

# Massachusetts Pension Reserves Investment Management

## *Overview of Timberland Investments*

Dec 2001 开始制作  
Timber.

Atlanta, GA.

August 17, 2015



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# **Agenda**

- ***Investment Attributes of Timberland***
  - *Comparing Timberland, Farmland and Commercial Real Estate*
  - *Historic Returns and Cash Yields for Primary Classes of U.S. Real Estate*
  - *Total Returns, Volatility and Correlation for Various Asset Classes*
  - *Important Macro Indicators*
- ***Key Drivers of Investment Returns for Timberland***
  - *U.S. Timberland Returns by Region*
  - *Biological Growth*
  - *Timber Prices*
  - *Land Prices*
  - *Supplemental Income*
- ***PRIM Portfolio Overview***
- ***FIA Overview***



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## ***Investment Attributes of Timberland***



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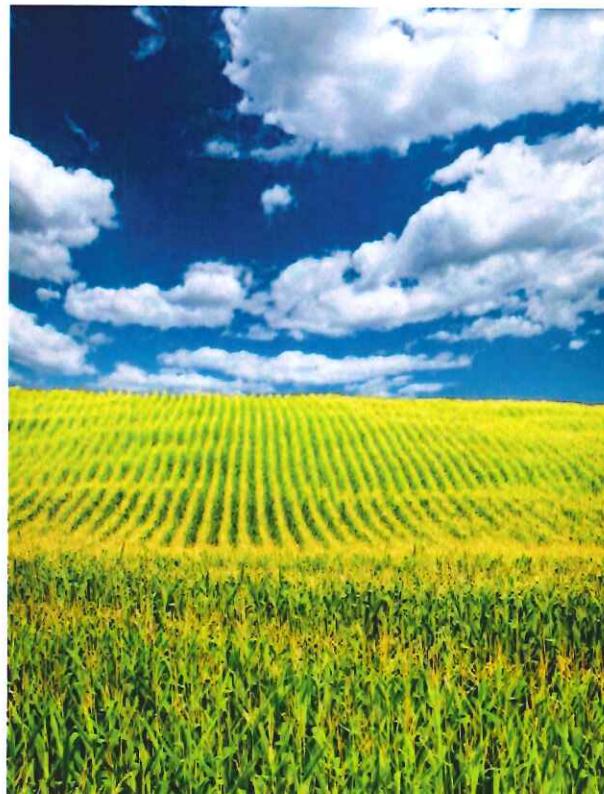
# U.S. Real Estate Assets

Comparing Timberland, Farmland and Commercial Real Estate



**Timberland**

*Investment returns generated primarily through the growing and selling of timber and appreciation of the underlying land and timber*



**Farmland**

*Investment returns generated primarily through the collection of cash rents from farmers and appreciation of the underlying land; in some cases investors will opt to grow and sell crops directly versus collecting cash rents*



**Commercial Real Estate**

*Investment returns generated primarily through the collection of cash rents from tenants and appreciation of the underlying real estate assets*

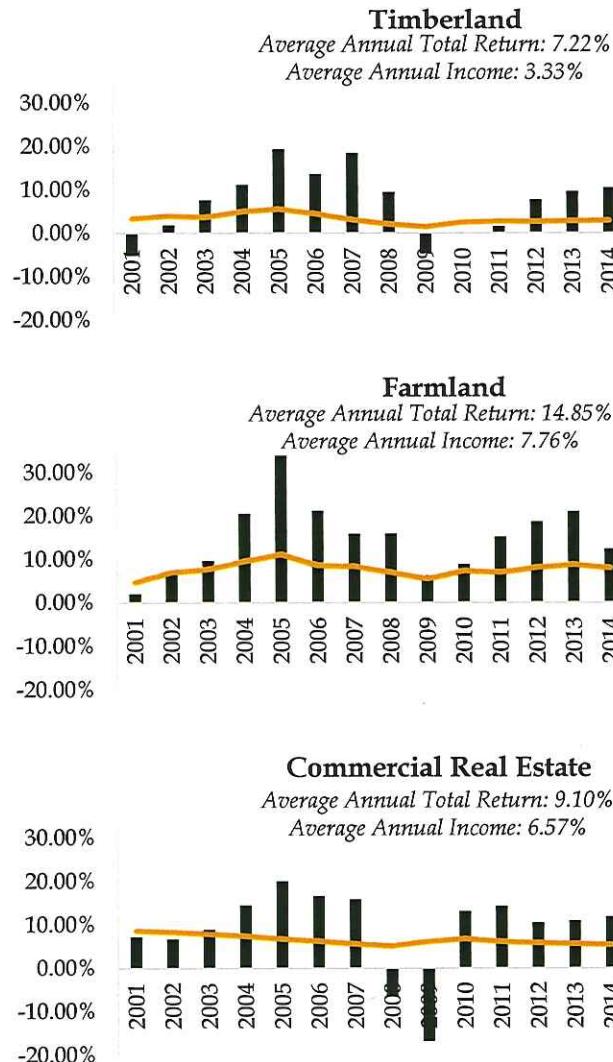


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# U.S. Land Use and Investment Returns

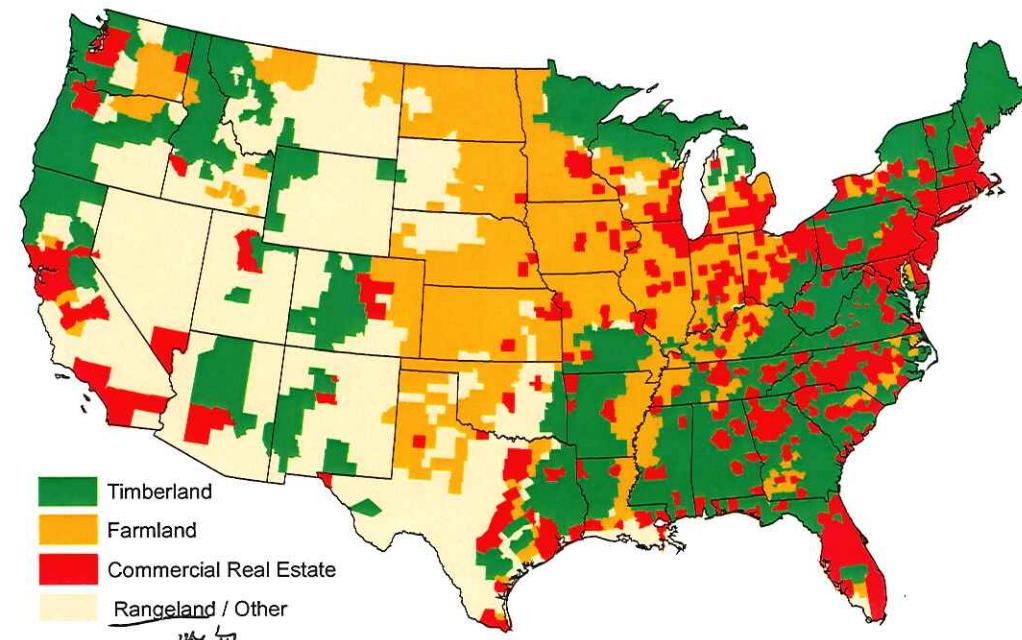
2001 - 2014



lower cash yield  
mainly appreciation  
low correlation

The charts to the left display the historic average annual total returns and cash yields for U.S. timberland, farmland and commercial real estate as measured by the respective NCREIF indices. Though timberland returns have been lower than farmland and real estate over the last 14 years, the volatility of these returns has also been lower. This has generated a favorable overall risk - return profile.

The map below displays the primary land uses at the county level for the continental U.S. Though rangeland is a key land use within the U.S., returns and cash yields are generally lower for this class of real estate and are not tracked by NCREIF.



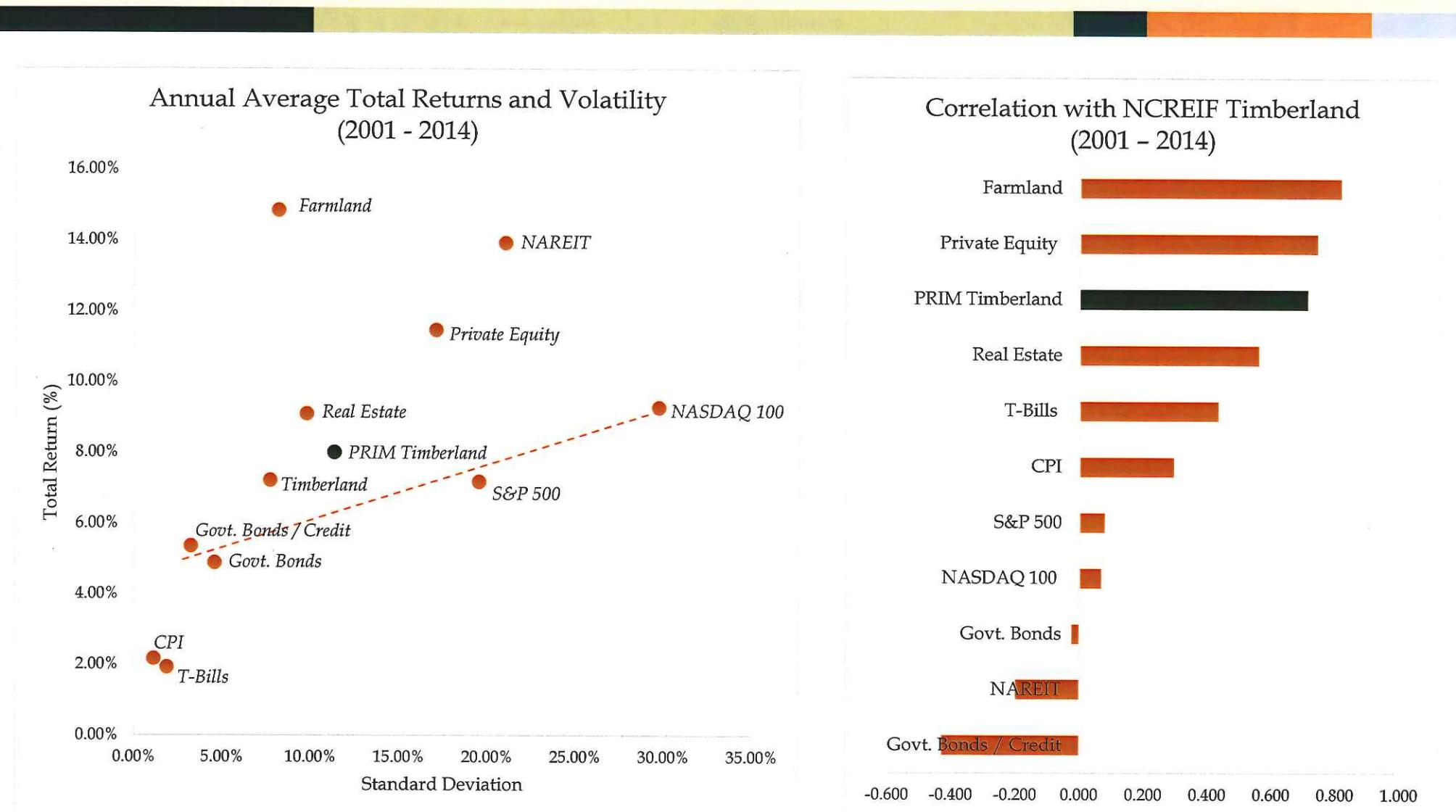
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Sources: NCREIF, ESRI, WWF, U.S. Census Bureau

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# Total Returns, Volatility and Correlation

2001 - 2014



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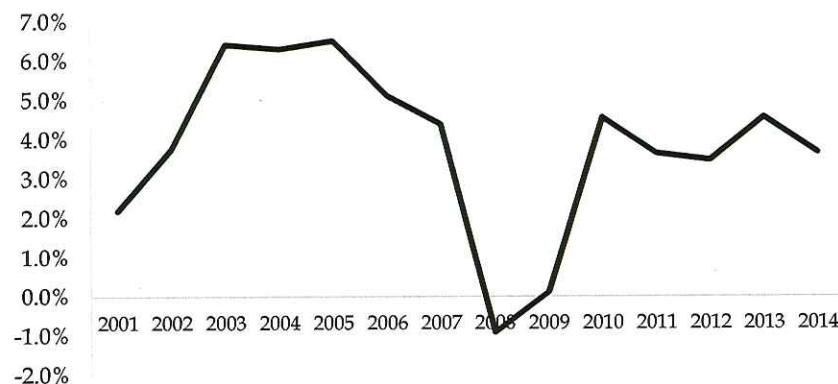
Sources: NCREIF, FIA, Cambridge Associates, NASDAQ

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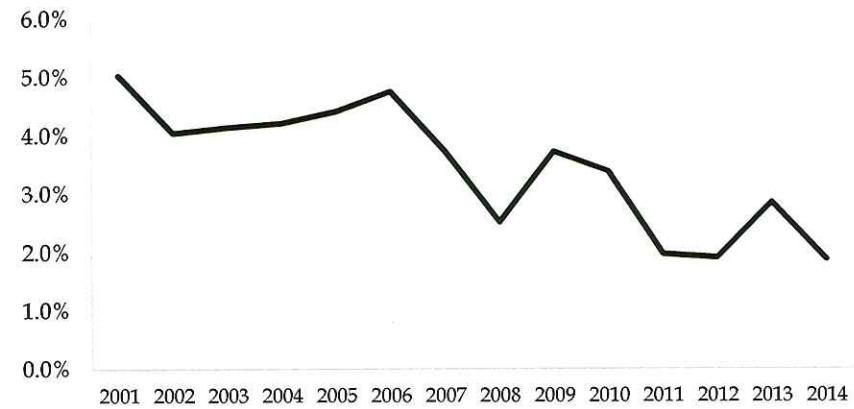
# Key Macro Indicators

2001 - 2014

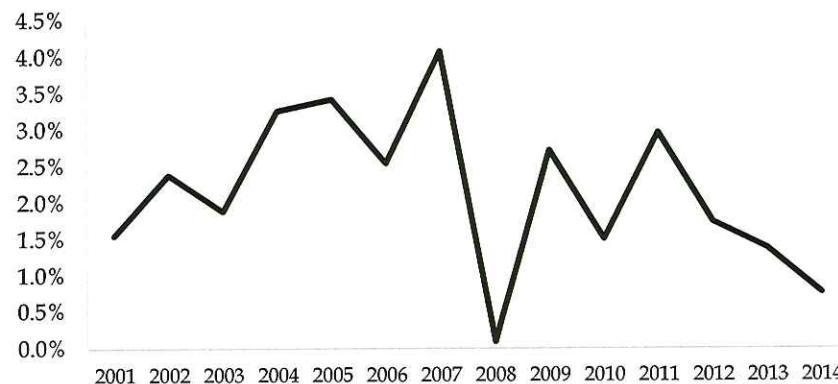
U.S. GDP



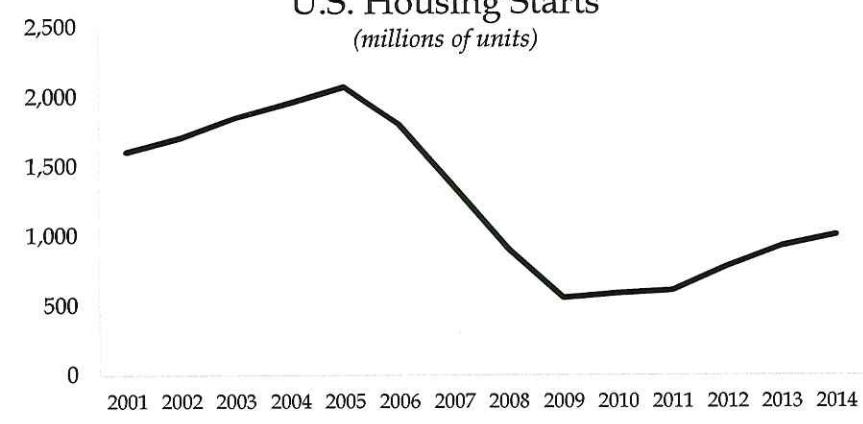
10-Year Treasury Yield



U.S. Inflation



U.S. Housing Starts  
(millions of units)



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Sources: U.S. Dept. of Commerce, U.S. Census Bureau,  
U.S. Dept. of Labor, U.S. Treasury

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## ***Key Drivers of Investment Returns for Timberland***



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# U.S. Timberland Investment Returns

2001 - 2014

## U.S. Timberland

Average Annual Return: 7.22%  
Standard Deviation: 7.68%  
Cash Yield: 3.33%

## Pacific Northwest

Average Annual Return: 9.91%  
Standard Deviation: 11.48%  
Cash Yield: 5.37%

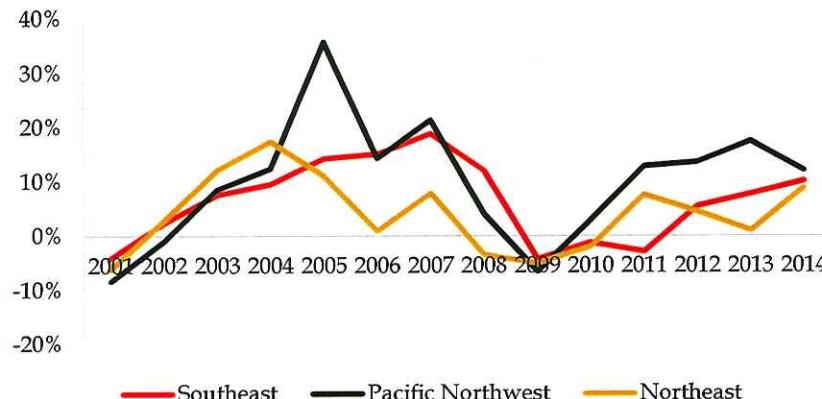
## Southeast

Average Annual Return: 6.45%  
Standard Deviation: 7.53%  
Cash Yield: 2.57%

## Northeast

Average Annual Return: 4.08%  
Standard Deviation: 7.03%  
Cash Yield: 3.0%

Annual Total Timberland Returns by Region



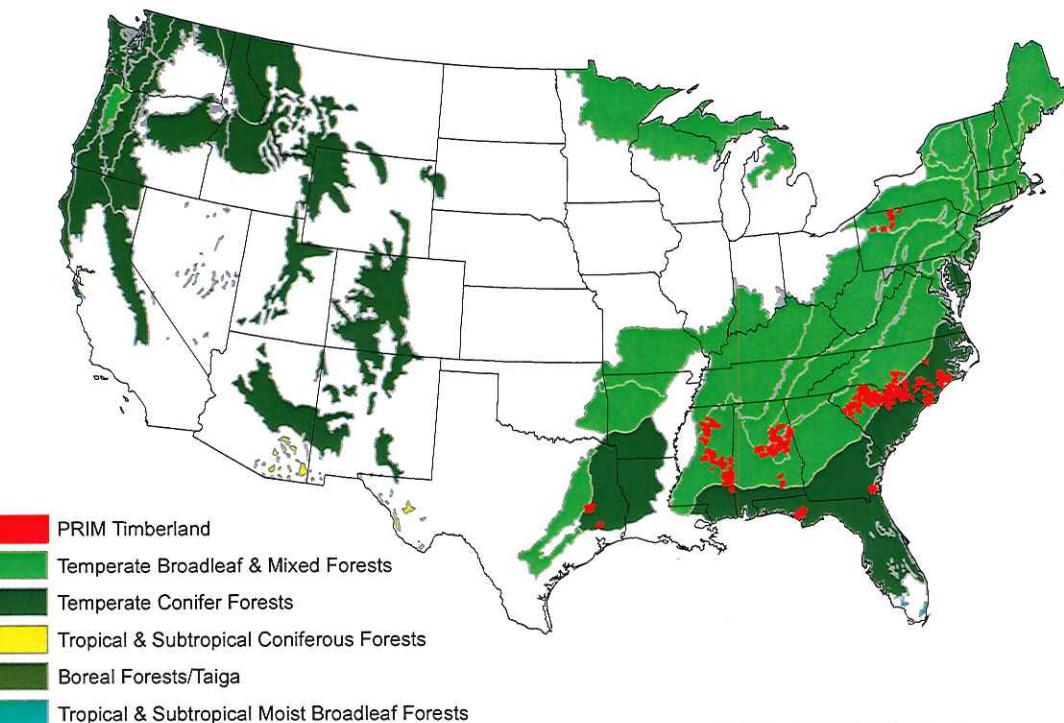
Sources: NCREIF, ESRI, WWF, FIA



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The summary to the left display the historic average annual total returns, standard deviations and cash yields for U.S. timberland by region as measured by the NCREIF timberland sub-indices. The chart to the lower left provides historic total annual returns by region.

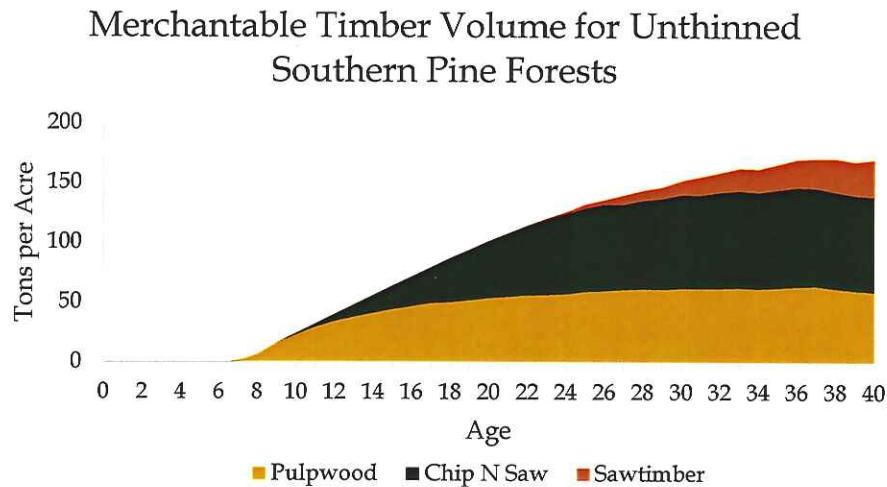
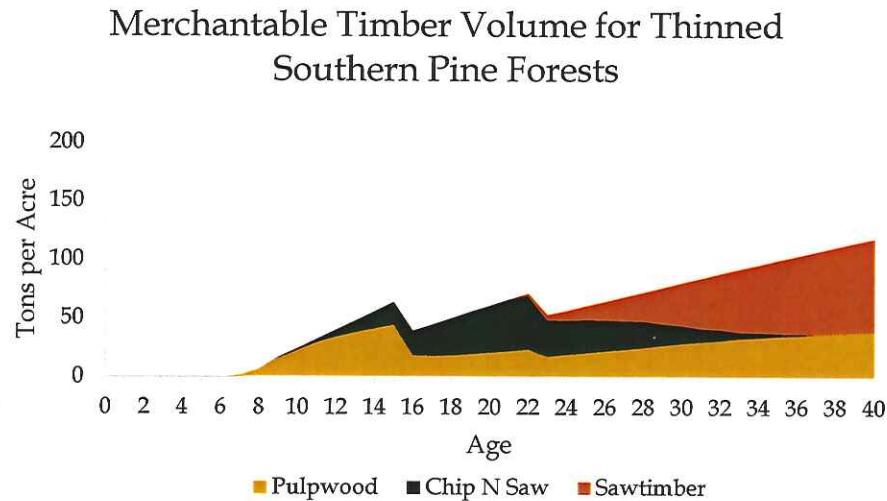
The map below displays the primary forest regions within the U.S. as well as the general locations of the PRIM timberland properties.



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# Biological Growth

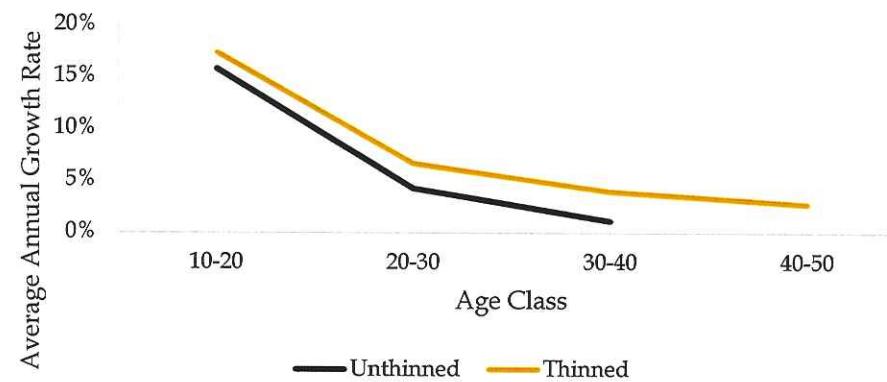
Biological growth is the primary driver of returns for core timberland investments



The charts to the left display the merchantable timber volume by product class based on two different management regimes for southern pine forests. Management regimes can be adjusted to capture local market opportunities.

The chart below summarizes the annual growth rate for southern pine forests. As southern pine forests mature, the annual growth of merchantable timber declines. Forests in different regions of the U.S. have different growth rates and rotation lengths.

Merchantable Volume Annual Growth Rates for Southern Pine Forests  
(Average Site Index of 65)



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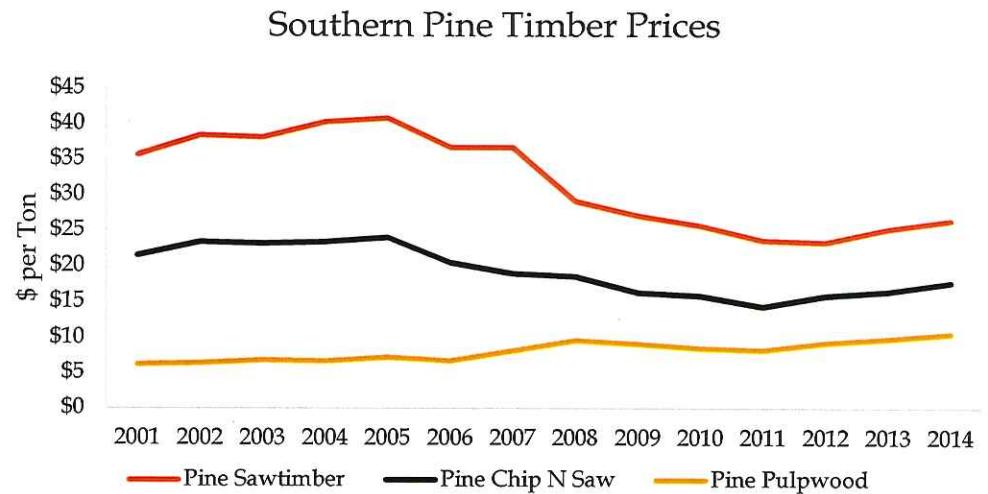
Sources: Virginia Tech, FIA

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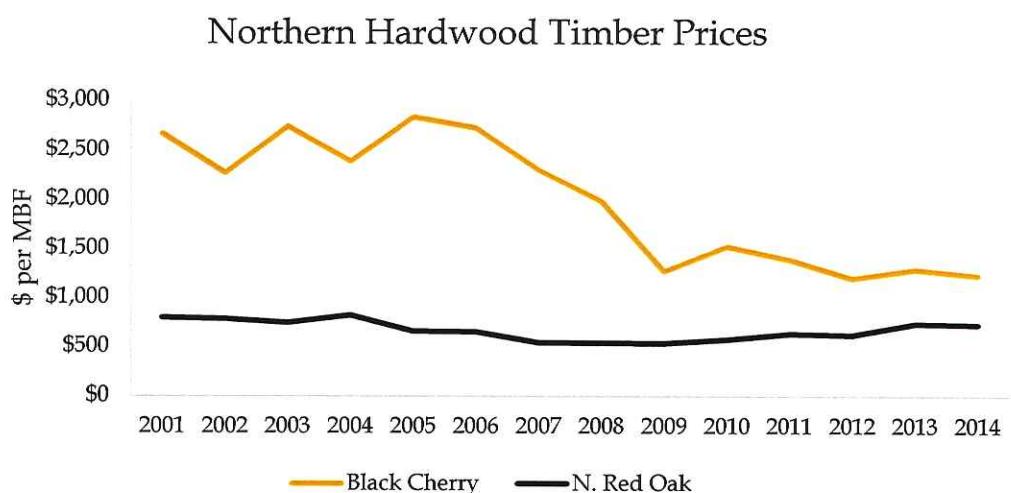
# U.S. Timber Prices

2001 - 2014

The chart to the right summarizes timber prices for southern pine forests. The spread between higher valued sawtimber and lower valued pulpwood has narrowed over the last few years. Though the price of sawtimber has decreased since 2001 as a result of the weaker U.S. housing market, the price of pulpwood has increased. The demand for pulpwood has been positively impacted by the growing global demand for wood fiber for use in packaging, tissue and other consumer products as well as for use in bio-energy plants.

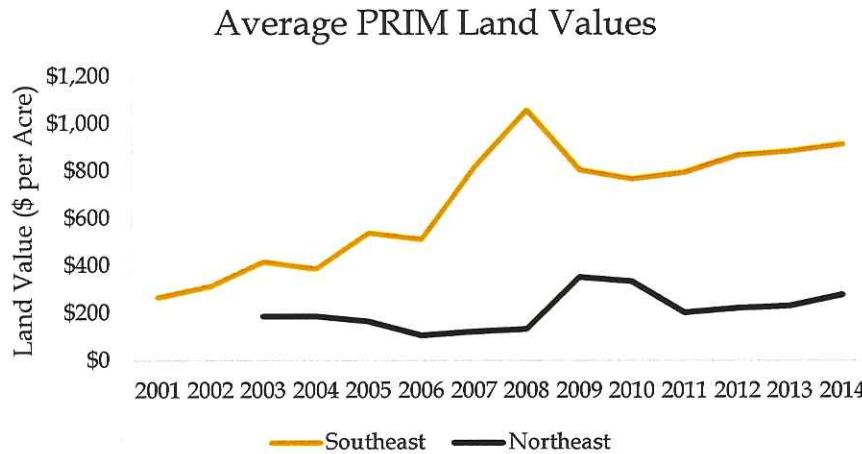


The chart to the right summarizes timber prices for two key species of merchantable timber from U.S. northern hardwood forests. The northern red oak prices are indicative of the relatively stable pricing for intermediate grade hardwood. Prices for premium black cherry have been weak as a result of the weaker U.S. housing market as well as limited export opportunities for premium hardwood.

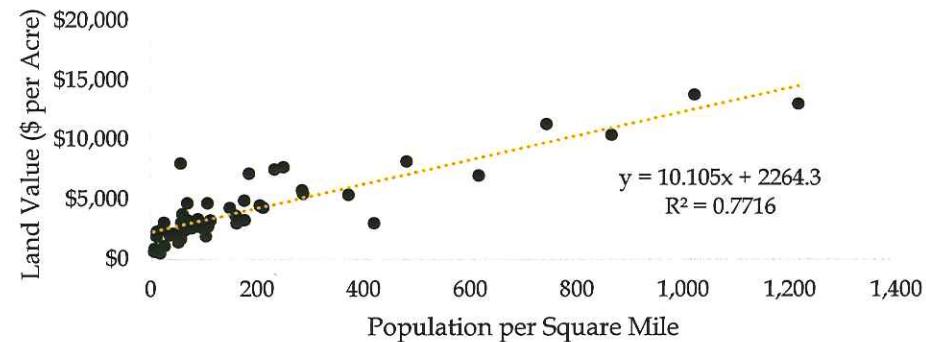


# Land Values

Average land values from 2001 – 2014 and population density as a key metric

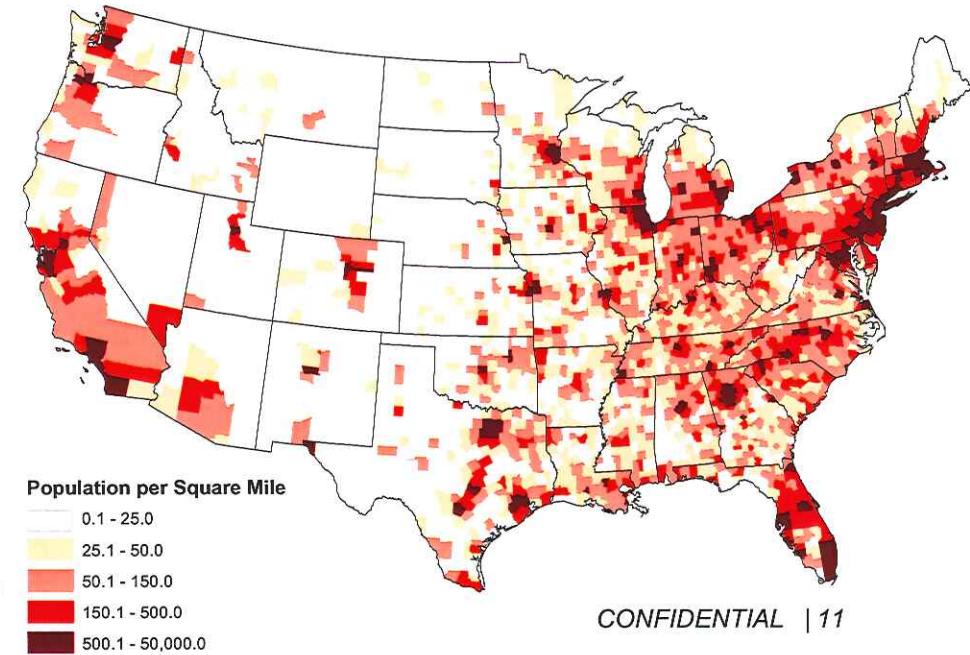


### 2014 Rural Land Values and Population Density



The chart above summarizes average land values by region for the PRIM portfolio. The appreciation of land values, especially in the southeast U.S., has had a positive impact on the PRIM portfolio over the last 14 years. The long-term historical rate of appreciation of productive rural land in the U.S. is approximately 5% - 6% per year. However, PRIM land values have appreciated approximately 10% – 12% per year for the last 14 years.

In addition to long-term appreciation trends, land values can also increase significantly due to potential land use changes or conversion to higher and better uses (HBU). A key measure of HBU potential and associated land values is population density. The chart on the top right displays state level land values relative to population density. The map to the right displays population density by county.



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Sources: USDA, U.S. Census  
Bureau, FIA

# **Supplemental Income**

*Recreation, Minerals, Utilities, Conservation*

*Supplemental income from recreational leases, utilities and other non-timber activities generates a supplemental annual cash yield of approximately 0.5% for PRIM. Though this is a relatively small component of the total annual return, the consistent annual cash yield helps maintain positive momentum for investment returns. These activities also provide ancillary benefits including enhanced relationships with local communities as well as opportunities to pursue beneficial environmental initiatives.*

*Certain non-timber activities such as mineral exploration and conservation sales have the potential to significantly enhance returns on certain properties. Though these are generally more speculative types activities, they can be pursued on an opportunistic basis based on the attributes of certain properties and general market conditions.*



# ***PRIM Portfolio Overview***



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# **PRIM Portfolio Summary**

As of 6/30/15

## **Account Details:**

- *Inception:* 2001
- *Net Asset Value:* \$ 1,123,280,045 <sup>a</sup>
- *Portfolio:* 11 properties in 8 states
- *Gross IRR, since inception:* 8.15%

## **Key Financial Metrics (since inception):**

- *Timber Sales Revenue:* \$ 349.8 million
- *Land Sales Revenue:* \$ 293.6 million
- *Total Contributions:* \$ 840.2 million
- *Total Distributions:* \$ 517.4 million

## **Annualized Returns<sup>b</sup>**

- *One Year:* 9.88%
- *Three Year:* 9.97%
- *Five Year:* 6.86%
- *Since Inception:* 7.83%

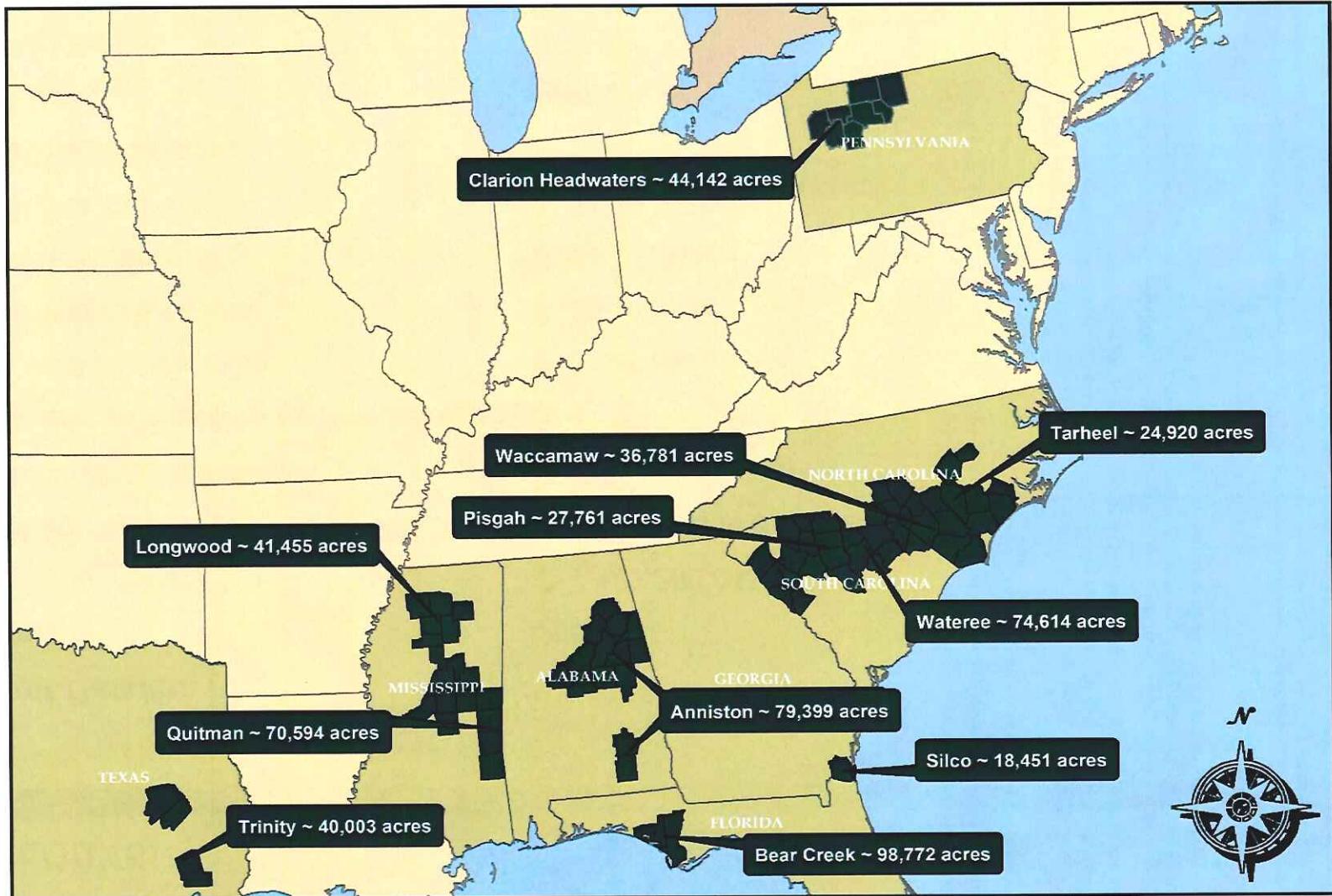
a) Includes cash, cash equivalents and liabilities

b) Annualized compound time-weighted return, gross of fees



# **PRIM Timberland Portfolio Map**

556,894 acres under management <sup>a</sup>



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# **PRIM Management Unit Performance**

As of 6/30/15

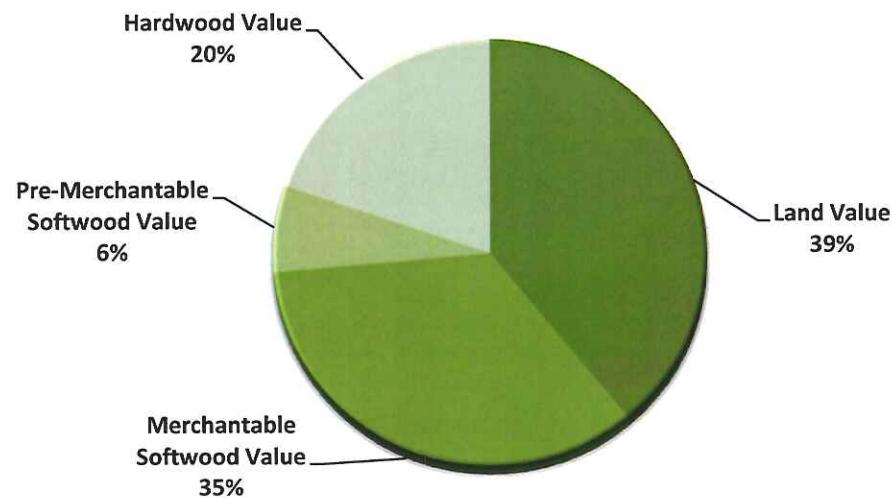
<b>Management Unit</b>	<b>Book Value</b>	<b>Market Value</b>	<b>Internal Rate of Return (since inception, gross of fees)</b>
Quitman – MS	\$35,161,488	\$141,365,974	12.60%
Trinity – TX	\$24,084,582	\$73,290,983	13.86%
Waccamaw – NC	\$26,094,088	\$71,595,124	10.52%
Silco – GA	\$14,819,621	\$44,106,751	10.84%
Clarion Headwaters – PA	\$101,398,425	\$139,793,908	2.17%
Wateree – SC	\$54,896,515	\$136,482,796	11.07%
Bear Creek – FL	\$61,746,196	\$167,792,815	8.26%
Anniston – AL	\$65,943,236	\$150,619,441	7.19%
Longwood – MS	\$41,624,899	\$87,988,776	5.87%
Tarheel – NC	\$19,571,176	\$49,618,407	10.87%
Pisgah – SC	\$20,995,532	\$54,721,777	10.53%
<b>Total Portfolio</b>	<b>\$466,335,758</b>	<b>\$1,117,376,752</b>	<b>8.15%</b>



# PRIM Market Value Allocation

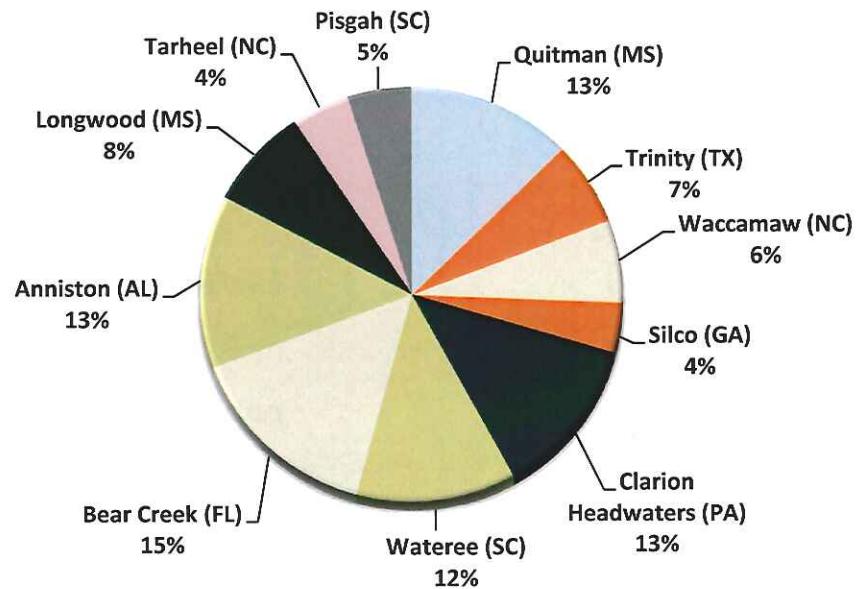
As of 6/30/15

Value by Component



The chart above displays the relative value of the key components of the PRIM timberland portfolio. The total timber value amounts to approximately 61% of the overall portfolio. This mix between land and timber is appropriate for a well-balanced core timberland portfolio that seeks to maximize the benefits of biological growth as a key driver of returns.

Value by Property



The chart above displays the relative value of the management units within the PRIM portfolio. The overall value of the portfolio is fairly well distributed among multiple properties throughout the eastern U.S.



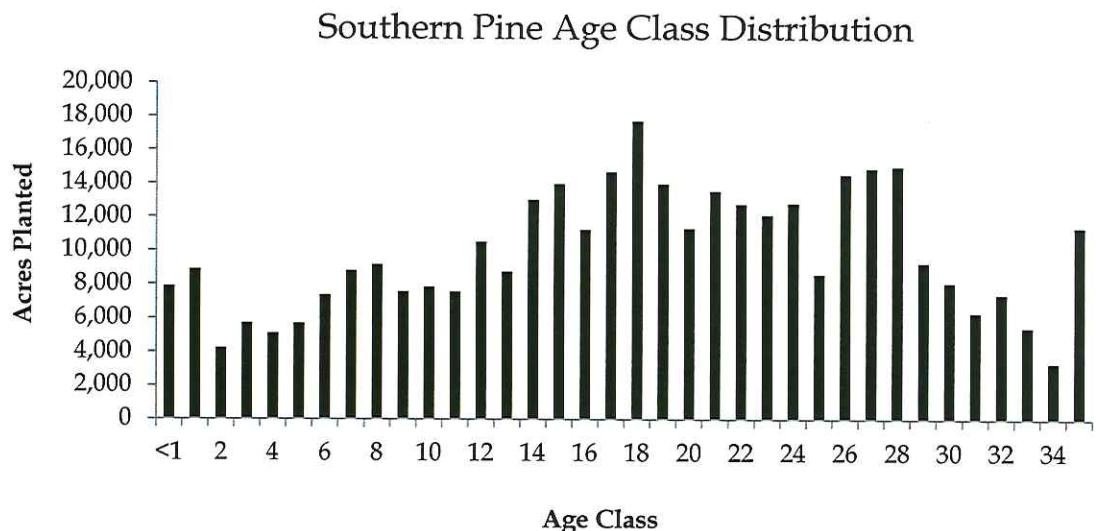
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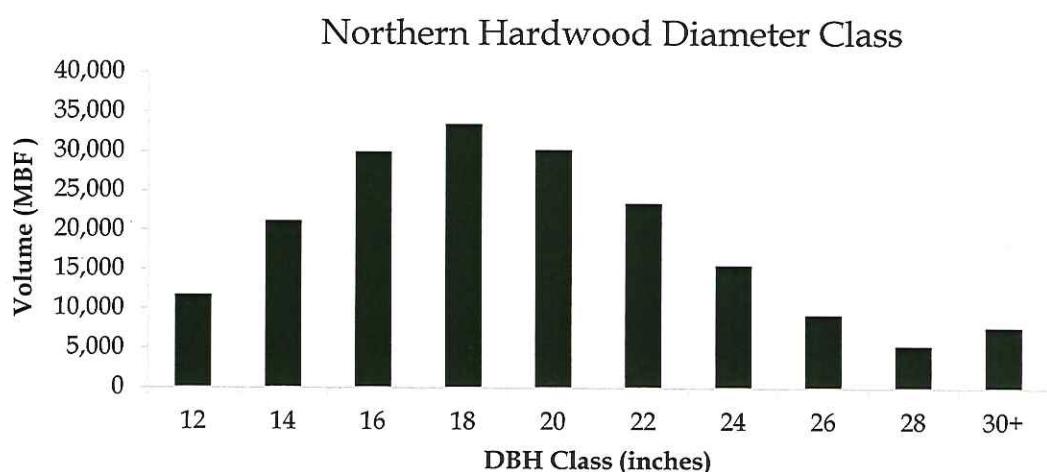
# **PRIM Age Class and Diameter Distribution**

As of 6/30/15

The chart to the right displays the age class distribution for the southern pine plantations within the PRIM portfolio. Pine timber in the southeast U.S. is generally managed on 30 year rotations. Over the last few years, some older pine timber has been held off the markets until conditions improve. As prices recover, harvest volumes will likely increase, particularly in some of the older pine stands. A key objective is to balance market opportunities with the maximization of biological growth potential.



The chart to the right displays the diameter class distribution for the northern hardwood forests within the PRIM portfolio. Northern hardwood timber becomes exponentially more valuable as the diameter of the hardwood logs increases. Premium northern hardwood is generally grown on 80 year rotations, so the general economics of forest management can be very different than for southern pine forests.



# *FIA Overview*



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# **Forest Investment Associates**

## *Firm Update*

### **\$4.5 Billion Timberland Assets Under Management**

- 19 separate account clients & 5 commingled funds
  - Fund 5, "Growth & Value", closed July 2015 at ~ \$250 MM

### **2.4 Million Acres of Timberland**

### **Employee Ownership**

- 56 staff members (45 shareholders)
- 24 professional foresters (16 with advanced degrees)

### **Headquartered in Atlanta, GA**

- Field offices in Georgia, Pennsylvania, Mississippi, Washington, Brazil and Mexico

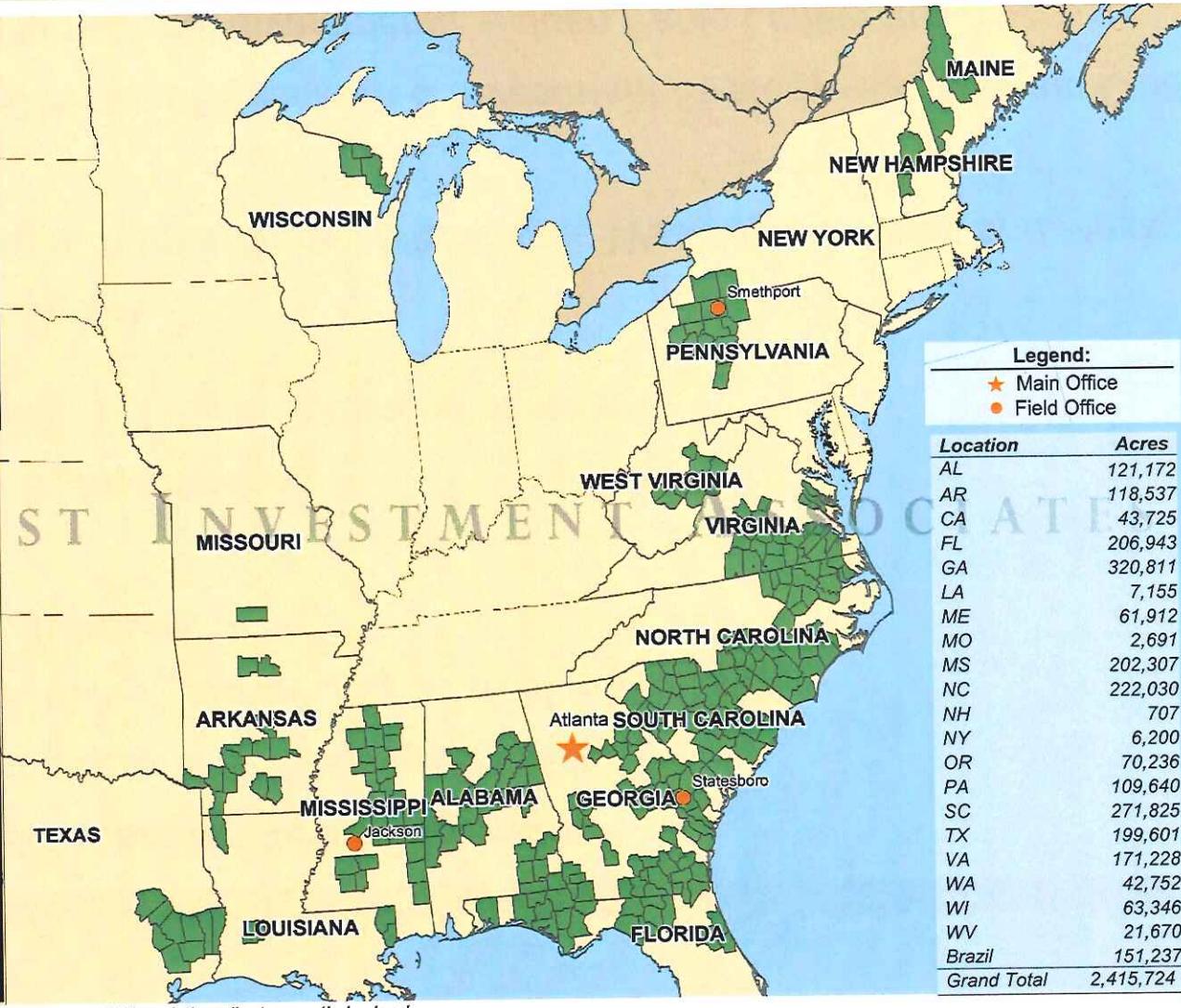
### **New Staff**

- Vice President and Director of Research & Investment Strategy - Dr. Michael Clutter
- Assistant Director International Investments – Juan Pablo Lankenau
- AgVictus Director of Business Development – Jon Callaghan
- AgVictus Director of Acquisitions – Fred Hepler



# Forest Investment Associates' Client Portfolio

2,415,724 Acres Under Management



The areas highlighted represent counties / countries in which FIA's existing clients own timberland.

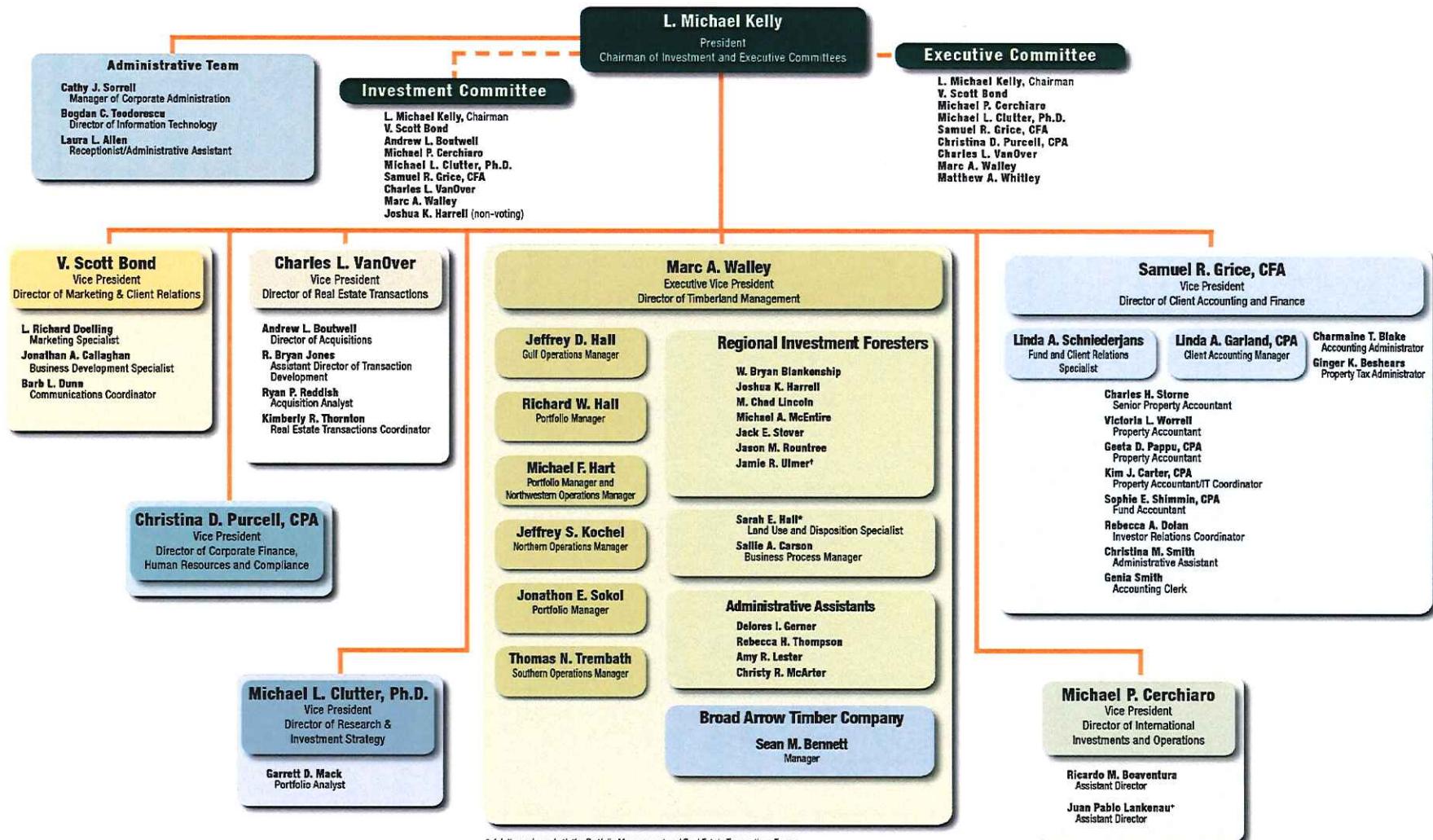
As of June 30, 2015

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## ***Forest Investment Associates Team Structure***



*\* Jointly works on both the Portfolio Management and Real Estate Transactions Teams*

<sup>7</sup> Also serves as Portfolio Manager for select clients

*\*Authorized Representatives of Forest Investment Associates / PIA*

