Forest Opportunity Roadmap/Maine

Vision for Maine's Forest Products Sector

Phase Two Summary 2020-2022

FOR/MAINE

This report was commissioned and co-authored by FOR/Maine and prepared by the Write Way, November 2022, and provides a summary of the Phase Two research and implementation of the Forest Opportunity Roadmap/Maine Coalition.

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Introduction

Maine's forest products industry is a critical part of the state's economy, comprising $8.5 billion in economic impact, and supporting 33,500 jobs. Technology, globalization and shifting consumer demands are bringing change and new opportunities to Maine's traditional forest products economy.

The Forest Opportunity Roadmap (FOR/Maine) is a unique cross-sector collaboration of industry, communities, government, education, and nonprofit organizations working together to ensure that Maine strategically adapts to and capitalizes on changing markets. The FOR/Maine collaborative was created with support from the U.S. Economic Development Administration, the Maine Timberlands Charitable Trust, and the Maine Technology Institute. Its charge is to assess Maine's current industry, assets, and readiness, and to determine a strategy to capitalize on new opportunities.

The Forest Opportunity Roadmap envisions Maine as a global leader in the forest products economy, with a thriving, innovative and diverse industry that provides good jobs in vibrant communities. With leadership and a plan, Maine's forest products sector has the potential to expand by 40 percent and grow to $12 billion in economic impact annually by 2025.

Maine already has the forest products infrastructure and workforce, as well as other key assets, to make the state a global leader in the industry. Work toward the goals of the Forest Opportunity Roadmap is fully underway. In Phase 1 of the project, 2016 to 2020, FOR/Maine conducted research on Maine's wood supply and emerging industry technologies, conducted a global market analysis and benchmarking study, analyzed Maine's wood energy markets, reviewed best practices in the transportation sector, and held forums to offer technical support to Maine communities experiencing mill closures. Reports from these efforts and a comprehensive summary document can be found *here.*

Five key themes guide FOR/Maine's efforts to grow and diversify Maine's forest products industry:

Theme 1: Maine's forest products industry is highly interconnected and interdependent. The success of each segment of the industry relies on the health of the whole industry.

Theme 2: A strong forest products industry supports vibrant Maine communities. Maine's forest products manufacturing has provided economic opportunity for generations of Maine families. Maine's working forests also provide social and environmental benefits. Maine's communities have existing infrastructure to support new products.

Theme 3: Wood is a sustainable, renewable resource. Maine's forests are managed for the health of the forest, wildlife, water quality and economic contributions to the surrounding communities. Wood can meet the growing consumer demand for greener products.

Theme 4: Wood is versatile. In addition to traditional outputs, such as sawn timber and packaging papers, cutting-edge technology allows Maine's wood resource to be used in a diverse array of eco-friendly products.

Theme 5: Embrace the global economy. Maine is ready to compete with other states and countries for the forest products investments of the future.

With these themes as guiding principles, FOR/Maine has established these goals:

Goal 1: Sustain and grow Maine's existing and emerging forest products economy, reaching $12 billion in economic impact by 2025. By leveraging existing industry assets, attracting capital investment, and accelerating innovation in new forest products that maximize the highest and best use of the wood resource, Maine can grow the forest products industry beyond traditional products and markets.

Goal 2: Manage the wood resource using sustainable and responsible forest management practices. Using accurate and current data on Maine's wood supply will allow growth in the industry while preserving Maine's forests for future generations.

Goal 3: Prepare the workforce for the future of the forest products economy. Maine needs a skilled workforce to attract new forest opportunities. Meeting the state's demographic challenges will require proactive and innovative efforts to recruit, train, and retain workers.

Goal 4: Increase prosperity in Maine forest economy communities, especially those in rural Maine, including those affected by mill closures. Industry leaders must engage with efforts to attract investment to rural communities, and strengthen local, regional, and statewide economic development efforts.

Goal 5: Organize the forest products industry with committed public sector partners, including the University of Maine, to implement the FOR/Maine vision for a thriving and diverse forest bioeconomy.

A unified and strategic approach involving all stakeholders will successfully implement these recommendations and keep all parties engaged in the long-term work required to reach these ambitious economic goals.

In 2021 and 2022, the collaborative moved into Phase 2 of the project, focusing on program design and implementation. Pertinent data was updated, including the wood supply data, and subcommittees reported on project implementation, lessons learned, and progress to date on strategies designed to achieve the collaborative's goals. To augment Maine's supply of sustainable wood, the collaborative has developed strategies to engage Maine's small, private woodland owners. The marketing committee developed a detailed business development and invesment attraction and began to cultivate leads for investment in new technologies in the state.

This report outlines the collaborative's work toward these goals completed through Fall 2022.

Workforce Strategy

Source: "The Forest Opportunity Roadmap for Maine Workforce Development Strategy," Center for Business and Economic Research, University of Southern Maine, April 2021.

Preparing the workforce for the future of the forest products economy (Goal 3) will require attracting young people to the industry; ensuring new, replacement and incumbent workers have the skills needed for existing jobs; and preparing the workforce for emerging products and technologies in the forest products industry. FOR/Maine's Workforce Committee is developing and implementing a comprehensive workforce strategy that supports long-term competitiveness and growth, including the articulation of career pathways and promoting opportunities in a resurging forest industry.

In 2020, the committee worked with USM's Center for Business and Economic Outreach to study the workforce challenges and opportunities facing the industry and the state of Maine. The results of this work are informing committee planning and advocacy to address the industry's workforce challenges. The USM analysis focused on current and future workforce demand, labor pools, and recruitment and training efforts. Sources included existing reports, public and proprietary labor market and economic data, and interviews with industry and workforce stakeholders.

The most pressing challenge to the industry is the state's aging demographic. Maine demographic projections anticipate a deficit of more than 60,000 workers in the labor force in the next 10 to 15 years. Especially in rural areas of the state where forest products industries are clustered, the numbers of in-state youth as potential workers is declining.

Maine's aging demographic is a constraint across all industries in Maine, including construction, manufacturing, and warehousing, and industries are competing for a shrinking pool of labor. Larger employers are investing in technology to augment human labor, but smaller firms are less able to do so. In addition to loss of labor, aging workers exit the workforce with decades of accumulated skills and knowledge, and companies are seeking ways to transfer that knowledge to newer workers.

To fill the labor gap, in-migration of labor will be required just to maintain current levels of employment. Potential new workers will come from displaced workers, immigrants, and workers with transferable skills in other industries. Other potential sources are youth in other Northeast states, exiting military service members, and workers from competitor regions in the U.S.

Maine's forest products sector provides direct jobs for more than 13,000 workers, which represents a decline of 47 percent since 2001, due mostly to mill closures. The current 13,000 forestry jobs are divided among wood product manufacturing (5,300), pulp and paper (4,500), and harvesting (3,600), with the rest in other end-use industries such as biomass energy. Related but not counted in this total are 1,037 transportation jobs.

Notwithstanding the recent market-driven contractions, over the next 15 years, Maine's forest products industry will need 5,000 new workers to keep up with growing demand and replace exiting workers. The availability of a workforce with the necessary skills and knowledge to meet the demands of existing and emerging businesses is a critical factor for industry growth. In addition to strategies for worker recruitment, which vary by sector and skill set, the industry must also develop strategies for worker retention.

By 2030 more than 26 percent of the current forest products industry workforce will reach retirement age. By 2035 that percentage will increase to 37 percent. Trends in workforce data show that not enough younger workers are entering the industry to replace those leaving. These numbers reflect statewide workforce trends. In the transportation sector, which directly impacts the forest products

industry, 37 percent of the current workers will reach retirement age within ten years. Already five percent of the current forest industry workforce is at or older than 65. In the logging and harvesting sectors, 9 percent of the workforce is 65 or older and 31 percent are between 55 and 64.

According to industry stakeholders the most urgent labor shortage is for commercial driver licensed (CDL) truck drivers and logging operators. Other specialized skill occupations, such as boiler operators, are also difficult to fill. Workers in the trades, especially electricians and pipefitters, are in demand not only in the forest products industry, but across industries in Maine.

Jobs requiring post-secondary education such as boiler operators, forestry professionals and other science-based skills will be a smaller but critical share of the future workforce demand. Emerging technology will play a significant role in expanding the industry, but it is still unclear which technologies will be commercialized, making it difficult to predict which skills and knowledge will be required to train the workforce.

Public perception of the industry is also a barrier to workforce development, and will require reframing the way the industry is discussed and perceived in schools and the public generally. Industry stakeholders report that efforts to attract workers to the forest industry are hampered by an emphasis in the education system on post-secondary attainment, and negative publicity about the industry from mill closures. Educating younger people about the opportunities for environmental stewardship in forestry careers could attract new workers, as would gender and racial diversity.

Sources of new workers for the industry include younger workers from states where the forest products industry does not have such a large footprint, such as Massachusetts, where more students attend career and technical programs. Other regions in the U.S. that have a concentrated forest products industry could also be sources of potential workers, especially those with similar skill sets, such as the Pacific Northwest, Northern Minnesota, Wisconsin, Michigan, and Southern Gulf states. With 200,000 U.S. service members each year transitioning back into civilian life, veterans could also be an important source of workers.

Recruitment of workers is a particular challenge in rural areas where the forest products industry is clustered. These areas lack affordable housing, access to health care, and cultural opportunities available elsewhere. Forest industry leaders must be part of regional and statewide efforts to capitalize on quality of place and provide basic amenities. The industry will also have to explore opportunities for remote work, and flexible work models.

These workforce demographic challenges are not unique to the industry and there are significant efforts across the state to address them. Leaders in the forest products industry should be more actively engaged in these efforts. There are extensive workforce development resources throughout the state, but these efforts are often fragmented and there is limited availability in more remote parts of the state. Workforce training and infrastructure needs to be more available and connected. A dedicated workforce connector for the forest products industry could coordinate industry needs with training program providers and students.

Several successful programs in Maine could be scaled up and with greater exposure could increase enrollment in training and apprenticeship programs. The Mechanized Logging Operations program through the Maine Community College System, and the Maine Apprenticeship Program are examples.

Internships are also an important avenue to attract and train new workers, but even with the long-term value, employers are concerned that training interns takes already scarce workers from their tasks in the short term. Using recent retirees to train interns would address this concern and provide the means to pass on the skills and knowledge of these experienced workers before they completely leave the workforce.

A skilled workforce is a prerequisite for growth in the forest products industry. With worker shortages challenging every industry in Maine, a cohesive narrative, clearly drawn career pathways, and collaborative approaches will be essential to grow the forest products industry in Maine. FOR/Maine's Workforce Committee will continue its work on a comprehensive workforce strategy for the forest products industry using the following recommendations as a guide.

Report recommendations:

1. **Design, prepare, and execute a coordinated public awareness, communication and branding campaign that showcases the career opportunities in the forest products sector in Maine.**
   a. Leverage FOR/Maine's branding effort to market career opportunities in the sector.
   b. Connect and align with other related statewide initiatives aimed at targeting and attracting workforce to the state.
   c. Focus on consistent engagement, advocacy, and leadership across broader efforts to address workforce and economic challenges in the state.
   d. Raise the awareness of the forest products industry careers to align with emerging career trends and job opportunities involving new technologies.

2. **Foster greater education, outreach, and awareness of opportunities in the forest products sector to Maine secondary school students and advisors.**
   a. Support teachers and career advisors to promote forestry and wood processing careers, prerequisites, and pathways.
   b. Provide resources, information, and materials to ensure the sector is represented among the career choices presented to students.
   c. Bolster teacher and student engagement through site visits and industry experts.
   d. Connect guidance counselors and educators with the industry through regional professional development centers, such as the Central Aroostook Council for Education and Western Maine Education Collaborative.
   e. Improve access to career pathway information for students.
   f. Expand flexible internships modelled on the Mechanized Logging Operations Program internship program with Northern Maine Community College.
   g. Appeal to the environmental stewardship aspects of the industry that align with youth curriculum.

3. **Cultivate out-of-state workforce pipelines and integrate with statewide attraction and recruitment efforts.**
   a. Engage in communication and recruitment activities to Career and Technical Education, vocational, and post-secondary institutions in other Northeast states.
   b. Partner with other Maine heritage industries, such as marine and agriculture, to market to and recruit out-of-state youth and displaced workers.
   c. Explore and test recruitment efforts in targeted locations in comparable geographic locations and industry clusters.
   d. Target racial and ethnic minority groups, women, and nontraditional workers in the industry.
   e. Develop partnerships with initiatives designed to place veterans and servicemembers, including Boots 2 Roots and Workshops for Warriors (www.wfw.org).
   f. Explore and consider adoption of military recruitment models.
   g. Explore and develop opportunities to source non-domestic labor.

4. **Leverage existing workforce infrastructure to increase coordination and engagement and expand existing internship, apprenticeship, and training programs.**
   a. Build network connectivity across partners and with firms through a dedicated industry point person.
   b. Increase access to programs and provide opportunities for time-intensive training and education opportunities (e.g., training boot camps).
   c. Explore opportunities to integrate internship training with industry mentors to help facilitate knowledge transfer and relieve job training burden for incumbent workers.
   d. Bolster and promote apprenticeship models where feasible.

5. **Recognize that "placemaking," or a community's quality of life, is important in workforce attraction and retention.**
   a. Advocate for community resources and actions that empower and enable communities and regions to build quality of place, including access to core amenities such as affordable housing, health care, and cultural attractions.
   b. Increase engagement with local and regional community and economic development initiatives.

6. **Maintain an information system that enables continuous monitoring and evaluation of workforce conditions and requirements across the industry to develop and adapt workforce development initiatives.**
   a. Monitor workforce requirements and trends, and evaluation of initiatives.
   b. Revisit workforce demands and forecast annually or biennially.

Implementing the Strategy

FOR/Maine's Workforce Development Committee prioritized strategic recommendations from the report for an implementation project. After discussion of resources, timelines, and trends in existing workforce development programming, the committee decided to focus implementation efforts on Recommendation 2a, b, c, d & g. Through a competitive RFP process, Rural Aspirations was selected as an implementation partner for deepening forest economy educational connections with participation from industry, communities and educators. The project developed by Rural Aspirations included working in 4-6 school districts to raise awareness of opportunities for deepening forest economy connections, and supporting educators in their adoption of curriculum materials that engage learners on forest-based themes and educate them about opportunities in Maine's forest economy. The work completed and ongoing includes: Deepening

Educational Connections

A stakeholder meeting in Oxford/Franklin County drew 29 participants including 8 educators from 5 schools, 3 representatives from community/economic development organizations, 10 industry representative, and 1 representative from community college system. The meeting focused on two central questions: Is there a link between natural resource based educational opportunities within rural schools/communities and the success of a diverse forest economy? And how could a collaboration between natural resource community leaders, postsecondary institutions, teachers and students contribute to a successful natural resource-based economy in Maine? Rural Aspirations will continue to make connections with schools and industry for the 2022-2023 school year and will track engagements throughout the year. As a result of the Oxford/Franklin meeting Rural Aspirations has begun conversations with an additional rural high school

to build out their Advisory program which supports students in raising aspirations and connecting to careers. They have also started conversations with two additional high schools to begin building out connectivity opportunities.

Rural Aspirations is also working through the Department of Education and Department of Labor to identify *Extended Learning Opportunities* that might be available for forest sector careers, and is working in Aroostook County to plan a stakeholder meeting for late fall.

Supporting Educators

Rural Aspirations worked with the Katahdin Middle School educators to develop connections to the forest economy within the existing science curriculum. They are also supporting Katahdin High School's development of an Outdoor Leadership pathway - focused on soft skill development - problem-solving, collaboration, communication, leadership, etc. According to the FOR/Maine Workforce Study, these skills were some of the highest in demand for forest economy careers.

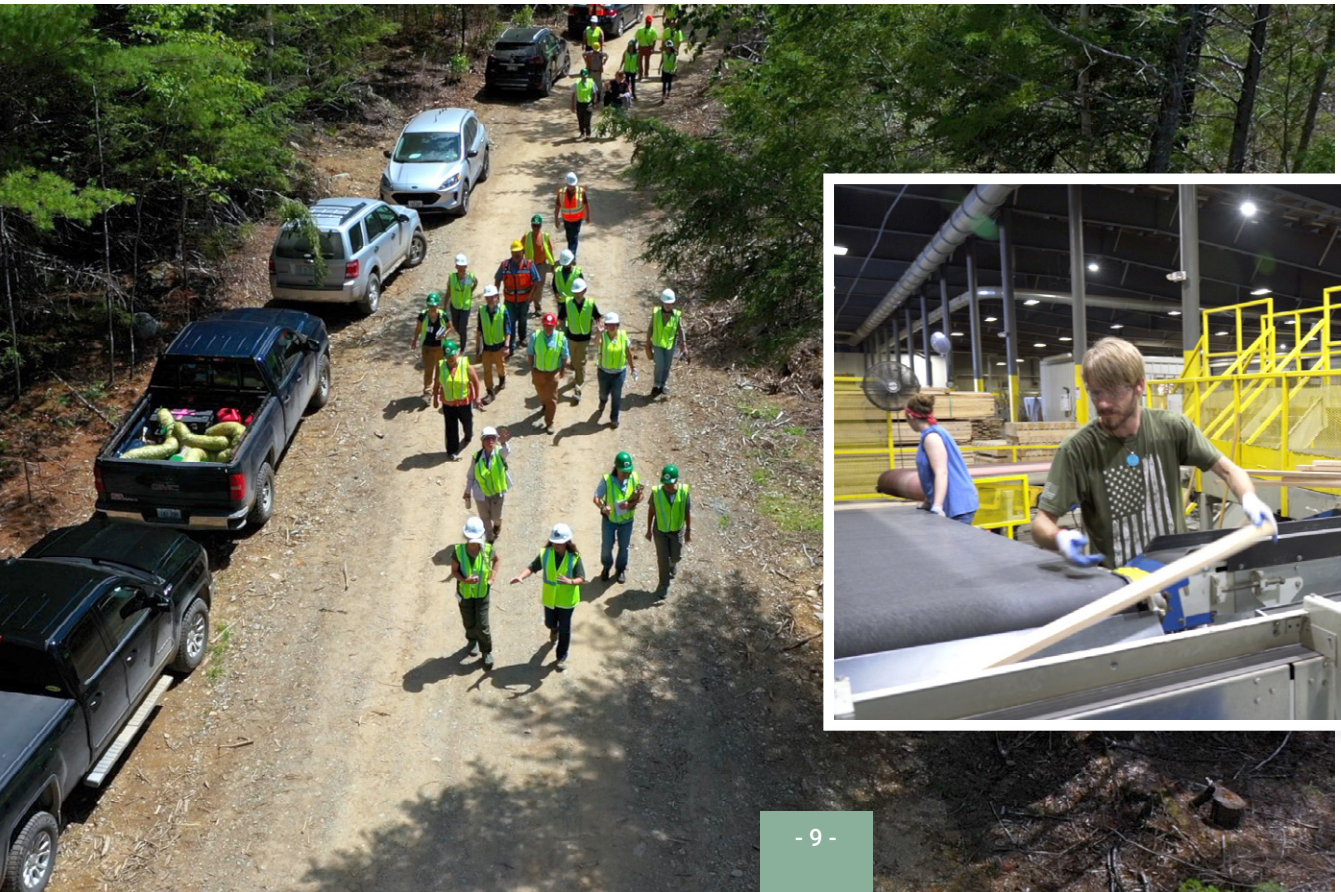
Through FOR/Maine's support of the Maine Forest Collaborative, Rural Aspirations worked with 6 high schools and 86 students (64 HS, 22 MS) to develop 40 connections with Natural Resource Practitioners/ Community Leaders. All students received Digital Design Thinking Badges from Thomas College and engaged these skills to answer the question, "How can we use natural resources to positively impact local communities?" Student presentations can be viewed *here.*

Industry Connection

In addition to hosting convenings and working with educations and students, Rural Aspirations met with ND Paper and is working with their HR team to chart career pathways - identifying entry-level, trades/certification tracks, and 2-4-6 yr college tracks across the entire mill. Rural Aspirations hopes to share these pathways with schools at a follow-up meeting in January with the goal of establishing career exploration experiences for specific cohorts of students interested in different tracks, rather than just having a generic tour of the mill.

Complementary Communications

A communications campaign accompanied the workforce development project, and focused on spreading a message of opportunity in the industry. Digital and print media, as well as television ads were employed to illustrate the variety of opportunities available in the industry, and to shift public perception about what a career in Maine's forest economy can entail. Video content developed during the project *can be viewed here.*



Section 2

Community Engagement

The resilience, capacity and livability of Maine's forest economy communities is critical to the success of FOR/Maine's industry led strategy. A complementary EDA project (Grant # 01-79-149061 113716) supports FOR/Maine's economic development work at the community level and is led by the Maine Development Foundation. This work focuses on local leadership development, downtown revitalization, and understanding and addressing constraints to workforce development in rural areas.

Strategic Investment Attraction

Sources: "FOR/Maine Deliverables 5 and 6: Phases 3-4 Report and Final Report," February 25, 2022; and "Strategic Investment and Attraction Plan for Maine's Forest Industry, Deliverable 1: Report on Lessons Learned from Successful Investment Attraction in Wood Products Industries," September 2, 2020, Indufor North America, LLC.

Sustaining and growing Maine's existing and emerging forest products economy to reach $12 billion in economic impact by 2025, FOR/Maine's Goal 1, will require a forest products industry attraction program to increase capital investment in the state in markets that are a good fit for Maine. Achieving this goal will also require new capital investment in the forest products industry, including encouraging markets for industry by-products to manage the wood resource sustainably.

The FOR/Maine collaborative is using a data-driven approach to attract new capital and diversify the range of the state's wood products and byproducts in the new and emerging forest-based bioeconomy. In 2018 FOR/Maine contracted with Indufor to provide a global market analysis of these new and emerging wood products to see which would be the best fit for Maine's wood supply and infrastructure, and to provide benchmarking studies to inform the collaborative's strategic investment planning and early efforts.

In 2020 the collaborative's Market Attraction Committee again worked with Indufor to develop and begin to implement an investment attraction strategy. Phase I, stocktaking, assessed successes and lessons learned from targeted states and regions, with products that emerged as promising for Maine. Maine's investment attraction and business development process was also examined. In Phase 2, marketing preparation, targeted strategies and marketing materials were developed. In Phases 3 and 4, investment attraction strategies and materials targeted for company leads in seven markets were developed and initial contacts were made.

In Phase 1, "Stocktaking," Indufor prepared a database of relevant incentive programs and major companies from seven forest product markets. The analysis reviewed successful investment attraction efforts in other regions of the U.S., and in Canada, Australia, Finland, and the Netherlands, for eight forest products in the forest-based bioeconomy that were identified in FOR/Maine's planning phase as products with potential for growth and investment in Maine. These products included:

- Cross-laminated timber (CLT)
- Laminated veneer lumber (LVL)
- Particle board
- Medium density fiberboard (MDF)
- *Nanocellulose*
- Dissolving pulp
- Cellulosic sugars (for fuels, chemicals and plastics)
- Pyrolysis oil

Interviews with companies, industry experts, and government officials in key regions resulted in broad insights to guide Maine's investment attraction strategies. The analysis included incentive schemes that encouraged investment and the enabling environments that supported those investments. Job creation, increasing capital investments, and fit for Maine's existing industry infrastructure were the top criteria when selecting which of 100 investment and incentive programs to analyze. Indufor then prepared 14 investment case studies and three jurisdictional case studies in Finland, Oregon, and Quebec, for the identified products.

The study analyzed investment drivers and lessons learned from various incentives across the identified key products and locations. Investment attraction incentives include one or a combination of the following: government grants, loans, loan guarantees, bonds, technical assistance, tax

credits, tax exemptions, government co-financing in infrastructure improvement, and discounted land acquisition or land lease payments. The resulting case studies revealed a variety of approaches and the importance of the enabling environment for success.

The key investment drivers for a company's choice of locations that emerged from the study included resource availability and research and development (R&D) partnerships, followed by financing and infrastructure. Market access was an important consideration for heavy products with high transportation costs. The most successful incentives reflected the specific characteristics of each type of product. For example, for pyrolysis oil, grants and loans for R&D facilities construction were important to location of new investments, and with the cost of fuel transportation, available local markets, and marketing efforts to inform consumers were factors in a company's choice of location.

Enabling factors with bearing on the forest products sector would include economic and social risks, infrastructure, regulatory environment, governance and law enforcement, contract enforceability, corruption, property rights security and access to capital and financial services. Workforce training and export market research show positive impacts for attracting small to medium sized companies that lack the capacity to invest in those activities.

Of these enabling factors, investments in workforce training and infrastructure that remains in place even if a company leaves, were shown to be the best uses of scarce public funds. Promoting research and development through funding R&D facilities is a critical factor in promoting growth in the bioeconomy, as is political and industry leadership.

The Indufor analysis identified challenges and key factors for success in the targeted regions, products, and companies. Case studies drew lessons learned that can inform Maine's efforts to transform its forest products industry, including five broad implications:

1. Political and industry leadership is pivotal to embracing opportunities and addressing the challenges of a forest-based economy.
2. A healthy and strong timber and pulp production capability is a prerequisite for the new and emerging value-added products.
3. Maine must leverage its key assets, including resource availability, R&D, and its skilled workforce to attract investors that fit rather than trying to compete with other regions in pursuit of an investments-at-all costs strategy.
4. The state must identify the best ways to support the forest-based economy, leveraging key assets such as the University of Maine's innovations, and focus on small and growing companies.
5. Do not crowd out private capital where there is sufficient market demand to drive capital investments. Focus instead on support services, infrastructure, and workforce training.

Lesson	Status	Recommendation
Location and Market Access	Maine is well located to supply the East Coast and Central US.	Ensure clear messaging on benefits of a Maine location (market and logistics facilities).
Resource Availability	Although Maine is well known as being a "Forest State", the fact that significant volumes of wood are available needs to be clearly communicated as an opportunity.	Ensure clear messaging of the availability of fiber in Maine, providing detail on the future availability of logs by grade, species, and location.
Resource Costs	Fiber in Maine remains expensive compared to other States or competing markets.	Identify efficiency gains throughout Maine's supply chain—inclusive of land management, wood brokers, procurement, harvesting, extraction and transport, etc. Communicate advances on other cost elements (power, logistics), as well as current quality of logging and trucking networks.
State-wide "Alignment"	There is some industry integration but weak compared to international competitors. The State and the industry are beginning to work on bioeconomy as a pillar for growth (e.g., Maine Economic Development Strategy 2020-2029)	Develop a fully integrated and aligned strategy to move towards the Bioeconomy. Identify workforce development initiatives and educate public on potential new career paths.
Flexibility Incentives Provided	It appears Maine is developing along this line, but in the past did not appear to be flexible on this. Groups like Maine and Co. or MITC can provide valuable services to new investors.	Provide flexibility in terms of the range of incentives provided to enable development of business hubs, industry clusters, and services.
Foster Home-Grown Scaling Up	Finland and Canada show examples of fostering local companies and ecosystem. University of Maine and existing ecosystem provide good basis to build on.	Provide continued support for R&D, industry ecosystem and companies that invest profit in state.

Key Lessons and Recommendations for Maine. Page 14, Indufor Stocktaking Report.

In Phase 2 of the project, Marketing Preparation, Indufor produced a set of "pitch decks," (marketing materials to attract investment capital), a bioeconomy investment guide, an interactive database of the state, and targeted marketing strategies for Maine.

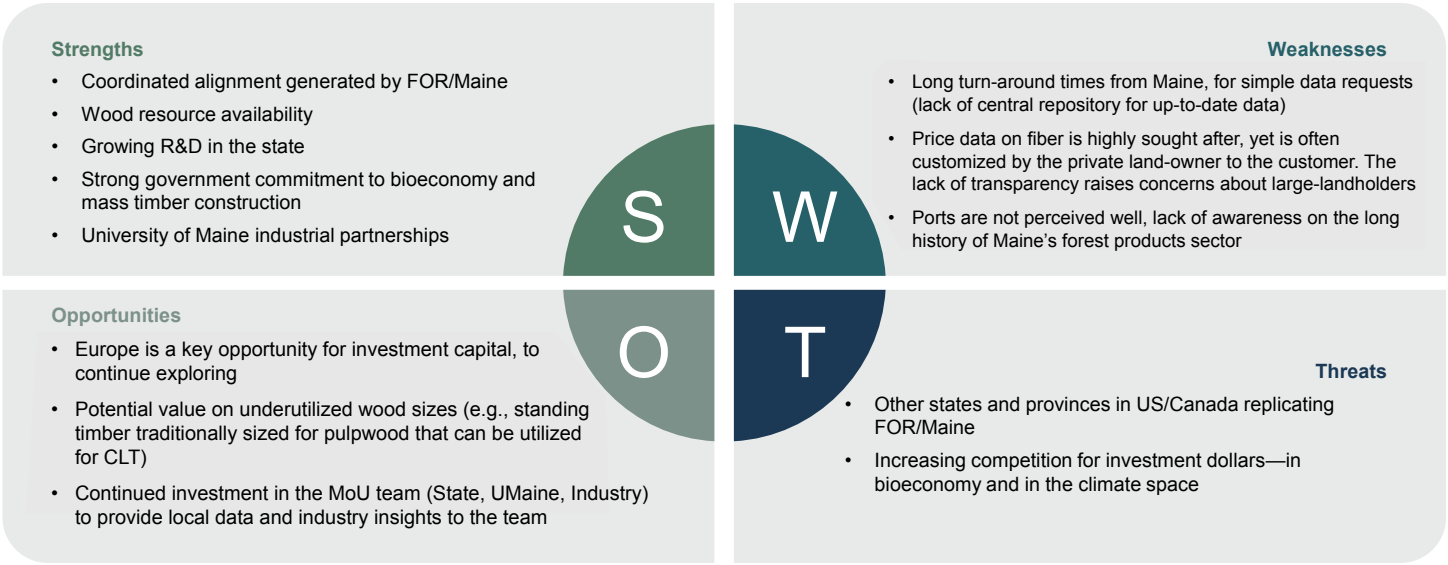
- The pitch decks and guide to investing in Maine's forest bioeconomy provide sector-specific and industry wide investment attraction material—including Maine's forest bioeconomy potential and details on Maine's existing network of forest products companies, resource availability/sustainability, market access, brownfield investment opportunities, and incentives.
- The publicly available interactive database (https://formaine.netlify.app/) rebuilt FOR/Maine's green/brownfield investment opportunity database and provided spatial data on the forest resource in the state by megaregion, infrastructure, incentive zones, and existing wood processing facilities. The database also contains state-level highlights of exports, energy costs, investment incentives, and demographic and workforce statistics.
- Use of the marketing materials during the subsequent investment attraction phase provided confirmation that the bioeconomy narrative is growing in the industry; the need for continuously updated, and product specific marketing materials; and that the database is a strong resource to explain the forestry and market dynamics in the state—including cross-border issues.
- While there is competition globally, Maine has laid the groundwork to capitalize on future opportunities through FOR/Maine, the Finland partnership[1], and continued commitment to the broader bioeconomy (e.g., SEAMaine, Maine Climate Action Plan).

[1] Information on the Finland partnership can be found at *https://www.maine.gov/governor/mills/news/governor-mills-finland-prime-minister-sign-agreement-facilitate-maine-finland-forest-sector*

In Phases 3 and 4, Investment Attraction, companies in seven markets were targeted, and personalized outreach strategies were developed, in partnership with a group of investment attraction partners from industry, the University of Maine, the Maine Department of Economic and Community Development, and Maine & Co. From a long-list database of 382 companies that fit the FOR/Maine committee criteria, Indufor conducted personalized outreach to 112 companies for potential investment in Maine, including 37 in Asia, 51 in Europe and 23 in the Americas. Regular outreach and response to data requests for several promising leads is ongoing.

One key weakness identified is a long turnaround time for simple data requests. Looking forward, up-to-date estimates for the following data items will be important to ongoing marketing efforts: existing operations in Maine; wood supplies and pricing; available opportunities and incentives; electricity costs; weight limits on roads; and related information.

Lessons learned and recommendations



SWOT Assessment of Investment Attraction in Maine. Page 14 , Indufor Final Report.

	Lessons Learned	Recommendations
Process	• There is high degree of uncertainty with all lead development efforts. It will be vital to keep the drumbeat of lead generation and cultivation beyond the timeline of Phase 4. Formalizing this process will improve likelihood that leads established now will be converted in the years to come. • Industry representation, along with subject matter experts (e.g., University of Maine representatives) improves trust and level of engagement with leads. • The time invested establishing the MoU team (State, UMAINE, Industry) and working relationships is valuable and a good start to more concerted investment attraction efforts. • FOR/Maine committee members have played an important role in supporting engagement with potential leads through discrete conversations on their expertise, continuing to keep members apprised of movements will be important moving forward.	• Maintain the MoU committee structure. • Maintain the regular drumbeat of coordination and outreach efforts. • Incorporate more local industry expertise, which is challenging given the range of products and data that companies are interested in. Consider a roster approach. • Follow-up with leads contacted in 2020-2021 with Covid recovery news. • Generate more publicity on Maine's bioeconomy opportunities for international audiences.
Data	• FOR/Maine does not currently have in-house capacity to respond to detailed data requests on a level expected from incoming firms. • Data collection and outputs from Phase 1 were relevant but required updates—this will continue for most indicators. Requests from active leads are detailed and geography/sector specific, with considerations for language, units, and expectations. • The online site database Indufor created for For/Maine has proven useful for explaining Maine's forest industry to potential leads.	• Incorporate data partnerships within the MoU committee—for example from staff/students at the University of Maine. • Continue updating and maintaining the site database.
Feedback	• Persistent questions regarding wood prices and residual off-takes have arisen. • Attraction efforts focused on Medium Density Fiberboard (MDF) manufacturers have not yet yielded interest. Additional efforts to build the investment case by providing more precise answers to the availability of residuals may improve outcomes. • While the Finland-Maine partnership is strong, Finland is shopping around to other states and provinces in North America, there are likely benefits from expanding ties to other European countries.	• Develop a clear and updated narrative on how wood is owned, managed and sold/priced in Maine and recommendations for companies to conduct their own wood price analysis.

Investment Attraction Lessons Learned to Date. Page 15, Indufor Final Report.

Integration in Maine's Business Development and Invesment Attraction

As work with Indufor came to a close, a MOU was established between Maine & Co, Maine Forest Products Council, the University of Maine, and the Maine Department of Economic and Community Development to continue coordinated business development activities. Maine & Co, as recipient of the contract for Strategic Investment Attraction services, assumed lead generation and stewardship responsibilities from Indufor. Maine & Co staff have shifted significant focus to forest economy leads, as interest in opportunities in the sector grow. Since April 2022, Maine & Co has worked with twenty companies, and progressed five promising business development projects with which they continue to work. Companies with the greatest interest in Maine are those producing advanced construction materials, with mass timber being of particular interest. Two companies have visited Maine since April and met with landowners and other industry representatives.

In addition to providing services for businesses seeking to locate or launch in Maine, Maine & Co has also worked to liaise with existing industry to promote the forest bioeconomy concept, raise awareness of the services they offer, and understand existing assets and needs of industry leaders. Maine & Co representatives have met with the Maine Forest Products Council board and are routinely in contact with industry leaders about potential opportunities and their fit in the state. Members of the MOU group have also attended conferences and trade shows to continue efforts to attract investment to the state and network with potential leads. Conferences attended include the International Mass Timber Conference in Portland, Oregon, Advancing Mass Timber Construction in Boston, MA, and the Maine Forest Products Council Annual Meeting.

Incorporating Emerging Technologies

FOR/Maine's Emerging Technologies Committee, led by the University of Maine, provided support to investment attraction activities by assess new technologies and identifying opportunities for outreach to companies with biobased products that could complement Maine's industry landscape. Representatives from the FOR/Maine coalition travelled to the WorldBioMarkets conference in June of 2022 to represent the state's advancements in forest-based biomaterials and demonstrate interest in developing our forest products sector in partnership with global bioproducts companies. This event resulted in follow up between the emerging technologies chair and major European biotech firms. Throughout the duration of the FOR/Maine Project, the University of Maine has continued to progress with innovation and commercialization of biobased products. Their accomplishments in additive manufacturing, building materials, nanocellulose, biofuels, and other wood fiber-based products, bring prestige and promise to the state's bioeconomy future.

Section 4

Wood Supply

Source: "Maine Wood Volume and Projection Study, 2021 Update," Ernest Bowling and Gary Mullaney, Sewall Forestry & Natural Resource Consulting, September 20, 2021.

Maine is 89 percent forest, comprising 17 million acres of timberland, 90 percent of which is privately owned. About half of this timberland is certified to independent sustainability standards. Managing Maine's wood resource using sustainable and responsible forest management practices (Goal 2) requires accurate and current data about Maine's forest inventory and wood supply.

In 2018, Sewall Forestry & Natural Resource Consulting provided an analysis of the current demand for forest products and the potential future wood supply for Maine to determine the potential for the sustainable expansion of the wood supply over the next fifty years. Sewall's "Maine Wood Supply and Projections Study," (May 17, 2018) provided data on the current inventory of Maine's six major commercial species and projections for the capacity of each for sustainable expansion. This wood supply data established the basis for the collaborative's long-term goal to grow Maine's forest economy by 40 percent, or by $12 billion in economic impact by 2025. In order to be sustainable, wood inventories at the end of the 50-year projections could not be lower than at the start.

The analysis of the 2018 wood supply data indicated that the largest surplus of sustainable fiber for harvest was in the spruce/fir species, with a projected sustainable increased harvest of 5.8 million tons per year over the first 25 years of the 50-year study, and 7.5 million tons per year in years 26-50. Ownership of these timberlands is concentrated in large commercial operations and spruce/fir account for nearly one quarter of all commercial timber in the state. A major factor for the potential for harvest increases was the rebound of the species after the spruce budworm infestations of the 1970s and 1980s.

For pine, the 2018 data showed a potential for harvests of 50 percent above 2017 harvest levels, with small, private landowners holding most of the timberlands. For other softwoods, 54 precent owned by small, private landowners, the data showed a potential increase of 84 percent above 2017 harvests. Mixed dense hardwood showed a potential increase in the harvest of 39 percent, again heavily influenced by land ownership. Data for cedar and aspen showed no significant potential for increased sustainable harvest, with aspen inventory declining and cedar sustainable at current levels.

With 90 percent of Maine's forest privately owned, and 54 percent of this under industry ownership, market changes in this sector have a significant impact over resource projections and industry needs. Pine and mixed dense hardwood, species that showed significant potential for increased harvest in the 2018 study, are owned by small private landowners, so changes in forest management practices by these owners will influence available fiber. Encouraging small woodlot owners to harvest sustainably will increase the wood supply. In addition to these factors, forest inventory forecasts for spruce/fir inventories will be impacted by future spruce budworm infestations.

Considering these two major factors, in 2020, the collaborative asked Sewall to study the *demand* for wood data based on the most current Wood Processor Report (WPR) data and current market conditions, and to make *wood supply projections* based on this updated demand data, as well as light and heavy spruce budworm infestations, and to further refine harvest projections based on forest management practices of small woodland owners. The 2018 study was based on 2017 data. Particularly in the case of hardwood and spruce/fir, the data showed that wood consumption rates were well below the U.S. Forest Service's Forest Inventory

Analysis wood consumption data for the previous decade due to contraction of the pulp industry in Maine. The 2021 Report is a refinement of the 2018 report and the methods and underlying assumptions did not change.

1. Updated Demand Estimates

Since the projected wood consumption estimates were released in July of 2019, additional changes within the industry, including an industrial accident at the Pixelle mill in Jay in April of 2020, increases in capacity of spruce/fir sawmills in Jackman and Dover-Foxcroft, and the startup of a new spruce/fir mill in Enfield, netted a decrease in demand for pine and hemlock pulpwood by 990,000 tons per year, a decrease in demand of hardwood pulpwood by 450,000 tons per year, and an increase in demand for spruce/fir by 715,000 tons per year. This demand data will be used to calculate fiber surplus. Table 1.3 shows the changes in estimated demand for each of these species for August 2020 in thousands of tons.

Species Group	Sewall Estimate 2019	Change	Sewall Estimate 2020
Aspen	900	-	900
Cedar	200	-	200
Hardwood	5,250	(450)	4,800
Other Softwood	1,155	(396)	759
Pine	1,695	(594)	1,101
Spruce-fir	3,500	715	4,215
Total	12,700	(725)	11,975

Table 1.3 Proposed New Estimates as of August 2020

The harvest level for pine and other softwood for 2016-18 aligns well with Sewall's original estimates for 2020 and beyond. For Spruce/fir, the 2016-18 period was prior to the resumption of pulp production at Old Town and prior to the expansion of two Pleasant River sawmills, and the startup of Enfield. As a result, total mill capacity and anticipated harvest levels by 2021 are sharply higher than the previous study.

As expected, Wood Processor Report data showed a decline in use of hardwood, and since it is unlikely the Jay mill will produce pulp again, there will be further declines in hardwood processing. Sewall's 2020 estimates are based on zero consumption at the Jay mill. These demand estimates were being updated as this 2021 report was released.

2. Updated Wood Supply Projections

The wood supply model used in the 2018 report was based on U.S. Forest Service Forest Inventory Analysis data from 2012 to 2016. Since almost five years have passed from the original study to this update, harvest levels for the first 5-year period (2016 to 2021) were fixed at the actual levels used in the first period for the 2018 study (harvest levels were fixed at what is assumed to be the actual consumption during that period). The model was then allowed to optimize harvest levels starting in period 2 of the projection. These wood supply studies make projections in 10 five-year periods covering a fifty-year timespan and consider projections for harvest and for inventory across types of land ownership and regions of the state.

Since differing land management goals and priorities impact harvest levels, land ownership is a major consideration in determining the commercial availability of timber. Estimated yields by wood species were thus modeled by type of land ownership: Large, private land ownership; small, private landownership; federal lands; and other public lands (including state, county, and municipal/local government lands). Figure 2.1 below shows the harvest based on landowner type. The greatest volume of spruce/fir harvest is predicted to come from the Northern and Eastern regions of the state.

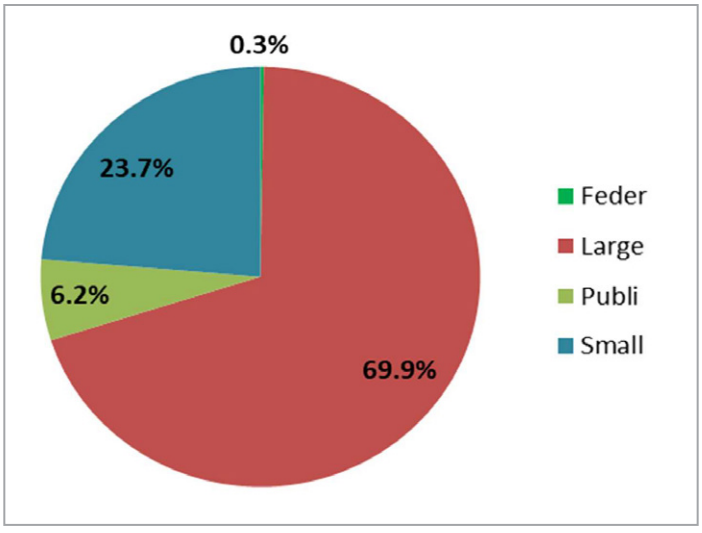


Figure 2.1. Base Run, Distribution of Average 50-years Modeled Harvest of Spruce/Fir Across Landowner Types

For the effect of improved forest management practices by small, private landowners, new yield projections using the U.S. Forest Service's Forest Vegetation Simulator[2] were made based on input from Tom Doak, Executive Director of Maine Woodland Owners. Doak suggested modeling "Heavy" and "Light" forest management regimes. The "Heavy" forest management regimes would assume 50 percent removal every 35 years. The "Light" forest management practices assumed 15 percent removal every 20 years.

Tom Doak also provided input on the ratio of Heavy vs. Light activity on the landscape. Using these definitions, the Sewall projections assume that the "Heavy" regime would apply to 80 percent of the small owner category and the "Light" regime would apply to the remaining 20 percent. Inventory levels by landowner type appear in Figure 2.4. Spruce/fir inventory is projected to increase to approximately 160 million tons at the start of the projections to approximately 230 million tons by periods 6 and 7. Spruce/fir inventory from large landowners will remain relatively constant at 100 million tons, but harvest from small landowners will increase over time.

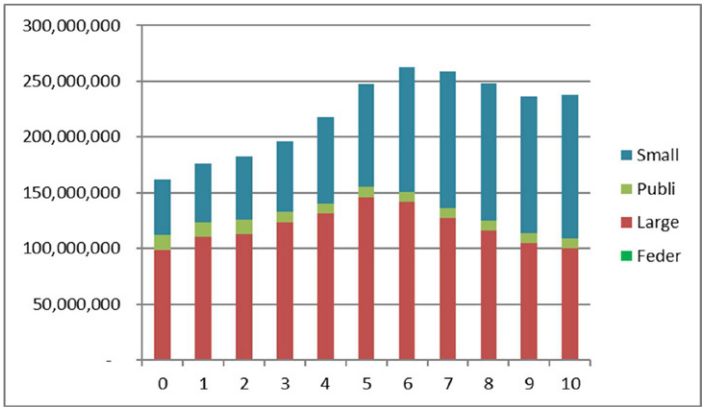


Figure 2.4. Base Run, 50-year Projected Spruce/Fir Inventory by Landowner Type

The base runs in the modeling are the basic model runs before adjustments and discounts to reflect current landowner behavior are applied. These adjustments were made post-run, so the projected inventories are therefore conservative. A factor of zero percent means that none of the modeled harvest for that landowner class was included in the chart. One hundred percent means that all the modeled harvest is included in the chart.

	S/F, Pine, OS, Cedar, Aspen	Hardwood
Large landowner	100%	100%
Small landowner southern Maine	100%	70%
Small landowner not southern	100%	80%
State lands	70%	70%
Federal lands	0%	0%

Table 1.3 Proposed New Estimates as of August 2020'

Spruce/fir Projections

Potential spruce/-fir harvests over the fifty-year period assume that 70 percent will come from large landowners, 24 percent from small landowners, 6 percent from public lands and less than one percent will come from federal lands, from mostly the Northern and Eastern regions of the state where large landownership predominates. Figure 2.6 shows the projected harvest of spruce-fir by landowner type, with discounts as shown in the table above to reflect landowner behavior. Most of the potential spruce/fir harvest comes from large and small landowners.

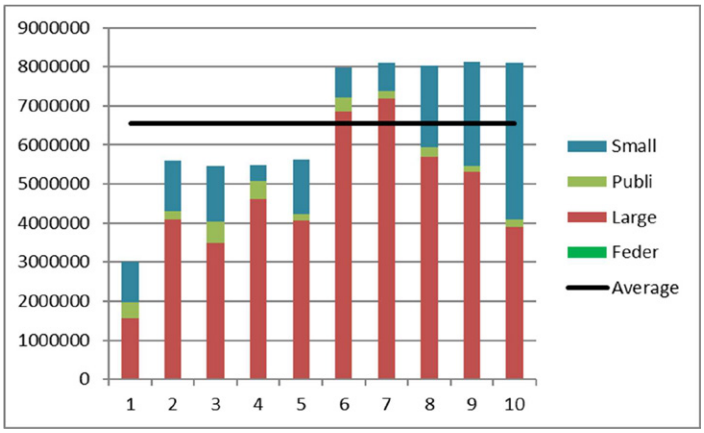


Figure 2.6. Base Run, 50-year Harvest of Spruce-fir by Landowner Type, With Discounts

With discounts applied harvest levels are approximately 5.5 million tons in periods 2 to 5, rising to approximately 8 million tons by period 7.

Mixed Dense Hardwood Projections

In the current projections, 53 percent of the mixed hardwood harvest is from large landowners, 39 percent is from small landowners, 7 percent from other public lands, and less than 1 percent is from federal lands. Projections show that harvest levels will rise

[2] The Forest Vegetation Simulator creates landscape level yield curves by projecting growth of actual tree lists. It was used for all the yield curves in the FOR/Maine wood supply runs.

to approximately 8.5 million tons in the second ten-year period and remain constant for the remaining periods. Projected inventory levels of mixed dense hardwood are projected to rise from approximately 270 million tons to nearly 350 million tons by the end of period 10. Average modeled harvest from period 2 through 10 is approximately 7.2 million tons, as seen in Figure 2.10 below.

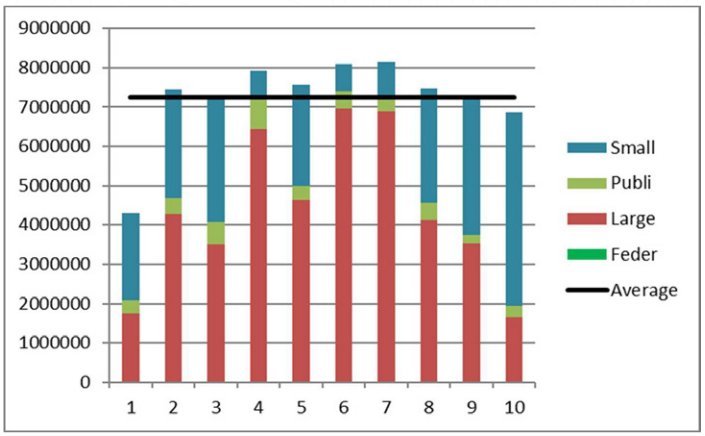


Figure 2.10. Base Run, 50-Year Modeled Harvest of Mixed Dense Hardwood by Landowner Type with Discounts

Pine Projections

Base run projections assume that the largest potential pine harvest, 59 percent, will come from small landowners, with 33 percent from large landowners, 7 percent from other public lands, and less than 1 percent from federal lands. Pine harvest is concentrated in the Southern region of the state.

Figure 2.15 shows pine harvest by landowner type. Average modeled harvest for periods 2 through 10 is 1.76 million tons. In all but three of the ten-year periods modeled, most of the pine harvest is from small private landowners.

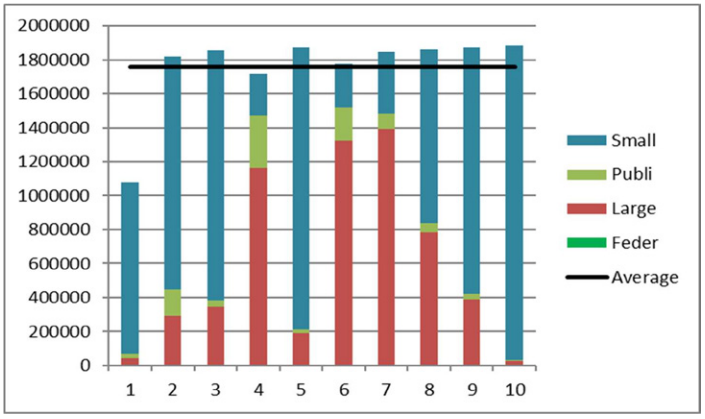


Figure 2.15. Base Run, 50-year Modeled Harvest of Pine by Landowner type, with Discounts

Other Softwood Projections

Other softwood includes mostly hemlock used for pulpwood. As with pine, the largest potential other softwood harvest in the base run comes from small landowners, at 49 percent, with 45 percent from large landowners, 4 percent from other public lands, and 2 percent from federal lands. In Figure 2.19 below, the fifty-year harvest of other softwood after discounts are applied shows that especially in periods 2, 3, 9 and 10, most of the harvest of other softwoods will come from small landowners.

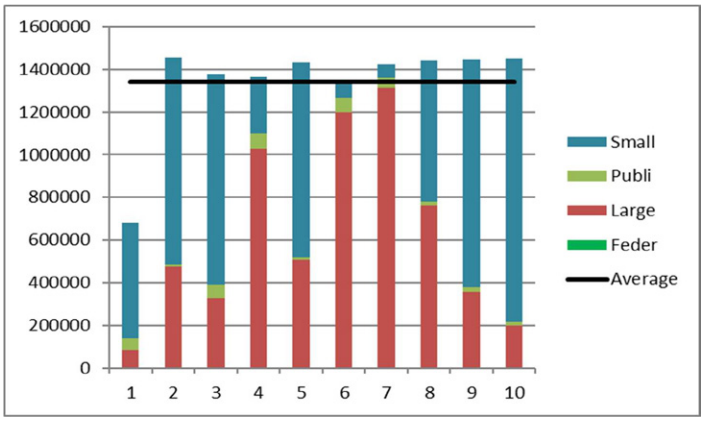


Figure 2.19. Base Run, 50-year Modeled Harvest of Other Softwood by Landowner Type, with Discounts

Aspen Projections

For the base run, 54 percent of the potential aspen harvest is from small landowners, 40 percent is from large landowners, 5 percent from other public lands, and less than 1 percent is from federally owned lands. Harvest for periods 2 through 10 averages approximately 916,000 tons. Aspen harvest by landowner type appears in figure 2.22.

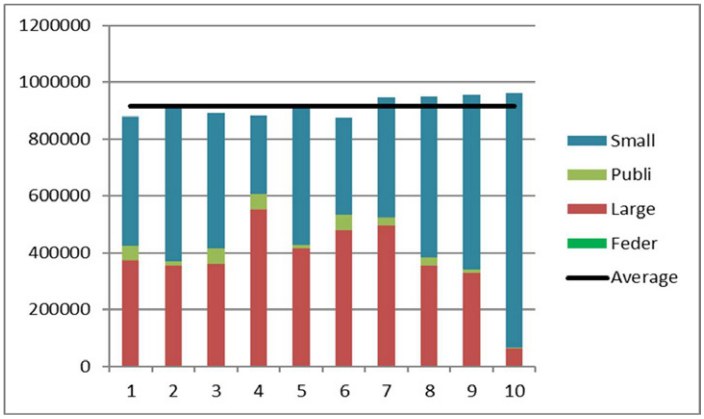


Figure 2.22. Base Run, 50-year Modeled Harvest of Aspen by Landowner Type, with Discounts

Cedar Projections

For the base run, 50 percent of the potential cedar harvest comes from large landowners, with 34 percent from small landowners, 16 percent from other public lands, and none from federal lands. Most of the cedar harvest comes from the Northern and Eastern regions of the state. As shown in Figure 2.25 below, projected harvest for periods 2 to 10 average approximately 269,000 tons.

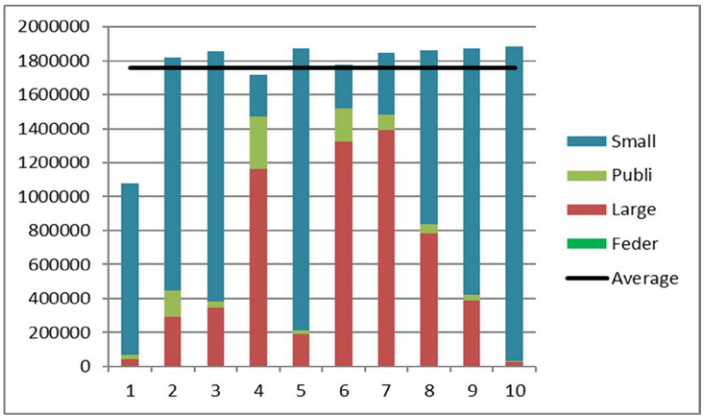


Figure 2.25. Base Run, 50-year Modeled Harvest of Cedar by Landowner Type with Discounts

3. Spruce Budworm Projections

To project the effect of spruce budworm infestations on future wood supplies, Sewall worked with Dr. Jereme Frank of the Maine Forest Service. Sewall made wood yield forecasts assuming a heavy budworm outbreak beginning with the 2025-2029 projection period that would end by the close of the 2030-2034 period. For the heavy outbreak, the budworm curves generated for this report were scaled to agree with the data from Dr. Frank. The curves were adjusted by 28.5 percent for the 2025-2029 period and 47 percent for the 2030-2034 period. Yield projections after 2034 were assumed to track parallel to the yield curves without budworm. For the light budworm outbreak, Sewall assumed budworm loss at 25 percent of the loss assumed for the heavy outbreak. Spruce/fir harvest levels for spruce budworm outbreaks are modeled in Figure 3.1.

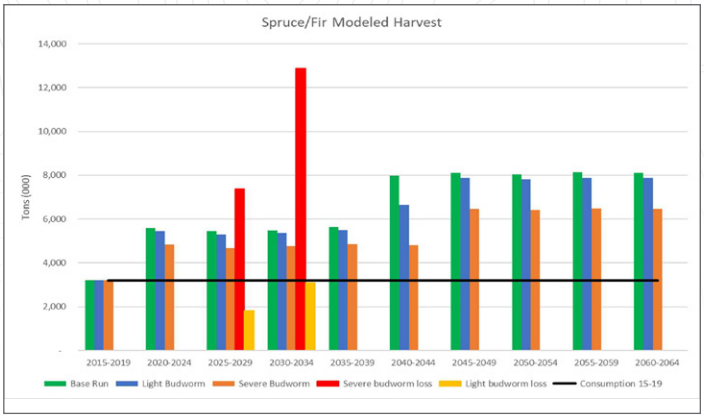


Figure 3.1. Summary of Spruce/fir Harvest Levels for Spruce Budworm Scenarios

The base run, in the green column, produces the highest projected harvest level, followed by the light budworm in blue and the severe budworm infestation in orange. The red columns in periods 2025-2029 and 2030-2034 show the severe spruce budworm losses, some of which will be harvested as salvage. The greatest difference is the 2040-2044 period where the light budworm harvest is 16 percent below the base and the heavy budworm is 40 percent below the base run scenario. In the later periods the light budworm harvests approach the base run, with the heavy budworm scenario 20 percent lower than the base run for 2045-2064.

Summary

The modeling and consumption projections in the wood supply analysis give an indication of which of the major species groups have a surplus of fiber available for sustainable harvest. The data indicate that spruce/fir, dense hardwoods, other softwood (conifer), and pine have significant fiber available over the next fifty years. This fiber can be used to supply new and expanded wood processing facilities. Because Maine's spruce/fir resource is subject to periodic spruce budworm infestations, the committee modeled the effect of an infestation soon. The model runs indicate that while the budworm would affect supply, significant surplus fiber remains available.

Small Woodland Report and Strategy

Source: "Recommendations for Engaging Maine's Family Woodland Owners," Center for Nonprofit Strategies, June 2021.

One-third of Maine's timberlands are owned by family landowners who own small woodland parcels of 10 acres or more, and from these lands comes about a quarter of Maine's wood supply. How these owners manage their forested land is a critical factor in ensuring Maine has the sustainable wood supply to grow the forest products industry. In order to achieve the goal that Maine's wood resource is managed using sustainable and responsible forest management practices (FOR/Maine Goal 2) more of Maine's small woodland owners will need assistance from forestry professionals and will need to increase sustainable harvests from their lands.

FOR/Maine's Small Woodland Owners Committee worked with the Center for Non-profit Strategies to study this segment of land ownership and make recommendations on how to engage small, private landowners to achieve two objectives: to increase the percentage of Maine's woodland owners receiving assistance from forestry professionals; and to increase the sustainable timber productivity from these lands.

Based on data from the 2011-2013 National Woodland Owner Survey (NWOS) about half of all Maine family landowners with between ten and 1,000 acres of wooded land state their reasons for land ownership are primarily for its conservation and recreational value. This category of small woodland owners is referred to in the Tools for Engaging Landowners Effectively project *www.engaginglandowners.org* as "Woodland Retreat Owners." Woodland Retreat Owners are a significant and growing segment of the landowning population.

The committee chose to **focus on Woodland Retreat Owners because they are less likely to harvest their trees for sale and are less likely to manage their woods to improve timber stands. They are also less likely to engage with forestry programs or services and therefore might be at higher risk for harvesting land when financially driven to do so, without adequate planning for a sustainable harvest that would improve their timberlands.** As well as impacting the sustainable supply of quality timber for the forest products industry, engaging with forestry professionals, and participating in timber markets, could demonstratively help Woodland Retreat Owners keep their land healthy, forested and in the family.

The 2017-2018 NWOS shows that of thirteen possible reasons Maine family woodland owners cite for owning their land, the two most often cited are to protect or improve wildlife habitat and to enjoy its beauty. Privacy and protecting water resources are the next most often cited reasons for owning these lands. Four of five Maine small landowners have purchased some or all their land and two-thirds have their primary residence there. Another one quarter have a seasonal or vacation home on the land.

In the survey, only 28 percent of Maine family woodland owners indicate that timber products are an important reason for owning the land, and only 11 percent rely on their woods for some portion of their household income. More than half cite land investment as an important reason for owning the land. Most landowners in the survey want their land to remain wooded and want to pass it on intact to their heirs.

In terms of land use, the survey shows that the most important use of wooded land is for recreation, such as hiking, hunting, and animal watching. About half of these owners cut wood for personal use such as firewood and fencing, and 19 percent collect non-timber forest products. Still 49 percent of Maine's family landowners say they have harvested trees for sale, about one-fifth within the last five years, and

about the same number plan to do so within the next five years. These numbers are high compared to other states, perhaps reflecting Maine's long history of forestry and the quality of the state's timber.

When Maine's family landowners express their concerns for their land, financial concerns top the list. Seventy-five percent of surveyed owners say they are concerned about taxes and the financial ability to keep their land intact. Seventy-two percent of these landowners are concerned about vandalism, 64 percent about trespassing or poaching, and unwanted insects and diseases. Fewer than half are concerned about pollution, invasive species, or climate change.

In terms of management, one quarter of small woodland owners say they have a forest management plan, but the data shows that fewer than half of them are actively managing their land. Only 17 percent of landowners have cut trees, reduced invasives or built trails, and 32 percent have done no management activities on their land. Less than 20 percent have received advice from a professional forester, and even fewer report they have used this professional advice to make land management decisions. Awareness of state and national forestry programs such as tax programs, green certification or conservation easements is also low.

Woodland Retreat Owners are even less likely than family woodland owners as a group to participate in forestry programs or consult with a professional forester. Though they are aware of the resale value of their land, Woodland Retreat Owners are less likely to own land for monetary gain, but own land for its intrinsic value. However, financial limitations are the primary reason given for not making improvements to their land, and decisions about harvesting or selling land are still often driven by financial need and available options.

Unlike those who work their land, Woodland Retreat Owners reflect a philosophy of stewardship that allows the natural ecology of the woods to flourish with minimal human impact. Engaging Woodland Retreat Owners in active forest management will require different approaches than outreach to landowners with a working-the-land philosophy. In addition to landowner beliefs and attitudes about harvesting, other barriers to commercial harvesting on small private lands include characteristics of the land, availability of forestry infrastructure, and timber markets.

Woodland Retreat Owners are less likely to consider harvesting because they are overall more removed from the forest products industry, perceive timber harvesting negatively, believe that harvesting would reduce their land's value, and fear harming their woods. They have an overall lack of knowledge or confidence about harvesting their land, even if they do see it as a positive. These characteristics may make them less likely to plan for harvests and more likely to do so under financial pressure, and without professional planning.

	Working the Land Owners	Woodland Retreat Owners
Key Belief	Woods should be productive; woodland amenities and products have (or should have) monetary value.	Woodland amenities are valuable in their own right, i.e. they have intrinsic value.
Value woods for...	Income generation and wealth creation Recreational amenities Natural amenities.	Natural amenities and recreational opportunities.
Stewardship philosophy	Woods need to be tended and managed judiciously to meet human needs.	Minimize human interference—nature knows best and the less you mess with it, the better it is for your woods.
Knowledge and capacity	Because these landowners anticipate financial returns from the land, they are willing to invest time and energy into learning how to maximize those returns. They tend to be well-connected to forestry professionals and government programs.	They don't see any compelling need for active management and are less likely to seek information and advice on this (unless there is a specific problem that demands their attention). They are less likely to use, or even be aware of, forestry programs and services.

Table 1: Key Differences Between Working the Land and Woodland Retreat landowners

To engage Woodland Retreat Owners to actively manage their timberlands, forestry professionals must communicate in ways that are relevant to landowner goals. Small woodland owners will also be more likely to harvest timber on their land if timber markets are healthy and well-organized; if logging is well-managed and regulated; and if their land's location, timber stock and features make it conducive to a profitable harvest.

To meet the committee's objectives: To get more small woodland owners to engage with forestry professionals and to encourage more of them to engage in sustainable harvesting on their land, the Small Woodland Owners Committee study recommends the following:

1. Reframe the goals of landowner engagement – The values and goals of Woodland Retreat Owners differ from those who work their land. Forestry professionals must market and provide services to these landowners in a way that is relevant to landowner goals, such as presenting commercial harvests as a tool to improve woodland health. Training forestry professionals to present an 'active stewardship' model rather than a management model would help these landowners move toward active stewardship of their land.

2. Support action by high-priority landowners – Forest agencies should focus resources on high-priority landowners and institute a simple system to keep them motivated and active. A "one-stop-shop" approach, that provides follow-up support and guidance, and tailors communications to landowner goals and interests, would improve outcomes. State and national incentive programs can be effective if they are strategic; current programs should be repurposed and streamlined.

3. Disseminate messages that invite landowners to learn more about the benefits of sustainable harvesting – These messages must dispel the concerns of Woodland Retreat Owners that harvesting is damaging and exploitative to their woods. Community level campaigns are more successful.

The challenge of engaging owners of small, private timberlands is not unique to Maine. Given that these landowners control nearly a third of wooded land in the United States, they are critical partners in efforts to sustain and grow the forest products industry. Communication strategies that have proven successful in other places, tailored to Maine's unique situation, and applied in a comprehensive way, will encourage more of Maine's small, private timberland owners to engage with forestry professionals, and actively and sustainably manage their forest land.

Implementation

One of the recommendations from the strategy developed by the Center for Non-Profit Solutions was to "Create a cadre of "woodland consultants" who are trained to guide Woodland Retreat owners on the path to active stewardship." FOR/Maine's Small Woodland Owner Committee developed this cadre of consultants from across the forest products sector in Maine. Members include representatives from industry, industry associations, state agencies, and municipal agencies. The committee issued a request for proposals for development of train-the-trainer materials and an in-person session to train the cadre on how to deliver workshops. Katherine Hollins, of Welsummer, who assisted in the development of the Woodland Retreat Owner Report, was selected and the training session was held for 8 participants June of 2022. Training materials are *available to view here.* Participants are scheduling trainings for winter of 2023.

Measures of Success

While Maine's forest economy has succeeded in the past, a rapidly changing global economy requires new approaches to sustain and grow the industry. The goal to grow and diversify Maine's forest products sector by 40 percent by the year 2025 is ambitious. Early data and efforts show that the five goals and 17 strategies set forth in the Forest Opportunity Roadmap are achievable.

Results from rigorous research done in Phase 1 of the FOR/Maine project provided necessary information and data to inform strategy development and project implementation. In Phase 2, data from Phase 1, along with wood supply updates, more in-depth analysis into the emerging bioeconomy, and workforce research, are providing the basis for sustained collaboration for implementation of the Forest Opportunity Roadmap.

FOR/Maine is using the following *key measures* to mark progress as Maine as becomes a global leader in the forest products economy with a thriving, innovative, and diverse industry that provides good jobs in vibrant Maine communities:

1. Increased volume and dollar value of production and sales of manufactured forest products:

   An updated economic report is needed, however current data for 2014 compared to 2019 is as follows:

   https://maineforest.org/wp-content/uploads/2022/08/2019-FP-Impact-Final-to-MFPC-Revised-Nov-2021.pdf

   Total economic impact went from 8.5billion in 2016 to 8.1 billion in 2019, employment declined from 33,538 jobs in 2016 to 31,822 in 2019 producing an estimated $1.7 billion in labor income in 2019.

   The loss in economic contribution occurred during a time of rapid mill losses. Despite a trend in increased wood consumption, the COVID-19 Pandemic and the closure of the Pixelle Mill in Jay following a boiler explosion in April 2020 dramatically reduced wood consumption. However, reinvestment in mills throughout the state indicate an increase in demand for 2023.

2. Number of companies located in Maine active in value-added forest products, and the number of people employed by these companies:

3. Investment dollars attracted to Maine:

4. Public and private research and development dollars invested in the forest products sector.

Company	Location	Start	Investment	Purpose
Sappi	Skowhegan	Nov. 11, 2022	$418 M	Conversion & expansion
LP Building Solutions	New Limerick	Nov. 2, 2022	$400 M	Expansion
J.D. Irving	Ashland	Aug. 3, 2022	$1.8 M	Energy efficiency
LP Building Solutions	New Limerick	Feb. 18, 2021	$150 M	Conversion & upgrades
Timber HP	Madison	Dec. 31, 2021	$85 M	Transformation into a wood fiber manufacturing facility
Total:			**$1.05 B**	

Recent investments

5. Volume of residual and low-value fiber markets, including energy:

   Continued monitoring of sustainability demonstrates the hoped-for growth in softwood consumption. despite significant disruptions in the market from the loss of the Jay Mill. Sawlog consumption increases and the ND Old Town Pulp Mill coming online mitigated losses from Jay to some degree. The major takeaway from wood supply analysis is that there are trees are available to grow our forest economy at a sustainable rate of consumption.

6. Number of biomass and/or combined heat and power plants in the state and percentage of the state's thermal energy generated from wood: Efficiency Maine and Maine Technology Institute grants have funded current sawmill upgrades in Maine that insert electric turbines into existing steam boilers. Combined Heat and Power (CHP) promotion was identified in the FOR/Maine project and incorporated as an objective in the Governor's 2021 Climate Action Plan. CHP legislation designed to install 20 MW of power into the states renewable portfolio was unanimously adopted by the Maine legislature, and project bidding is anticipated by the end of 2022.

7. Number of mill sites redeveloped or transformed into technology parks. Five communities have mill site redevelopment projects underway. These efforts include projects focusing on:

   - Structural round timber market exploration.
   - Engineering services on industrial parcel.
   - Repair warehouses on former mill site.
   - Master planning of former mill site.
   - Demolition of special chemicals building & boiler house on former mill site.
   - Update commercial digester feasibility study.
   - Activation of electrical substation on former mill site.
   - Heating and electrical studies on former mill buildings

8. State rankings relative to competitors on regulatory environment, taxes, and energy prices:

9. Evidence of FOR/Maine influence on forest policy relating to markets.

FOR/Maine goals have been included in the state's COVID Recovery initiatives, the Maine State Strategic Plan and in Maine's Climate Plan. Areas of alignment highlight opportunity for the development of Maine's forest-based bioeconomy. The brand and roadmap created by FOR/Maine has provided a vision for policy makers at both the state and federal level.

Challenges Going Forward

Market Development: Recent analyses verify that additional volumes of timber can be harvested and used to support more manufacturing. Finding additional manufacturing capacity that can use softwood resources, biomass and mill residuals is of critical importance in building market diversity. We also see opportunities to increase secondary manufacturing in Maine because of wood supply constraints in other parts of the US and a growing interest in nationalizing the supply chain for natural resource goods. A continued and sustained effort in market development needs to continue. Identifying and cultivating a skilled workforce will remain a priority as market development is pursued.

Emerging technologies and their development and commercialization through the efforts of the University of Maine are critical. FOR/ME facilitated the connections to Oakridge labs and the installation of the world's largest 3D printer at the university of Maine. Having built the first bio-based 3D printed home the University continues to demonstrate its globally attractive capabilities. The University was identified by our global consultants as a very competitive asset that requires ongoing investment. Continuing to promote investment in R&D and working to incentivize innovation and start-up activity in the state will ensure a diverse and globally relevant industry.

Workforce Development needs have evolved into long-term and short-term strategies. We have initiated elementary, middle and high school approaches to building visions of career opportunities in the forest sector but have only just started to integrate this curriculum into the broader state education program. Through ongoing outreach, education and communications we can grow our future workforce.

An immediate crisis in available workers has affected the nation but been amplified in Maine's forest sector with the double hit of COVID-19 and the loss

of a major pulp & paper operation in Jay, Maine. The labor shortage predicted for future years through our research arrived overnight as an oversupply of wood was generated by spring mill inventories. Diesel fluctuations brought on by world events are also contributing to the business uncertainty faced by logging and trucking contractors. In Maine's production facilities only a portion of the wood supply needed is moving to market at a time when demand for goods is increasing. Manufacturers are unable to staff second shifts to capitalize on recent demands for wood products. FOR/Me will pivot to focus on these areas as we seek solutions that will include access to daycare, increased availability of affordable housing and recruitment of immigrant communities.

SUMMARY

Momentum has been growing despite market gyrations, but the drive to diversify Maine's forest economy through market growth and now a focus on dynamic workforce issues supports the need to maintain the coordinating function of the FOR/Maine partnership that has removed institutional and industry barriers and built a strong economic development focus (i.e., the job is not done).

The FOR/Maine project has created a strong, recognized, and trusted brand of forest economy leaderships, and the group will continue to seek financial support and contribute time to building a stronger Maine Economy.

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