from \$55.6 million at 12.25% to \$61.6 million at 10.25%. Sensitivity analysis based on decreasing or increasing the value of products by 10% results in values ranging from \$47.4 million to \$69.4 million. Appendix B provides additional supporting detail for Sewall's DCF analysis. Table 7.2 provides supplemental analysis of the effects of discount rate on value showing a range of values corresponding to rates ranging from as low as 5.25% to as high as 14.25%.

**Figure 7.4. Plantation Harvest Area**



**Figure 7.5. Harvest Volume by Product and Average Clearcut Age****Figure 7.6. Total Merchantable Inventory by Product**

## INDICATED VALUE BY THE INCOME CAPITALIZATION APPROACH.

The base rate analysis produces a present value of \$58,379,387, rounded to \$58,400,000, or \$4,004 per plantable hectare. This analysis is subjective, requiring many assumptions, but it directly models cash flows anticipated by institutional investors. Therefore, the estimated market value by the income capitalization approach is \$58,400,000.

Due to the complexity of the model in regards to pricing changes, future silviculture projections and currency exchange volatility, and other factors, it is entirely appropriate to regard the full range of values shown in Table 7.1 - \$47.4 million to \$69.4 million - as plausible.

**Table 7.1. DCF Summary**

<b>SATT - Brazilian Teak - June 30, 2020</b>					
<b>Estimated Value by Income Capitalization Approach:</b>		<b>\$58,379,387</b>	<b>Conclusion:</b>	<b>\$58,400,000</b>	
Per Total Area:		\$4,003		\$4,004	
Per Productive Area:		\$4,003		\$4,004	
<b>Sensitivity Analysis</b>				<b>Capitalization Rate</b>	
<i>(Assume base data as indicated below unless otherwise indicated)</i>				Years 1-20	Per Planted Hectare
Discount Rate	Present Value	Mean Price/m3	Present Value	Revenues	\$682.55
10.25%	\$61,637,388	90%	\$47,396,495	Expenses	-\$311.35
<b>11.25%</b>	<b>\$58,379,387</b>	<b>\$140.94</b>	<b>\$58,379,387</b>	NOI	\$371.20
12.25%	\$55,636,779	110%	\$69,364,760	Cap Rate	9.27%
<b>Data and Assumptions</b>					
<b>Revenues</b>	<b>Assumption</b>	<b>Units</b>	<b>Present Value of Cash Flows</b>		
Timber	\$140.94	Average	\$115,630,930		
<b>Expenses</b>					
Forest Costs	\$3,354	per Productive Area @ CC	(\$31,698,801)		
Harvest Costs	\$20.00	per m3	(\$16,678,803)		
Land Clearing	\$596	per final harvest hectare	(\$5,801,341)		
Performance Fee	5%	\$ per Hectare	(\$3,072,599)		
<b>Area:</b>			<b>Other Assumptions</b>		
Total Area (ha)	14,585		Discount Rate:		
Productive Area (ha)	14,585		Base Rate: 11.25%		
<b>Roadside Prices:</b>		<b>Current</b>	<b>Future</b>		
<b>Species/Product</b>	<b>Thin \$/m3</b>	<b>Clearcut \$/m3</b>	<b>Thin \$/m3</b>	<b>Clearcut \$/m3</b>	
		<b>Teak</b>			
Logs 18-20 cm	\$29.00	\$29.00	\$29.00	\$29.00	
Logs 20-25 cm	\$61.00	\$61.00	\$61.00	\$61.00	
Logs 25-30 cm	\$110.00	\$110.00	\$110.00	\$110.00	
Logs 30-40 cm	\$205.00	\$205.00	\$205.00	\$205.00	
Logs 40+ cm	\$311.00	\$311.00	\$311.00	\$311.00	



**Table 7.2. Supplemental Discount Rate Analysis**

<b>Discount Rate</b>	<b>Indicate Value (million USD)</b>
5.25%	\$80.1
6.25%	\$75.9
7.25%	\$71.9
8.25%	\$68.2
9.25%	\$64.7
10.25%	\$61.6
<b>11.25%</b>	<b>\$58.4</b>
12.25%	\$55.6
13.25%	\$52.8
14.25%	\$50.3

## 8. RECONCILIATION & FINAL OPINION OF VALUE - FEE SIMPLE INTEREST

The final step of the appraisal process is to reconcile the results of the three valuation approaches. We have conducted a Cost Approach (CA) and an Income Capitalization Approach (ICA) for this appraisal. Because of the unique nature of the interest, we have not used the Sales Comparison Approach (SCA). The values estimated by the two approaches are as follows:

- Cost Approach (CA) - \$18,200,000
- Income Capitalization Approach (ICA) - \$58,400,000

The cost approach indicates a value of \$18.2 million. It enables the appraiser to separately identify and evaluate each of the basic property components, using market-derived sources for each. However, simply adding together each separate component may not accurately reflect the contributory value of each of the assets. In addition, the cost approach does not consider all sources of cost and revenue and does not recognize discounts for liquidity or potential to increase timber value through price appreciation or future yield improvements. Moreover, the cost approach violates the unit rule and is not often used by investors to drive their decision processes. However, where plantations are young and afforestation common, the cost approach may be used by investors as a supplemental check on value, and it models the sort of afforestation efforts that have been applied to teak plantation development. The cost approach result falls well below that of the ICA ranges. It does not appear in this instance to provide a reliable indication of value; we therefore give it no weight.

The Income Capitalization Approach indicates a value of \$58.4 million and a supportable range between \$51.5 million and \$65.5 million. The range of likely values set by the income approach is determined by sensitivity analysis of important assumptions: pricing and discount rate. The approach is the primary method employed by investors to determine bid prices. As such, it serves as a good indication of the investor thought process. Its primary weakness lies in how sensitive it is to many assumptions. Teak markets in Latin America are developing but far from mature; silviculture and growth and yield science is developing; and present value remains highly sensitive to such assumptions. Because of the manner in which the income approach allows us to directly model individual assumptions about the subject property and the markets affecting its value, and because it is the method of choice for acquisition analysis, we allocate 100% weight to this approach.

Therefore, the estimated market value of the SATT interest in the Mato Grosso timber rights, as of June 30, 2020 is:

**\*\*\* USD FIFTY-EIGHT MILLION FOUR HUNDRED THOUSAND \*\*\***  
**\*\*\* \$58,400,000\*\*\***  
**(\$4,004 per net plantable hectare)**  
**Market Value Range: \$51.5 to \$65.5 Million**

Overall value is down 18% from 2019 (Table 8.1). Property area is down nearly 7%, as a result of harvesting, accounting for a significant portion of the decrease. The most significant year over year change is related to inventory changes. Inventory data provided for the 2019 appraisal was not as current as the 2020 inventory data set, requiring considerably more updating prior to use in the 2019 analysis. Because of this, starting volumes resulting from necessary update assumptions regarding current and future projected volumes were higher in 2019 than those projected in the current appraisal, which required less updating. As a result, the harvest schedule developed for the current appraisal produces less timber over time than was the case in 2019, resulting in lower value.

Other sources of change include lower log pricing and costs. Lower log price assumptions result in lower value, while lower cost assumptions increased value. Changes to costs resulted in lower land clearing costs, driven primarily by exchange rate changes. Back-end management costs incurred at time of harvest were also down somewhat.

**Table 8.1. Stepwise Change Analysis**

<b>June 30, 2019 Indicated Value</b>	<b>\$ 71,600,000</b>	<b>% Change</b>	<b>Cumulative Change</b>
Area (Harvest Reductions)	\$ 66,802,800	-6.7%	-6.7%
Ages, Inventory, & Yields	\$ 57,285,094	-14.2%	-20.0%
Cost Assumptions	\$ 61,364,967	7.1%	-14.3%
Log Price Assumptions	\$ 58,379,387	-4.9%	-18.5%
Discount Rate Changes	\$ 58,379,387	0.0%	-18.5%
<b>June 30, 2020 Indicated Value</b>	<b>\$ 58,400,000</b>		<b>-18.4%</b>

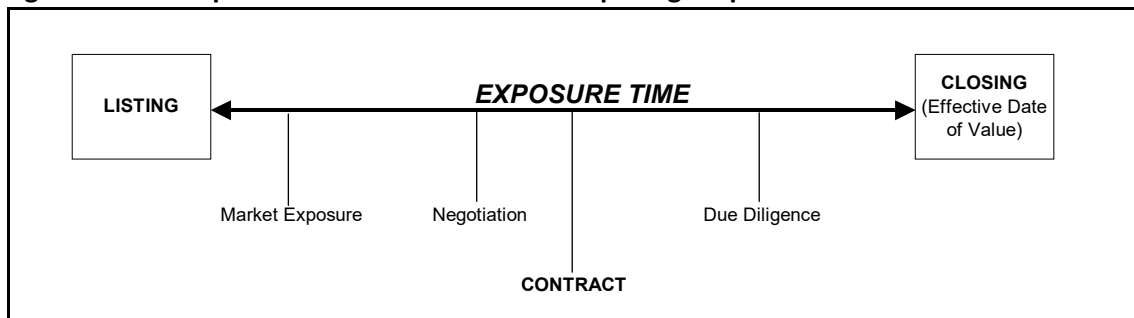
## EXPOSURE PERIOD

Exposure period is the estimated length of time the property being appraised would have been offered on the market prior to the hypothetical consummation of a sale at market value on the effective date of the appraisal; a retrospective estimate based on an analysis of past events assuming a competitive and open market. Exposure time is always presumed to occur prior to the effective date of the appraisal.

Figure 8.1 shows the activities that comprise "exposure time" for a real property sale. The first major segment of that timeline is the period between listing and contract. In auctions of large forest properties, which would be the most expeditious way to sell a property such as the subject, that period is typically 90-120 days. Following the contract, there can be a significant time period for due diligence. Although the due diligence period can vary, a range of 60-90 days is typical, which means a Reasonable Exposure Time for typical properties such as the subject is 150-210 days, or 5-7 months. However, given the unique financial arrangements surrounding the subject, it is reasonable to expect a longer than normal exposure period. We estimate a longer period on the order of 9 to 12 months.

For this appraisal, Market Value is estimated as of June 30, 2020, so the hypothetical sale of the subject is assumed to have been listed during Q2 2019.

**Figure 8.1. Conceptual Timeline of Activities Comprising "Exposure Time"<sup>18</sup>**



Given the impacts of the ongoing coronavirus pandemic, a good argument could be made for expanding exposure period. However, it is important to reiterate that exposure period is retrospective, and market impacts resulting from the pandemic would not have been known for much of the period leading up to the effective date of appraisal. It is possible some investors would have dropped out as the effects of the pandemic became known. At the same time, many would have continued with the deal, caught up in the momentum. Many investors Sewall interviewed right after the pandemic began cited they did not or intend to drop out of deals under contract as a result of the pandemic. We therefore still estimate a 9- to 12-month exposure period.

<sup>18</sup> After J. Parks Roundtree and Robert W. Taylor, 1993, "Marketing/Exposure Time and Market Value Estimates". The Appraisal Journal LXI(4):489-493.

It is worth noting that marketing period, as opposed to exposure period, is forward-looking. It is the length of time the property interest being appraised would have been offered on the market immediately following the hypothetical consummation of a sale at market value on the effective date of the appraisal. Based on this definition, a marketing period of 12-18 months would be reasonable as of the effective date of appraisal. In normal active markets, it is often the case that exposure period and marketing period are effectively the same. However, in this case, there is a reasonable argument to be made that they differ.

## ALLOCATION OF VALUE

The interests are organized by farm and planting year. Each unique farm/year combination is considered a project within the investment scheme. Table 8.2 presents an allocation of value by project, based on the income approach. Also shown is a column listing “effective” value. Several projects have negative value (Bambu/1999, Bambu/2000, and Paraíso/1997). The condition of the trees for these projects are such that they are unlikely to produce positive cash flows over time. They are therefore not allocated any value, as shown in the table.

**Table 8.2. Value Allocation by Project**

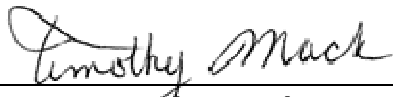
Project		Hectares	Discounted Value			Undiscounted Cash Flows	
Farm	Year		Value	\$ / Hectare	Effective Value	Cash Flow	\$ / Hectare
Bambu	1999	549.07	-\$1,542,119	-\$2,809	\$0	-\$2,468,031	-\$4,495
	2000	513.83	-\$295,153	-\$574	\$0	-\$275,908	-\$537
Barranquinho	2002	970.20	\$2,159,994	\$2,226	\$2,159,994	\$3,741,371	\$3,856
	2003	12.95	\$156,875	\$12,114	\$156,875	\$276,380	\$21,342
	2004	1,021.00	\$5,193,026	\$5,086	\$5,193,026	\$10,451,119	\$10,236
Cacimba	2002	571.03	\$4,388,859	\$7,686	\$4,388,859	\$7,369,715	\$12,906
	2003	10.19	\$141,531	\$13,889	\$141,531	\$254,301	\$24,956
Capim Branco	1999	170.53	\$1,037,196	\$6,082	\$1,037,196	\$1,456,606	\$8,542
Duas Lagoas	2000	1,527.51	\$4,151,444	\$2,718	\$4,151,444	\$5,875,204	\$3,846
	2001	1,764.33	\$1,036,155	\$587	\$1,036,155	\$2,119,829	\$1,201
	2002	48.41	\$764,683	\$15,796	\$764,683	\$997,880	\$20,613
	2005	207.67	\$693,563	\$3,340	\$693,563	\$1,460,313	\$7,032
	2006	233.88	\$1,426,157	\$6,098	\$1,426,157	\$2,893,333	\$12,371
Mutum	2007	539.18	\$3,016,617	\$5,595	\$3,016,617	\$6,634,509	\$12,305
Paiolândia	1997	297.92	\$397,876	\$1,336	\$397,876	\$499,334	\$1,676
	1998	93.95	\$317,113	\$3,375	\$317,113	\$460,374	\$4,900
Paraíso	1997	396.58	-\$1,192,206	-\$3,006	\$0	-\$1,556,748	-\$3,925
São José	2007	301.30	\$4,514,783	\$14,984	\$4,514,783	\$10,335,014	\$34,301
Serras das Araras	1999	105.01	\$221,217	\$2,107	\$221,217	\$259,487	\$2,471
São Miguel	2001	97.52	\$66,336	\$680	\$66,336	\$77,812	\$798
	2002	5.71	\$40,737	\$7,134	\$40,737	\$73,196	\$12,819
Santa Maris do Jauru	2002	1,085.18	\$3,673,809	\$3,385	\$3,673,809	\$6,508,358	\$5,997
	2003	207.87	\$1,883,163	\$9,059	\$1,883,163	\$3,479,676	\$16,740
Santa Maria do Jauru II	2008	99.87	\$274,157	\$2,745	\$274,157	\$568,914	\$5,697
Santa Fé	2003	2,562.71	\$11,301,206	\$4,410	\$11,301,206	\$21,158,456	\$8,256
Terra Santa	2004	1,143.17	\$14,066,789	\$12,305	\$14,066,789	\$24,970,203	\$21,843
Vale Dourado	1999	48.59	\$506,192	\$10,418	\$506,192	\$660,560	\$13,595
		14,585.16	\$58,400,000	\$4,004		\$108,281,256	\$7,424

*Appendix A*  
*Certification &*  
*Qualifications of Appraisers*

## CERTIFICATION

I certify that, to the best of our knowledge and belief:

1. The statements of fact contained in this report are true and correct.
2. The reported analyses, opinions and conclusions are limited only by the reported assumptions and limiting conditions, and are my personal, unbiased professional analyses, opinions, and conclusions.
3. I have no present or prospective interest in the subject property, nor do I have a personal interest or bias with respect to parties involved.
4. I have no bias with respect to the property that is the subject of this report or to the parties involved with this assignment.
5. My engagement in this assignment was not contingent upon developing or reporting predetermined results.
6. My compensation is not contingent upon: (a) the development or reporting of a predetermined value or direction in value that favors the cause of the client, (b) the amount of the value estimate, (c) the attainment of a stipulated result, or (d) the occurrence of a subsequent event directly related to the intended use of this appraisal.
7. I personally inspected the subject property on July 16 to 19, 2019, but have not done so in support of the current assignment.
8. Sewall has appraised the subject property in the past 3 years prior to accepting this appraisal assignment.
9. The reported analyses, opinions, and conclusions were developed, and this report has been prepared, in conformity with the Code of Professional Ethics and Standards of Professional Appraisal Practice of the Appraisal Institute.

  
\_\_\_\_\_  
Timothy J. Mack

October 22, 2020  
\_\_\_\_\_  
Date



## QUALIFICATIONS OF APPRAISER

### TIMOTHY MACK

#### APPRAISER / BIOMETRICIAN

Tim Mack specializes in timberland appraisal, forest inventory, growth and yield modeling, harvest scheduling, and acquisition due diligence for Sewall out of its Lakes States office. Mr. Mack has appraised timberland all over the world, including properties in North America, Hawai'i, Central & South America, Australasia, Europe, and Africa. Species for which Mr. Mack has had experience range include aspen/spruce/pine in the north, to northern hardwoods in the Lake States and New England region. International experience includes eucalyptus in Australia, Uganda, Uruguay and Brazil. Mr. Mack has done pine work in Uganda, New Zealand, Argentina, Uruguay, and Brazil. Mr. Mack's international specialty is teak, having cruised, appraised, or modeled it in Panama, Costa Rica, Nicaragua, Guatemala, Colombia, and Brazil.

During his career, Mr. Mack has developed expertise with various growth and yield models throughout the Eastern United States and has designed and built forest-level harvest schedule models, implementing their results on the ground. This expertise includes the use of the US Forest Service's Forest Vegetation Simulator (FVS) and linear programming (Woodstock and FORPLAN). He has designed and supervised forest inventories and implemented forest information systems at small and large scales. In addition, Mr. Mack has experience with forest information system design and discounted cash flow analysis, and financial analysis for silvicultural alternatives. He is also a regular contributor to wood supply studies conducted by Sewall.

#### Education

M.S., Forestry--Biometrics and Business, University of Minnesota  
B.S., Forest Resources, University of Minnesota

#### Professional Affiliations/Designations

Licensed & Certified General Appraiser, Minnesota, Michigan, Wisconsin  
Licensed Professional Forester, Michigan  
Association of Consulting Foresters of America

#### Relevant Experience

##### ***2006 - Present, James W. Sewall Company, International Falls, Minnesota***

*Appraiser/Biometrician:* Timberland appraisal, due diligence assistance, timber inventory, and resource study support.

##### ***2005 - 2006***

*Independent Forestry Consultant:* Oversaw a large inventory project in Pennsylvania. Assisted with due diligence work for timberland investors. Conducted financial analysis for forestry properties.

**2004 - 2005, James W. Sewall Company, Old Town, Maine**

*Biometrician:* Supervised forest inventory design and implementation, performed due diligence analysis for land acquisitions, appraised timberlands, and developed mill resource studies. Also performed forest modeling.

**2002 - 2003, MeadWestvaco, New England Region**

*Inventory and Analysis Forester:* Designed, implemented, and oversaw new inventory systems for MeadWestvaco timberlands in Western Maine. Advised field staff regarding forest inventory needs. Assisted with the maintenance of the region's forest information systems.

**2000 - 2003, College of Natural Resources, University of Minnesota**

*Research Assistant/Pawek Fellowship:* Developed a model-based approach for the development of a density management diagram for red pine in the Lake States (RESINOSA model).

**1991 - 2000, Boise Cascade, Northern Minnesota Region**

*Planning Forester:* Performed forest planning and allowable cut determination for 308,000 acres, including extensive use of linear programming (FORPLAN) and growth and yield modeling (FVS). Coordinated with the operational foresters to achieve the region's planning goals in the field. Performed financial analyses for silvicultural alternatives. Responsible for the region's forest information systems including two year experience managing the GIS (ArcInfo). Oversaw the design, upkeep and implementation of various forest inventory systems including an operational stand inventory and a continuous permanent plot inventory. Analyzed and executed land deals involving company property. Participated in wood supply analyses for the company's International Falls paper mill.

*Appendix B*  
*Base DCF Harvest Schedule*  
*& Projected Cash Flows*

**Cash Flow Summary, Years 1-10**

SATT - Brazilian Teak - June 30, 2020	Period									
	1	2	3	4	5	6	7	8	9	10
Revenues:										
Timber	\$5,216,802	\$10,740,681	\$13,733,383	\$13,318,278	\$36,951,683	\$50,611,818	\$34,561,249	\$10,367,493	\$10,093,233	\$10,572,101
Total Revenues	\$5,216,802	\$10,740,681	\$13,733,383	\$13,318,278	\$36,951,683	\$50,611,818	\$34,561,249	\$10,367,493	\$10,093,233	\$10,572,101
Expenses:										
Silviculture	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Management Cost Fee	\$2,633,561	\$5,778,020	\$7,662,825	\$5,463,395	\$8,541,529	\$8,245,481	\$5,077,619	\$2,227,876	\$1,601,980	\$1,054,272
Harvest Costs	\$1,095,408	\$2,057,034	\$2,752,308	\$2,276,965	\$4,917,292	\$6,230,249	\$4,193,471	\$1,378,924	\$1,174,125	\$1,097,203
Land Clearing	\$637,913	\$1,261,903	\$1,373,834	\$1,112,368	\$1,387,560	\$1,236,795	\$755,263	\$387,793	\$281,801	\$171,773
Performance Fee	\$42,496	\$82,186	\$97,221	\$223,277	\$1,105,265	\$1,744,965	\$1,226,745	\$318,645	\$351,766	\$412,443
Total Expenses	\$4,409,378	\$9,179,144	\$11,886,188	\$9,076,006	\$15,951,646	\$17,457,490	\$11,253,097	\$4,313,239	\$3,409,672	\$2,735,691
Net Income:	\$807,424	\$1,561,537	\$1,847,195	\$4,242,272	\$21,000,037	\$33,154,328	\$23,308,152	\$6,054,254	\$6,683,561	\$7,836,411

**Cash Flow Summary, Years 11-20**

SATT - Brazilian Teak - June 30, 2020	Period									
	11	12	13	14	15	16	17	18	19	20
Revenues:										
Timber	\$2,655,713	\$280,589	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Revenues	\$2,655,713	\$280,589	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Expenses:										
Silviculture	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Management Cost Fee	\$522,542	\$102,892	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Harvest Costs	\$306,077	\$38,937	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Land Clearing	\$73,141	\$12,623	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Performance Fee	\$87,698	\$6,307	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Total Expenses	\$989,457	\$160,760	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0
Net Income:	\$1,666,255	\$119,830	\$0	\$0	\$0	\$0	\$0	\$0	\$0	\$0

Notes:

**Merchantable Timber Inventory (Merchantable Stands), Years 1-10**

SATT - Brazilian Teak - June 30, 2020	Period									
	1	2	3	4	5	6	7	8	9	10
<b>Merchantable Timber</b>										
Teak Logs 18-20 cm (m3)	119,597	93,832	66,127	48,933	32,152	20,702	11,070	4,570	2,729	1,707
Teak Logs 20-25 cm (m3)	353,344	304,503	245,590	204,908	147,067	82,847	39,364	22,334	12,446	2,872
Teak Logs 25-30 cm (m3)	276,003	264,513	242,410	220,550	161,289	83,842	38,616	25,581	11,677	2,695
Teak Logs 30-40 cm (m3)	214,792	261,758	287,612	300,201	236,454	135,602	66,900	47,131	24,781	6,372
Teak Logs 40+ cm (m3)	23,292	45,553	68,954	91,172	90,171	58,210	28,914	25,194	19,204	3,475
<b>Total Teak (m3)</b>	<b>987,029</b>	<b>970,159</b>	<b>910,694</b>	<b>865,765</b>	<b>667,133</b>	<b>381,202</b>	<b>184,864</b>	<b>124,811</b>	<b>70,837</b>	<b>17,121</b>
<b>Total Merchantable Timber (m3)</b>	<b>987,029</b>	<b>970,159</b>	<b>910,694</b>	<b>865,765</b>	<b>667,133</b>	<b>381,202</b>	<b>184,864</b>	<b>124,811</b>	<b>70,837</b>	<b>17,121</b>

**Merchantable Timber Inventory (Merchantable Stands), Years 11-20**

SATT - Brazilian Teak - June 30, 2020	Period									
	11	12	13	14	15	16	17	18	19	20
<b>Merchantable Timber</b>										
Teak Logs 18-20 cm (m3)	350	0	0	0	0	0	0	0	0	0
Teak Logs 20-25 cm (m3)	293	0	0	0	0	0	0	0	0	0
Teak Logs 25-30 cm (m3)	343	0	0	0	0	0	0	0	0	0
Teak Logs 30-40 cm (m3)	794	0	0	0	0	0	0	0	0	0
Teak Logs 40+ cm (m3)	168	0	0	0	0	0	0	0	0	0
<b>Total Teak (m3)</b>	<b>1,947</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Merchantable Timber (m3)</b>	<b>1,947</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

**Total Timber Inventory (All Stands), Years 1-10**

SATT - Brazilian Teak - June 30, 2020	Period									
	1	2	3	4	5	6	7	8	9	10
<b>Merchantable Timber</b>										
Teak Logs 18-20 cm (m3)	120,362	93,832	66,127	48,933	32,152	20,702	11,070	4,570	2,729	1,707
Teak Logs 20-25 cm (m3)	355,528	304,503	245,590	204,908	147,067	82,847	39,364	22,334	12,446	2,872
Teak Logs 25-30 cm (m3)	277,351	264,513	242,410	220,550	161,289	83,842	38,616	25,581	11,677	2,695
Teak Logs 30-40 cm (m3)	215,177	261,758	287,612	300,201	236,454	135,602	66,900	47,131	24,781	6,372
Teak Logs 40+ cm (m3)	23,292	45,553	68,954	91,172	90,171	58,210	28,914	25,194	19,204	3,475
<b>Total Teak (m3)</b>	<b>991,711</b>	<b>970,159</b>	<b>910,694</b>	<b>865,765</b>	<b>667,133</b>	<b>381,202</b>	<b>184,864</b>	<b>124,811</b>	<b>70,837</b>	<b>17,121</b>
<b>Total Merchantable Timber (m3)</b>	<b>991,711</b>	<b>970,159</b>	<b>910,694</b>	<b>865,765</b>	<b>667,133</b>	<b>381,202</b>	<b>184,864</b>	<b>124,811</b>	<b>70,837</b>	<b>17,121</b>

**Total Timber Inventory (All Stands), Years 11-20**

SATT - Brazilian Teak - June 30, 2020	Period									
	11	12	13	14	15	16	17	18	19	20
<b>Merchantable Timber</b>										
Teak Logs 18-20 cm (m3)	350	0	0	0	0	0	0	0	0	0
Teak Logs 20-25 cm (m3)	293	0	0	0	0	0	0	0	0	0
Teak Logs 25-30 cm (m3)	343	0	0	0	0	0	0	0	0	0
Teak Logs 30-40 cm (m3)	794	0	0	0	0	0	0	0	0	0
Teak Logs 40+ cm (m3)	168	0	0	0	0	0	0	0	0	0
<b>Total Teak (m3)</b>	<b>1,947</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Merchantable Timber (m3)</b>	<b>1,947</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

# Harvest Schedule, Years 1-10

SATT - Brazilian Teak - June 30, 2020	Period									
	1	2	3	4	5	6	7	8	9	10
<b>Species/Product</b>										
<b>Thinnings</b>										
Teak Logs 18-20 cm (m3)	908	2,499	1,663	346	0	0	0	0	0	0
Teak Logs 20-25 cm (m3)	3,024	9,567	3,635	603	0	0	0	0	0	0
Teak Logs 25-30 cm (m3)	1,110	6,386	1,817	207	0	0	0	0	0	0
Teak Logs 30-40 cm (m3)	188	4,067	763	35	0	0	0	0	0	0
Teak Logs 40+ cm (m3)	0	0	0	0	0	0	0	0	0	0
<b>Thinning Volumes</b>	<b>5,230</b>	<b>22,518</b>	<b>7,878</b>	<b>1,191</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Final Harvests</b>										
Teak Logs 18-20 cm (m3)	9,236	19,847	23,771	14,359	14,568	10,604	9,376	6,320	1,755	997
Teak Logs 20-25 cm (m3)	22,955	46,253	57,846	38,969	54,183	62,339	43,197	16,517	9,411	9,536
Teak Logs 25-30 cm (m3)	15,385	25,582	31,294	27,851	61,253	77,903	45,954	13,227	13,782	9,051
Teak Logs 30-40 cm (m3)	7,099	10,720	21,097	26,188	90,061	113,538	75,162	23,630	24,025	18,916
Teak Logs 40+ cm (m3)	96	450	3,608	6,482	25,799	47,128	35,984	9,253	9,734	16,361
<b>Final Harvest Volumes</b>	<b>54,770</b>	<b>102,852</b>	<b>137,615</b>	<b>113,848</b>	<b>245,865</b>	<b>311,512</b>	<b>209,674</b>	<b>68,946</b>	<b>58,706</b>	<b>54,860</b>
<b>Total Teak (m3)</b>	<b>60,000</b>	<b>125,370</b>	<b>145,494</b>	<b>115,039</b>	<b>245,865</b>	<b>311,512</b>	<b>209,674</b>	<b>68,946</b>	<b>58,706</b>	<b>54,860</b>
<b>Total Merchantable Timber (m3)</b>	<b>60,000</b>	<b>125,370</b>	<b>145,494</b>	<b>115,039</b>	<b>245,865</b>	<b>311,512</b>	<b>209,674</b>	<b>68,946</b>	<b>58,706</b>	<b>54,860</b>

# Harvest Schedule, Years 11-20

SATT - Brazilian Teak - June 30, 2020	Period									
	11	12	13	14	15	16	17	18	19	20
<b>Species/Product</b>										
<b>Thinnings</b>										
Teak Logs 18-20 cm (m3)	0	0	0	0	0	0	0	0	0	0
Teak Logs 20-25 cm (m3)	0	0	0	0	0	0	0	0	0	0
Teak Logs 25-30 cm (m3)	0	0	0	0	0	0	0	0	0	0
Teak Logs 30-40 cm (m3)	0	0	0	0	0	0	0	0	0	0
Teak Logs 40+ cm (m3)	0	0	0	0	0	0	0	0	0	0
<b>Thinning Volumes</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Final Harvests</b>										
Teak Logs 18-20 cm (m3)	1,354	350	0	0	0	0	0	0	0	0
Teak Logs 20-25 cm (m3)	2,585	293	0	0	0	0	0	0	0	0
Teak Logs 25-30 cm (m3)	2,370	343	0	0	0	0	0	0	0	0
Teak Logs 30-40 cm (m3)	5,653	794	0	0	0	0	0	0	0	0
Teak Logs 40+ cm (m3)	3,341	168	0	0	0	0	0	0	0	0
<b>Final Harvest Volumes</b>	<b>15,304</b>	<b>1,947</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Teak (m3)</b>	<b>15,304</b>	<b>1,947</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>
<b>Total Merchantable Timber (m3)</b>	<b>15,304</b>	<b>1,947</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>	<b>0</b>

