

---

## Forisk Strategy Note, Q3 2018

### Thinking Beyond Deviations: Changes that Could Disrupt the Forest Industry

Brooks Mendell  
President & CEO

#### Summary Messages

- While the U.S. economy has produced a record of positive performance exceeding seven years, cautionary headwinds appear in standard economic metrics. This has implications for investments in timber and the forest industry. All things being equal, higher interest rates (and discount rates) are associated with lower timberland values and higher costs of capital.
- We apply a simple framework to assess potential disruptions on a relative basis and their implications to forestry, good or bad. This exercise supports strategic exploration of what could prove catastrophic or what could create untold wealth from investments in forestry.
- This work highlights the potential for value destruction associated with failing to solve immigration and the industry reshaping potential of technological breakthroughs and any hyper focus on renewability. In addition, for forestry, tax policy has larger and more durable implications on timber and industry values overall than do variations in trade policy.
- When applied, the framework maintains sufficient flexibility to account for the specific location of the investments, and the priorities and interests of the decision-makers.

#### Introduction

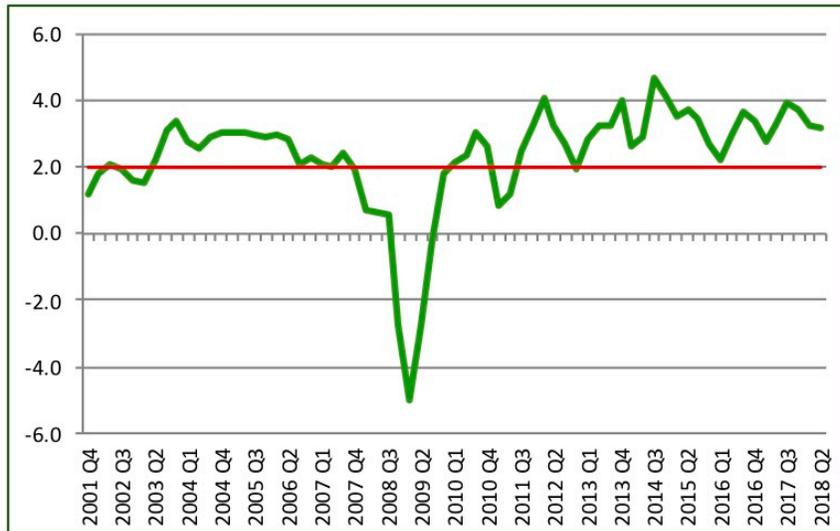
Major trends and physical realities related to demographics, timber supplies, and mill capacities provide boundaries and guard rails for what we can expect from timberland investments and forest industry producers. But what if and where could this “box” of normal market expectations get flattened by disruptions beyond reasonable control? What asteroid, black swan or cataclysm might reorder our world?

Strategy and investing require looking forward. What could disrupt the industry, beyond the normal variations and deviations of the business cycle? And how should we frame, screen and prioritize these disruptions, whether positive or negative? This Note applies a simple framework to evaluate the implications on forestry from internal and external disruptions ranging from technological advancements to legislative tinkering to economic contagions. Ultimately, we want to screen and rank changes that could affect the value, income generation and relevance of forests and wood-using mills to investors.

#### Current Situation

For the 22nd consecutive quarter as of Q3 2018, the Forisk Score, which provides a recent-weighted measure of the direction and health of the U.S. economy, remained above the “no growth” baseline of 2.0. Overall, **variables associated with production, investment and prices indicate and support a story of economic growth**. In particular, job growth remains strong. In Q2 2018, the U.S. generated its 31<sup>st</sup> consecutive quarter (since Q4 2010) of positive job creation. Real GDP was positive for 28 of the past 29 quarters, or over seven years. [Note: see Appendix A for details on the Forisk Score methodology.]

**Figure 1. Total Forisk Score for the U.S. Economy Over Time**



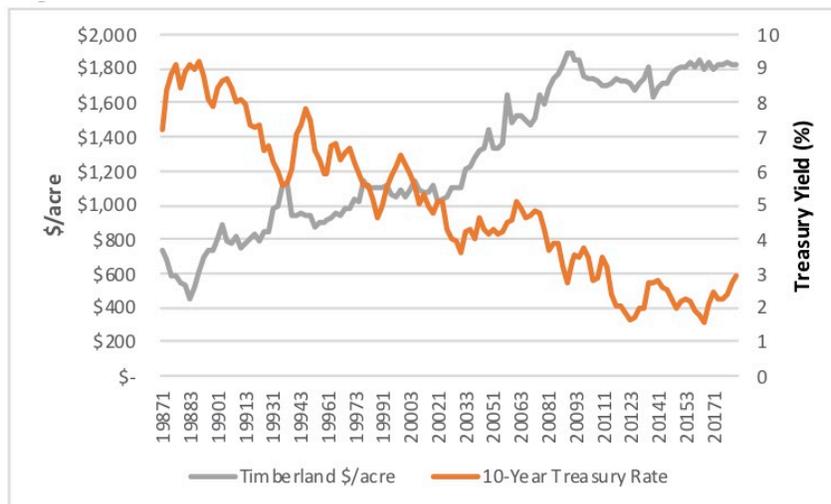
Source: Q3 2018 Forisk Research Quarterly (FRQ)

However, as economic growth continues, **potential headwinds from inflation and capital costs increased**. In Q2 2018, inflation increased year-over-year; CPI and PPI rose to 2.9% and 5.8%, respectively. Yields on 10-year U.S. Treasuries exceeded 3% in April and May in hitting a quarterly pace of 2.91%, its highest in over six years. In addition, over the last year, the yield curve for U.S. Treasuries has flattened, a traditional precursor to economic recessions.

### Timberland Values

The relationship between U.S. Treasuries and discount rates drives discussions affecting timberland valuations. The quarterly data in Figure 2 covers 30 years, from Q1 1987 through Q2 2018. For the first five years, quarterly yields on 10-year bonds averaged 8.5%, while over the most recent five years, yields averaged 2.3%. Meanwhile, timberland values increased on average in the U.S. from \$600-700 per acre in the late 1980s to over \$1,800 per acre today.

**Figure 2. U.S. Ten-Year Treasuries and U.S. Private Timberland Values**



Data: Federal Reserve; NCREIF

---

Timberland assets are constantly compared with alternative investment opportunities, and history reinforces the relationship between interest rates and valuations. **If the core cash flows from an asset don't change, lower discount (interest) rates support, lead to, cause and correlate with higher values, and vice versa.**

Let's be clear about the organizing principles here. First, timberlands (and mills) require capital. Second, investors have the capital. Third, investors have opportunity costs. If long-term U.S. Treasuries offered a 7% yield, net returns from alternate investments should exceed this. The cash flows and expected gains spinning off an asset justify the capital allocated to that asset. While timberland ownership supports a range of objectives – diversification, inflation hedging, ESG factors<sup>1</sup> – rising interest rates absent changes to cash flows increase pressure on values.

This leads to a tightening of the belt and sharpening of the pencil. How, why and when will timber prices increase? How, why and when will the market offset any imbalance in timber supplies? If asset values and portfolios get squeezed by higher interest rates and investments have less margin for error, then they also have increased exposure to negative risks and increased interest in return enhancing opportunities. How should we think about these?

### Framing Disruptions

Simple approaches can focus the mind. When thinking through the means and mechanisms by which disruptions affect forestry-related cash flows, I often ask two simple questions rooted in economic fundamentals<sup>2</sup>:

- Big or small? In other words, how impactful, whether positive or negative, would we expect this disruption or change to be on forest supplies or wood demand?
- Long or short? What is the likely duration, whether positive or negative, of this disruption or change on supplies or demand (in the market or industry)?

Consider the impacts of natural disasters on timber markets. In August 2005, Hurricane Katrina, a Category 5 event, struck the Gulf States, brutally affecting homes, forests and infrastructure. As a disruption, how would we provide context to its impact on timberland owners? Consider our two questions to organize our thinking:

- Big or small? Big event locally; devastating to some forests and damaging to many.
- Long or short? Short-term increase in supplies; negative impact on value.

Figure 3 summarizes this assessment spatially. A single Category 5 disruption degrades current values through temporarily flooding the local market with damaged timber. While we have little control over the event, options exist to salvage value. And research indicates the impact on stumpage prices works its way through the system in 12 to 24 months.<sup>3</sup> The event is short-term because it did not change the long-term fundamentals of wood demand or forest ownership.<sup>4</sup>

---

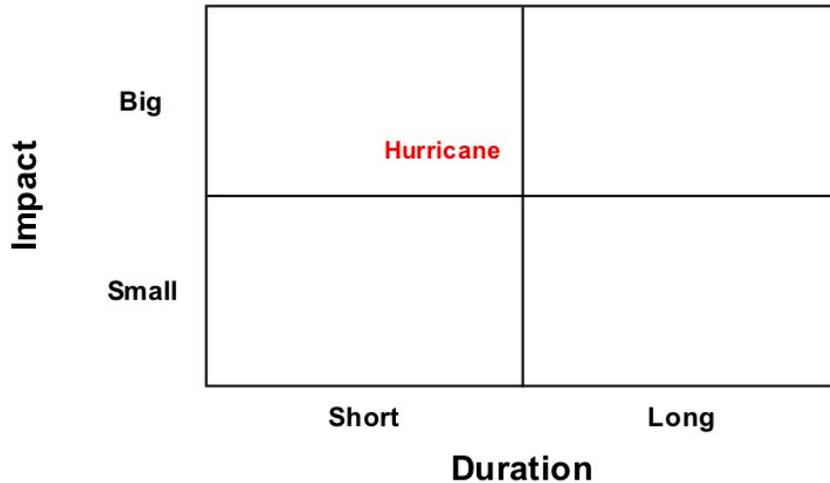
<sup>1</sup> Environmental, Social and Governance

<sup>2</sup> These questions are a variation on the frequency-severity framework used for insurance and risk management applications. In forestry, I have found it useful to think through duration – how long something lasts – rather than, or in addition to, the gap in time between occurrences.

<sup>3</sup> See “Natural Disasters and Forestry Markets, Part I”, (<http://forisk.com/blog/2017/09/24/natural-disasters-forestry-markets-part/>). Prestemon and Holmes (1997) compared stumpage prices before and after Hurricane Hugo in 1989. Yin and Newman (1999) later affirmed this analysis. Following Hurricane Katrina, Forisk found similar results in pulpwood stumpage markets in South Mississippi and Louisiana.

<sup>4</sup> Alternately, a series of Category 5 hurricanes in the same region would reduce long-term supply through devastating forest inventories, creating massive disruptions and also driving up short-term demand.

**Figure 3. Mapping Disruptions: Example of Hurricane Katrina**



**Simple frameworks add value to the extent that they prove useful.** This analytic exercise supports decision analysis. Using our experience, knowledge and available data, it screens and ranks the relative importance of potential disruptions on investments, businesses and markets. We can then probe assumptions and, while there may be no “right” answer, develop compelling narratives to establish priorities and strengthen our investment strategies.

When applied with senior managers and decision-makers, the resulting discussions clarify how much control we have. Some disruptions, like a zombie apocalypse, get thrust upon us from the outside, while others, like new mill or seedling technologies, offer strategic choices. And a big impact or opportunity for a single forest owner can be small for the overall market.

I think in terms of “tactics” (operations) versus “strategies” (capital allocation). Disruptions that get handled on the ground via operations tend to qualify as shorter or smaller in this framework, while anything that requires a board meeting or act of Congress reflects longer-term disruptions affecting investments and strategic advantage. Given this approach, how do we develop strategies and assess exposures across multiple disruptions for these situations locally?

**Local or Global?**

Big changes can affect us locally, globally, or both. As we have long taught in *Timber Market Analysis* workshops and emphasized in wood basket feasibility studies, timber markets are uniquely local. For strategy and planning, we want to specify the context of the disruption to best understand its absolute and relative risks, whether positive or negative.

Finance offers a useful analogy by distinguishing between systematic and unsystematic risks. Systematic risk, also called “undiversifiable” risk, refers to exposures and potential losses affecting the entire market or system, such as interest rates and recessions. Unsystematic risk includes “diversifiable” exposures specific to a given firm or industry. We have little, if any, control over systematic (global) risk, while unsystematic (local) risk can be mitigated and managed through diversification, insurance and operational competence.

Consider our example of Hurricane Katrina. We characterized this Category 5 event as short-term with a big, localized impact. Figure 4 refines our assessment of a major hurricane and

reinforces the point that, while severe and impactful, it remains an operational exposure and requires a tactical response rather than affecting our strategic view of the sector.

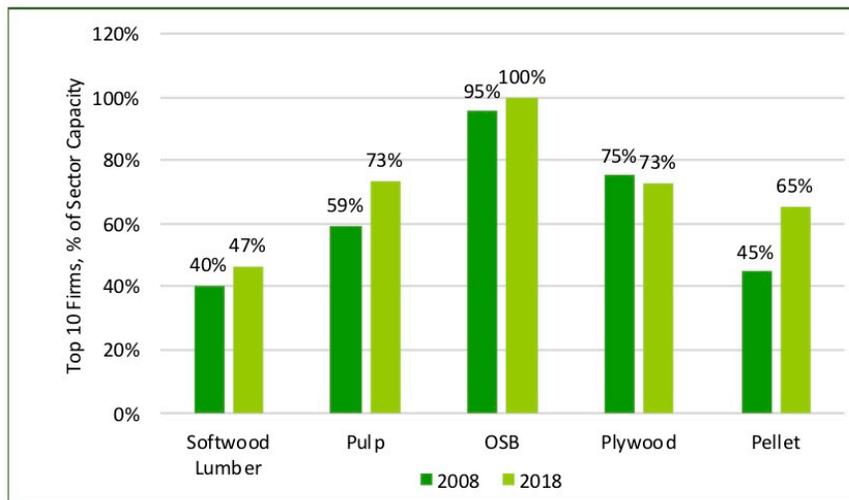
**Figure 4. Ranking Disruptions: Example of Hurricane Katrina**

Disruption	Big or Small?		Long or Short?	
	Locally	Globally	Locally	Globally
Category 5 hurricane	Big	Small	Short	Short

Source: Forisk

In sum, many events disrupt locally without interrupting the global industry. Alternately, consider consolidation, which varies across industry sectors and geographic regions. Strategically, the issue has grown in importance as consolidation increased in most forest industry sectors over the past ten years based on Forisk analysis (Figure 5). In fact, the forest products industry is consolidating up and down the supply chain, with implications on investments and strategies for both vendors to and customers of the sector.<sup>5</sup>

**Figure 5. Top Ten Firm Capacity by Sector in North America**



Source: Forisk Study of North American Forest Industry Capacity, 2018

While consolidation can strengthen firms and industries through rationalizing excess capacity and shuttering uncompetitive facilities, it can also reduce competition. Even Adam Smith recognized the importance of competition in allocating resources effectively and ensuring that firms operate efficiently.

How can we assess consolidation in forestry? Assuming that competition encourages efficiency, we evaluate the implications locally, as the local nature of timber markets can amplify or dissipate the relevance of consolidation. A locally consolidated market, where one firm owns ten mills, operates distinctly from a market with diverse mill owners. And local markets operate, to a large extent, independently from national industries when procuring wood raw materials.

Figure 6 profiles the wood demand across industries for three states and two pine product classes. Arkansas, Florida and East Texas have distinct exposures with respect to market

<sup>5</sup> In addition to wood-users, we have seen, for example, mergers among forestry consultants, timber REITs (e.g. Weyerhaeuser and Plum Creek), data providers (e.g. RISI and Random Lengths), and home builders (see “Big Builders Redo the Housing Market” in *The Wall Street Journal*, 7/14/18).

diversity and prevalence for timber sellers. In addition, these profiles become increasingly nuanced as we evaluate them at the sub-state level. Does a local timber investor face risk from consolidation or opportunity from diversity in their local market? The question reinforces the importance of understanding the competition-enhancing or hindering impacts locally.

**Figure 6. Localized (State-Level) Exposure of Wood Demand by End Market**

State	Pine Grade			Pine Pulpwood		
	Lumber	Plywood	Other*	Pulp/Paper	OSB/Panel	Bio
Arkansas	91%	9%	0%	79%	16%	5%
Florida	84%	5%	11%	85%	7%	8%
East Texas	86%	12%	2%	50%	45%	5%

\*Includes poles and log exports

Data source: Q3 2018 Forisk Research Quarterly (FRQ)

### Ranking Disruptions for Forest Owners

Our current research into forest industry and timberland investment strategies includes analysis of over 30 actual and potential disruptions relevant to physical, economic, legislative, technological, market, and geopolitical exposures. The work combines qualitative and quantitative analysis, and the application requires meaningful discussions of scenarios to assess whether or not an impact applies to “our” firm or assets in “this” market or sector.

Figure 7 summarizes an analysis and ranking for ten selected disruptions based on a forest owner point of view (as opposed to a wood user or manufacturer). This ranks first for global (strategic) exposures and second for local impacts. Each assessment has a “story” that changes based on the profile, objectives and assets of the firm. [Note: see Appendix B for notes on several of these topics, in addition to Forisk’s current working list.]

**Figure 7. Ranking Ten Select Potential Disruptions (Forest Owner View)**

Disruption	Big or Small?		Long or Short?	
	Locally	Globally	Locally	Globally
Forest tax policy change	Big	Big	Long	Long
Zero labor immigration	Big	Big	Long	Long
Nanocellulose et al	Big	Big	Long	Long
Climate change	Small	Big	Long	Long
Zero home buyer immigration	Small	Big	Long	Long
Water scarcity et al	Small	Big	Long	Long
Hyper renewability policies	Small	Big	Long	Long
Consolidation of a sector	Big	Small	Long	Long
Category 5 hurricane	Big	Small	Short	Short
Forest product trade policy	Big	Small	Short	Short

Source: Forisk

Even at this level, the relative ranking highlights critical themes.

1. Tax and environmental policies matter. Overall, forestry is a strategic asset and a low margin business that requires long-term commitments. Changes in how forest management costs get expensed or capitalized materially affect the profitability and attractiveness of these investments. And environmental policies that recognize forest benefits without constraining property rights can enhance these values materially.
2. People matter. Without people to work and to consume, forests have little economic value. Anything that slows or hinders the growth of the workforce or of a healthy populace, materially reduces the net cash to owners, the long-term demand for manufacturers, and their ability to run a business.

3. Technology matters. Technology has explosive potential as a value creator. Consider that pulp manufactured from pine as we know it did not exist 100 years ago. Today, fluff pulp mills have among the strongest ability-to-pay for wood in North America. The number of patents and applications for wood fiber continues to grow.
4. Demand matters. From an economic standpoint, trees have no value unless nearby mills exist to buy them and convert them to value added products.

### Strategic Implications

We can summarize all traditional timberland investment strategies as efforts to match, model and exploit cash flows from wood markets and forest supplies of varying levels of maturity over time (Figure 8). When investing in U.S. timberland, we either invest in established forests with mature wood markets, or we invest in areas that require development of the forests and/or wood markets. And we must evaluate potential disruptions relative to the specific assets, market and strategy under consideration.

**Figure 8. Timber Market Maturity for Investment**

<b>Wood Markets (Demand)</b>	<b>Mature</b>		
	<b>Emerging</b>		
		<b>Juvenile</b>	<b>Established</b>
		<b>Forest Inventories (Supply)</b>	

Also, time as a strategic idea remains malleable. Discussions about potential disruptions reinforce the arbitrary nature of “short” and “long” term in timber. The space and time required for impacts to realize themselves in forestry extends beyond the immediate quarter or year (with respect to what the asset can and should do). Value is created consistently over long periods of time, and to the extent we put arbitrary 1 or 5 or 10-year time horizons on the asset, we constrain its performance and change our understanding of the associated risks.

### Conclusion

Managing risk and identifying opportunity require looking forward. We imagine the future, structure these ideas as scenarios, and assess the implications and potential reactions in the market. The levers, relationships, causality and relevance of disruptions and opportunities vary, so we gain advantage, clarity and power by screening and prioritizing.

When applied, the framework introduced in this Note maintains sufficient flexibility to account for the specific location of individual investments, and the priorities and interests of different firms and decision-makers. We derive value in this process through separating the local, tactical issues from the global and strategic when testing investment strategies and confirming capital allocation decisions.

---

## Appendix A: Forisk Methodology for “Scoring” the U.S. Economy

The Forisk Score provides a recent-weighted measure of the direction and health of the U.S. economy through tracking variables associated with production, investment and prices. In studying the wood and timber industries, we use the Forisk Score to provide context and address the question, “is the U.S. economy “growing” or “shrinking” and to what degree?”

Key features and methodology include:

- **Growth & Production** variables confirm positive or negative economic activity over time relative to historic averages. If the economy is growing in real terms, manufacturing products and building homes, then good things are happening.
- **Investment Performance** benchmarks over time relate the economic activity to financial returns. Strong corporate and equity market performance raises expectations for more hiring and capital investments. Strong profits support the performance of pension funds and retirement accounts. Positive profit and market growth, to a point, indicate good things are happening.
- **Prices & Unemployment** variables remind that buying power changes and capital has an opportunity cost. Rising inflation means a U.S. dollar buys less, which can erode confidence and investment. Rising unemployment leads to decreased consumer spending. The 10-year Treasury benchmarks the opportunity cost of money and proxies a “risk-free” rate. Higher consumer prices and borrowing rates can slow spending and growth. Big jumps in these rates serve as an economic “engine light.” Time to take the car in and look under the hood.

**The math of the Forisk Score** includes a ratio of recent performance to historic averages. The numerator (top of the ratio) averages the past two quarters. We use a two-quarter average to reduce our exposure to one-quarter blips and outliers for individual variables. A two-quarter average gives us the past six months. The denominator (bottom of the ratio) averages the 5-year and 10-year averages. This gives us a denominator weighted to the past five years (which show up in both the 5 and 10-year numbers) while being informed by a longer trend. The total Forisk Score sums the scores of the individual variables. The Growth and Investment scores are positive, and the Price scores are negative. In sum, the Forisk Score provides an economic rolling-average that signals growth or contraction.

---

## Appendix B: Working List and Notes on Select Disruptions

Notes and assumptions related to disruptions in Figure 7.

- **Consolidation:** fewer firms competing for wood in some local markets.
  - Big or small? Small; stabilizes demand; supply impacts depend on reforestation.
  - Long or short? Long-term implications for local market profiles; unclear value effect.
- **Emigration:** more people leave U.S.
  - Big or small? Big; further reduces labor pool; increases costs; softens demand.
  - Long or short? Long-term implications on labor and household formations.
- **Immigration:** more people enter U.S.
  - Big or small? Big; grows labor pool; reduces industry costs.
  - Long or short? Long-term implications on labor and household formations.
- **Trade Policy:** disputes produce temporary, produce specific disruptions.
  - Big or small? Small; narrow implications; work-arounds exist.
  - Long or short? Short; ongoing negotiations.
- **Nanocellulose et al:** advanced fiber applications increase; costs fall.
  - Big or small? Big; demand for wood fibers multiplies.
  - Long or short? Long-term implications demand; log specs become irrelevant.
- **Tax Policy:** changes increase annual costs on forests, and to pension funds and REITs.
  - Big or small? Big; net cash flows and returns reduced for duration of change.
  - Long or short? Long-term implications on forest supplies; reforestation falls.
- **Water Security:** forestry “services” such as air and water increase in importance.
  - Big or small? Big/small; unclear potential value for investors.
  - Long or short? Long-term implications on forest ownership and management.

Examples from Forisk’s working list:

- Aggressive monetary or fiscal policy moves;
- Carbon credits;
- Destructive natural events (e.g. blight, fire, draught);
- Efficiency gains with fossil fuels, steel and concrete;
  - Reductions in impact improve their profiles on a relative basis;
- Federal policy changes;
  - Endangered Species Act, renewable energy (also at state level);
- Geopolitical change massively affecting U.S. competitiveness;
  - War, lack of confidence in governmental or financial institutions or rule of law
- Home preferences change, leading to more or less home construction;
- Industry overbuilds manufacturing capacity (by sector);
- Land conservation and changes in ag land management/utilization;
  - Reduced erosion, chemicals use and/or increasing use of better irrigation;
- Massive changes to the investable timber universe (absolute or relative);
- Massive increases in forest productivity (genetic improvements);
- Massive increases in harvesting on federal lands (USFS policy disruption);
- Oil prices skyrocket (or crash);
- Timberland alternatives for investors;
  - Alternate vehicle that better meets the hard, diversifying asset needs;
- Wood alternatives and substitutes;
- Zombie apocalypse.

---

## Appendix C: About Forisk

Our team helps clients understand the business of forestry and changes over time in timber-related investments and wood-using industries from the ground up. All Forisk researchers have direct forest industry and market analysis experience. This includes work in wood procurement, forest finance, forest operations, and timber market forecasting.

Forisk publishes the *Forisk Research Quarterly (FRQ)*, which includes timber forecasts, forest industry analysis, forest operations research and wood market rankings for North America. In total, Forisk subscribers own or manage over 100 million acres of timberland and use over 200 million tons of wood per year in the U.S. and Canada. This includes firms and organizations based in the U.S., Canada, Europe, Asia and South America.

Our consulting focuses on analyzing the supply and demand characteristics of local wood and timber markets and, from this analysis, developing forecasts and strategic guidance related to investment decisions and the management of assets. To support this research, Forisk maintains the most complete databases of mill level capacity for solid wood-using mills in North America.

### Forisk Product and Services

- Products
  - *Forisk Research Quarterly (FRQ)*
  - North American Forest Industry Capacity, 2008-2020
  - North American Timberland Owners & Managers database
  - Silviculture Surveys
    - Forest management benchmarking for the US South and Pacific Northwest
  - Wood Bioenergy US database
- Services
  - Timber market and wood basket screening, ranking and feasibility analysis
  - Property and mill-specific timber price forecasts
    - Stumpage and delivered
  - Forest operations analysis and benchmarking
    - Wood procurement, market infrastructure and logging/hauling capacity
  - Executive education and professional development

[www.forisk.com](http://www.forisk.com)