

AN ESRI
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A special report for forest and land managers

Transforming Long-Term Business Value, Income, and Performance

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Transforming Long-Term Business Value, Income, and Performance

Coping with Unprecedented Change

For the last decade, the United States forest products industry has experienced unprecedented change with the combined impact of globalization, extreme economic volatility, and rapid technological advancement. These factors make it increasingly difficult for many timber companies to maintain their competitive advantage. To cope, old operating assumptions are often discarded, and many forest managers are struggling to keep up. In addition, the market has influenced stakeholders to increase pressure on timber suppliers to implement environmental sustainability strategies across the supply chain. The forest industry has never been more diverse, interconnected, and competitive than it is today.

This paper will focus on the use of innovative technologies that have generated permanent benefits for modern forest companies as they respond to today's increasingly challenging and rapidly evolving business climate.

Technology has impacted almost every facet of forest companies. Since the 1980s, they have been dramatically reshaped by a wide variety of process improvements and technical innovations: desktop computers, high-speed networks, the Internet, geographic information system (GIS) and Global Positioning System (GPS) technologies, remote sensing (RS), mobile field devices, and more.

As new technologies continue to emerge and many forest management software solutions are reaching product obsolescence, forest companies are finding they have not yet finished transforming and streamlining business processes with technology.

"Innovation is the top tool for meeting expectations. The winners in the innovation game will be those that harness technology and innovation to deliver products and services that are cost-effective, convenient, functional, and sustainable. CEOs are also looking to measure risk better and communicate more around their environmental impact and purpose."

PwC Forest, Paper & Packaging

Current Information Systems

While business priorities and operational challenges differ, forest companies all have a common objective: to maximize the value of their timber asset and sustainably extract the highest value per acre from their land.

Forest companies are complex organizations. The dynamic nature of the forestry market and the multidimensional complexities of forest ecology require a wide variety of flexible management approaches and adaptable solutions. As a result, over the last three decades, almost all forest companies have developed or invested in highly customized technologies to meet their unique departmental business objectives. Many of these tools are used for routine data collection, analysis, and reporting on vast volumes of data—about companies' assets, leases, operational activities, timber sales, best management practices, and more.

Barriers to Improving Productivity

To cope with new and emerging business demands, foresters and land managers are increasingly required to go beyond their traditional role as data collectors, information suppliers, and planners. In addition, they are now needed to provide analytical insight into their business while improving the management reporting cycle, often with real-time visibility across the organization.

However, many forest companies have teams or even entire departments that are unable to fulfill these new business-critical requirements. This is often due to the following barriers:

- Many timber companies manage their data and information products in silos of disparate systems. Typically, these systems are technically limited to sharing information only at the team or departmental level.
- There is typically a need for integration between systems that could benefit and support other functional areas of the business, such as integrating timber inventory and valuations with financial systems.
- Many technologies in use are outdated and lack the functionality needed to meet present-day business requirements. The unique expertise needed and the high cost of replacing and updating these highly customized tools are usually prohibitive.
- Key information systems have historically been left to the realm of technologists. This has resulted in an overall lack of organizational access.
- Current systems are challenging for nontechnical personnel to operate. There is significant risk when only a few of the most highly trained and skilled technical staff can obtain deep analytical insight from these systems.
- There is a need for an integrative technology platform that can bring together legacy systems and innovative new apps in an easy-to-use environment.
- The proposals that many forestry leaders receive from their management teams are incomplete, lack vision, and include an unclear business case.
- The total cost of owning new technologies—including system design, infrastructure, hardware, software, implementation, and training—often exceeds operational budgets and requires capital expenditure.
- Many forest companies make technology decisions with neither insight into industry best practices nor regard for the organizational changes that these decisions will trigger.

A Reliable Industry Standard

For several decades, GIS has been used to support forest management planning and operational forestry activities. Esri® ArcGIS® software has a proven track record of success, consistently offering forest companies the ability to create authoritative information products across the entire organization. These information products include the following:

- Property ownership maps
- Stand-level forest inventory maps
- Land and timber valuation summary tables and maps
- Forest management planning maps
- Harvest plan contract maps
- Silviculture activity maps and reports

These and many other examples demonstrate how ArcGIS already underpins all forest and land management business functions in many forest companies. Additionally, the geographic attributes calculated and maintained in this system of record—such as location, number of acres, distances, and lengths—are critical to analyzing downstream revenue and capital cost computations.

Overcoming Barriers

While ArcGIS for Desktop continues to provide a foundation for GIS mapping, recent technological advancements have dramatically transformed ArcGIS from a desktop mapping tool into a complete system of engagement. The platform provides flexible building blocks for the in-house creation of modern, responsive apps without requiring any software programming. ArcGIS app builders include preconfigured templates along with widgets you can drag, drop, and configure.

The ArcGIS platform is rapidly becoming a key solution to deliver both strategic and operational benefits. With advances in GIS technology and its impact on today's business models, the ArcGIS platform offers a significant opportunity to innovate beyond business as usual by empowering everyone—from fieldworkers to executives—with timely, accurate information and a means of collaboration to discover, use, make, and share maps from any device, anywhere, at any time.

When the ArcGIS platform is aligned with corporate strategy and forest industry best practices, measurable business value is realized. The ArcGIS platform provides streamlined workflows and powerful maps and apps to meet complex forestry and land management challenges. This evolution of technology dramatically changes the business impact of GIS, and the platform becomes a strategic enabler rather than just another cost center.

"In the digital economy, platform ecosystems are nothing less than the foundation for new value creation. Every business now understands the transformational power of digital. What few, though, have grasped is quite how dramatic and continuous the changes arising from new platform-based ecosystems will be."

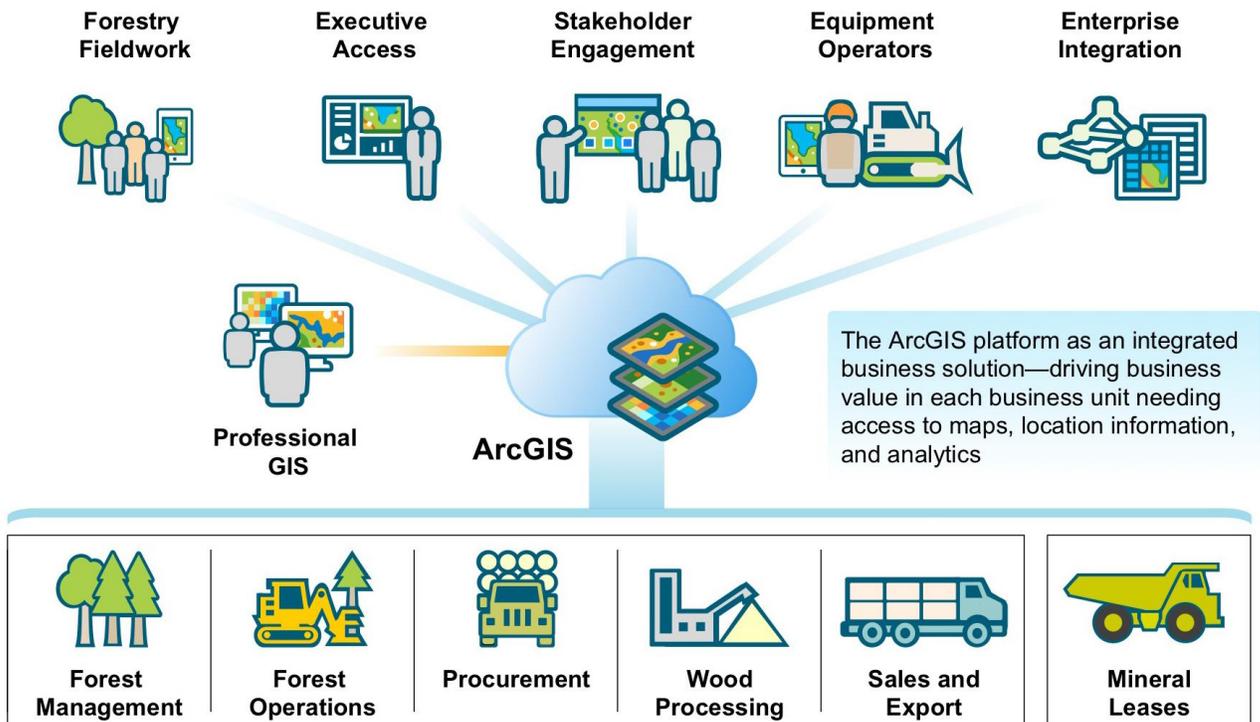
Accenture

Delivering Measurable Business Value

The most important cost drivers and business benefits from GIS are typically realized outside the GIS and IT departments, so to deliver and quantify business value, corporate executives and senior managers should raise fundamental questions to align the ArcGIS platform with their business objectives. The value of the ArcGIS platform is optimized when the operational needs of the business become the implementation focal point.

As depicted in the diagram below, the ArcGIS platform makes mapping and GIS capabilities available to everyone by supporting GIS professionals, who are the custodians and enablers of spatial data. It also supplies data in an appropriate contextual framework to others in the company via simple but powerful web-based services and easy-to-use apps. The ArcGIS platform offers the potential for open participation by the following:

- Corporate executives and decision makers
- Foresters and field staff
- GIS and IT staff
- Logging truck operators
- Forest machine operators
- Consultants and contractors
- Strategic customers
- External stakeholders

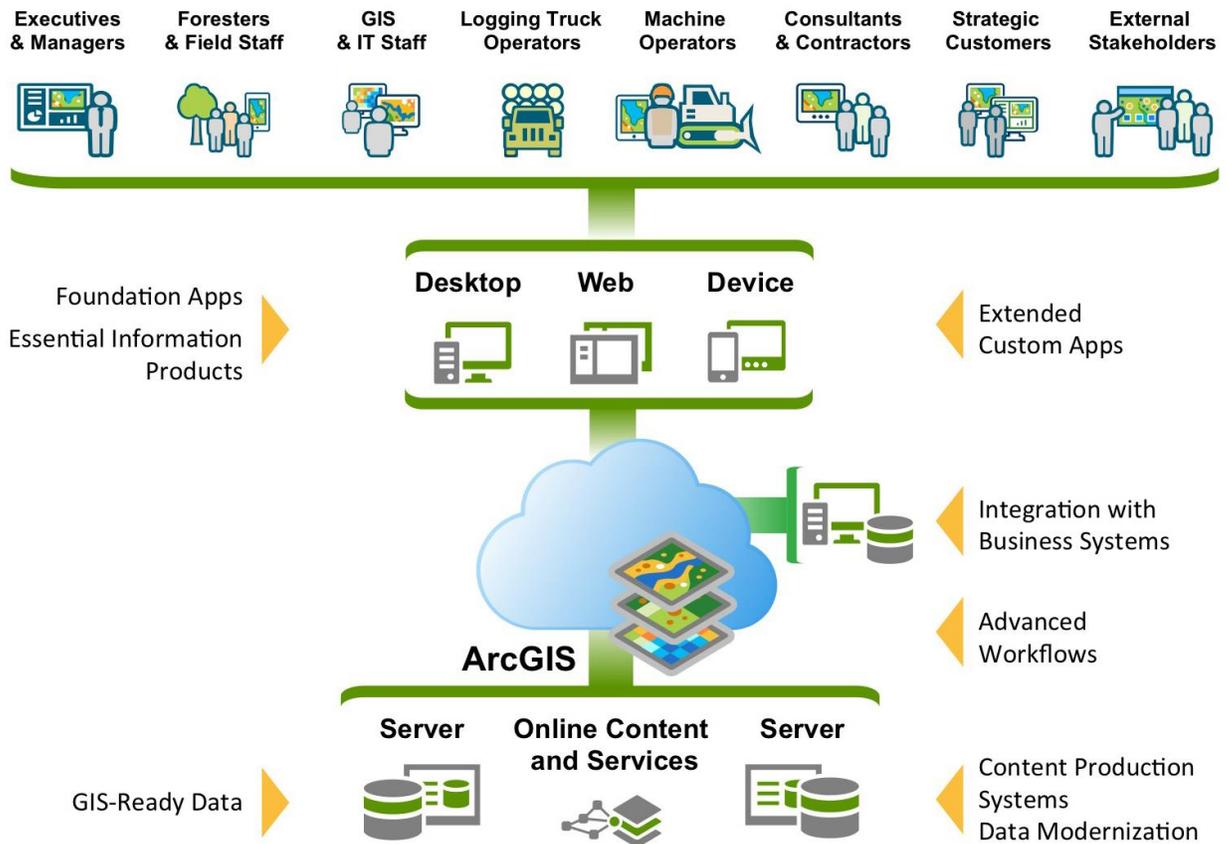


A Vision for the ArcGIS Platform in Forestry

“The ArcGIS platform is used by Molpus Woodlands Group, LLC, as a foundation for current and future forestry applications. In the field, foresters track and report operational inspections using map-driven forms to collect, edit, and update observations, measurements, and location information. ArcGIS also provides our leadership and strategic planning team with deep analytical insight about our timberlands. There are few software solutions that offer such significant business value by providing a real competitive advantage.”

Molpus Woodlands Group (Claire Bain, director of GIS and resource planning)

Extending land and timber asset data via the ArcGIS platform, as depicted in the diagram below, can provide forest companies with a means to address business priorities by leveraging authoritative land and timber data content in real time, anytime, anywhere, and on any device to corporate decision makers, knowledge workers, and operational field crews.



ArcGIS Platform Deployment Vision for Forestry

Business Value Drivers

The role of business-critical information in forest companies has never been more vital to future success. To sustain growth and achieve even higher levels of business value, forest companies must apply industry standards and best practices for managing this information. The following table summarizes the key business value drivers that impact operational efficiency and growth. Leveraging best practices that truly align with meeting operational challenges in these areas will drive significant results, lower costs, and support better decision making.

Key Business Value Driver	Operational Challenge	Best Practices
Continued Growth and Improved Financial Performance	Need agility when supporting multiple business units and to capture new opportunities in asset repositions, niche log sales, stumpage sales, and leases	Provide employees and executive decision makers with a centralized, authoritative destination for all asset content, current jobs, historical activities, and analytical tools to support strategic decisions.
	Controlling costs while staying focused on core business activities	Leverage software subscription models to shift software licensing costs from the capital expenditure budget to operational expense budgets. This financially positions GIS as an essential cost of doing business alongside other core costs of operations.
	Reducing process times and steps within key processes that generate revenue such as contracting, logistics, and reporting	Create a central framework that makes asset and activity information available to anyone in the organization. Reduce friction in processes and eliminate duplicate entry.
Lower Operational Risk	Delivering authoritative content and decision support tools to all levels of the organization	Enable access to easy-to-use, contextual content through apps for the entire organization.
	Difficulty in accessing the GIS and IT skills needed to support enterprise business objectives	Deploy ArcGIS platform technology to any user that requires it through an enterprise subscription model.
	Effective controls and documentation needed to ensure business continuity for intellectual property and processes while holding up to audits	Use a solution framework that is standards based, documented, IT compliant, supported, and accessible by nontechnical experts.
Optimized Capital Allocation	Limited on-site and regional IT resources to support enterprise hardware and software needed to provide employees with high-availability information systems	Leverage commercial cloud providers such as Amazon or Microsoft to deliver enterprise architecture. This leads to significant savings and a total cost of ownership that lowers capital expenditures and hardware costs.
Lower Financial Risk	Unknown quality of forest inventory data and a lack of	Expose inventory information products through web apps, mobile devices, and

	repeatable inventory computational processes, creating unnecessary risk when making operational decisions	dashboards to increase visibility into the organization's inventory program. Increase program scrutiny by all levels of staff to collaboratively improve and identify/fill gaps.
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Streamlining Business Processes

ArcGIS provides a new framework for information integration and performs a core business function in many forest companies through a single platform for multiple forestry business requirements. The big breakthrough is in how easy it is to engage with the system. This ease of use is about not just improvements in the software user experience and interface but also how the system is directly connected to authoritative data repositories of immense proportions.

Many forest companies leverage ArcGIS as an integration platform to connect existing business systems: enterprise resource management (ERM), computer-aided dispatch (CAD), records management systems (RMS), customer relationship management (CRM), and enterprise asset management (EAM). Integration allows forest companies to create more effective management plans and predict and minimize labor costs and errors resulting from manual reconciliation of inventory and accounting databases. To be effective, integration should be in real time, flexible, easily verified, and scalable.

"In The Boston Consulting Group's tenth annual global survey of the state of innovation, 79 percent of respondents ranked innovation as either the topmost priority or a top-three priority at their company. Speed is one of the major sources of differentiation for true breakthrough innovators."

The Boston Consulting Group

Trends That Help Your Bottom Line

With today's ArcGIS, your company can stay ahead of the competition. ArcGIS offers your company the ability to be more profitable, productive, and efficient. The technological innovations that are changing the forest industry currently encompass three major trends:

- **Data/Systems integration**—The era of stand-alone systems and cobbled-together workgroups is quickly coming to an end. Data has limited value when isolated in a single database, but the potential is enormous when systems are integrated and data is turned into actionable information.
- **Analytics**—ArcGIS provides the analytic engine to transform raw data into actionable business intelligence that can be run from any location, on any device. Analysis is critical to supporting the forest management life cycle; it is

how forest companies can analyze risk, understand vulnerability, identify mitigation priorities, develop comprehensive response plans, and test the impact of different event and planning scenarios.

- **Executive dashboards**—The results of data analysis need to be presented to users in clear, easy-to-understand ways. Well-designed real-time interfaces provide graphic representations of critical information and enable users to drill down to details. Visualize changes in the forest over time and see how different management strategies are affecting the forest.

These major trends are shaping technology across the forest industry. Analytics integrates data from multiple data collection systems and helps users leverage their data, observations, and assets to create enhanced systems of insight. Results can then be presented to foresters and land managers via dashboards and alerts.

The integration of systems, analysis of data, and the use of digital dashboards can benefit a forest company in a way that is as dramatic as was the introduction of cheap personal computers or the development of the Internet.

Top 10 Capabilities

By adopting industry best practices to mitigate obstacles that impact operational efficiency and growth, forest companies can realize the many benefits of the ArcGIS platform. These are the top 10 capabilities of this approach:

1. **Streamline and improve organizational processes and workflows**, resulting in improved efficiencies by implementing a cross-departmental solution that integrates with business information systems
2. **Improve productivity and field data collection performance** by eliminating redundant and duplicate data entry through preloading of existing GIS data into data collection forms
3. **Create efficiencies in field data transfer to corporate information systems** by replacing time-consuming manual and redundant methods with automated extract, transfer, and load processes
4. **Make faster and better-informed decisions in the field** by providing forest managers with immediate access to the authoritative information needed to make decisions or take action—anywhere, anytime, and on any device
5. **Communicate faster, improve teamwork, and advance interoffice information sharing** by staying connected to critical business data and the important resources executives and coworkers require while presenting information to each other in a highly visual geographic context
6. **Lower costs and increase profitability** by reducing the significant effort needed for forestry staff to manually record field observations and transfer this information to enterprise databases and for the organization as a whole to prepare data, maps, and reports

7. **Support business growth and scale as needs change** by easily adapting to new users, regulatory demands, and business commitments while preserving the integrity of existing systems, without new IT infrastructure costs
8. **Implement transformational technology without disruption** using current workflows for employees by aligning prevalent business processes, existing mobile form-based data collection, and information sharing practices
9. **Centralize forest management data and information** to standardize data collection activities while maintaining the authoritative and consolidated view of all operations
10. **Visualize, track, and monitor operational activities** through a real-time dashboard capability that measures key performance indicators

ArcGIS: A Mapping Platform

ArcGIS is a complete system for forest and land management. It's highly scalable and fits into existing IT architectures, or it can be used as a stand-alone solution. It transforms data into actionable intelligence for every forestry department and organization. ArcGIS enhances all forest management workflows, including land administration, forest and natural resources inventory, forest planning, and forest and asset management. This enables any forest resource manager employing these proven methodologies to meet organizational requirements through better decisions at every level.

Esri software benefits every department within a forestry or land management organization, improving connections and fostering greater collaboration. And because ArcGIS is available as a web-hosted or cloud-based system with ready-to-use maps and applications, Esri GIS is available anywhere, anytime, to anyone, and on any device. When implemented, ArcGIS—a technology, a platform, a content provider, and a tool—supports all of a forestry organization's resource planning and operational requirements.

Easy to Configure

The Esri ArcGIS platform is simple to activate and begin using, facilitating multiple core capabilities. Organizational sites can be quickly configured and maps and apps deployed in hours instead of days.

Get Started Now

Build a more efficient and profitable company that is integrated, collaborative, authoritative, and data decision driven with an innovative response to the challenges of operating in a dynamic market. Let Esri help you with the entire solution—from technology implementation to adoption and scaling up. Every forest company can now benefit from premium technology without the big-company cost.

Implement Faster

If you would like Esri to get you up and running, we offer a number of service packages that are designed to help you quickly become self-sufficient in installing, implementing, and managing Esri software. Service packages also provide knowledge transfer and best practices for the use of Esri products.

Esri's Forestry Expertise

Forest and land management companies are confronted with many of the same challenges as industry peers. Being the largest GIS consultancy in the world, Esri works with local and international customers to address their most pressing business challenges. This makes Esri the most qualified organization in delivering GIS-based business solutions. Esri's forestry team has a combination of industry domain and information technology expertise and works directly with the leading commercial forest management companies including timber REITs and TIMOs.

Esri senior consultants and managers also have a deep understanding of forestry business designs and processes. For over 40 years, Esri has supported commercial forest companies and government forestry agencies with a wide range of professional services engagements. Esri software is a global standard, with technology that is currently being used to manage over one billion acres of forests around the world.

In addition, an increasing number of Esri partners with forest industry expertise are starting to leverage the ArcGIS platform to meet your toughest challenges. Collaboration with Esri and its trusted partners can bring specialized talent and innovative solutions to your team, together helping to take your business to the next level.

Drawing on its many years of experience in US-based and international projects, Esri supports its clients to advance GIS from being merely a cost center into a key value driver. By aligning GIS with the company's strategy to add value, Esri experts systematically transform GIS into a critical business system.

Contact Esri

Esri forestry experts are ready to answer questions and provide more details. Please go to forestry@esri.com to contact Esri with your questions, comments, or feedback.



Understanding our world.

Esri inspires and enables people to positively impact their future through a deeper, geographic understanding of the changing world around them.

Governments, industry leaders, academics, and nongovernmental organizations trust us to connect them with the analytic knowledge they need to make the critical decisions that shape the planet. For more than 40 years, Esri has cultivated collaborative relationships with partners who share our commitment to solving earth's most pressing challenges with geographic expertise and rational resolve. Today, we believe that geography is at the heart of a more resilient and sustainable future. Creating responsible products and solutions drives our passion for improving quality of life everywhere.



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