

# Forest-Based Economy Overview



**The University of Maine supports our state's forest-based economy through a myriad of services to both current and potential businesses in Maine including:**

- **Research, development and commercialization of forest-based thermoplastics and chemicals, bioenergy, mass timber, wood-based composites, pulp, paper and nanocellulose technologies.**
- **Science-based solutions in sustainable best management practices, forest operations, informatics, pest & disease mitigation, ecology and wildlife management.**
- **Business & community development through market analysis, business attraction, startup support, entrepreneurship training, workforce analysis, economic diversification, policy review, community resilience, technology transfer and nature-based tourism.**
- **Industrial and manufacturing support services through process optimization, product improvement, prototyping and industrial automation.**



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# 400 years Maine's Forest Legacy

Over 400 years ago, our region's expansive coastal geography and abundance of natural resources drew settlers to Maine for economic opportunities and personal enjoyment. With over 17 million acres of forests and a 3,500 mile coastline, those foundational elements remain just as relevant today for Maine's local and national identity as it did then.

**During Maine's infancy, our founding settlers explored and utilized a vast forest network covering 92% of the land.**

Today, with over 1.3 million more citizens and all the supporting housing, businesses and infrastructure associated with a modern society, the state remains over 89% forested. This did not occur through happenstance: in other regions of the U.S., similar forest resources which once existed have long since disappeared, never to return. Our sustainable forest resources exist through the forethought and dedication of landowners, forest professionals, citizens and legislatures in maintaining Maine's working forests for generations to come.

While the products and markets which Maine's forest industry serves has varied over time, we have always adapted our practices and processes to respond to and meet new market demands. From ship masts, crates and cooperage (the original packaging) to lumber and paper products, Maine's forest economy has a history of "consistent transition". With the digital era, shifting consumer preferences, changing commerce trends and market demands, Maine's forest industry is again evolving to develop forest-based products and technologies to meet the needs of our global economy, while maintaining our dedication to sustainable working forests.



# Our Commitment

**For over 115 years, the University of Maine has served the citizens of Maine in providing unbiased science-based knowledge and results to address pressing issues and challenges facing our state in an ever evolving and increasingly complex world.**

Beyond our service as the state's flagship research and science-based education institution, UMaine has constantly developed and evolved its ability to deliver a greater scope and depth of effectiveness by investing in state-of-the-art equipment and facilities, new and emerging manufacturing and commercialization technologies and world-class experts in their respective fields. By actively engaging the needs and challenges of Maine's forest-based economy, the university continually strives to be an informative and valued resource for our industries and citizens.

In direct support of our forest economy, the university is enthusiastically assisting our state on several forest-based initiatives to guide us through our current transitional period with the goal of a stronger and more diversified forest-based economy aligned with global market demands. This includes the cross-sector collaboration Forest Opportunity Roadmap/Maine (FOR/Maine) bringing together forest stakeholders from industry, government, non-profits, education and rural communities with the purpose of ensuring Maine adapts to market changes quickly and strategically to maintain Maine's leading role in a global forest economy. The University of Maine has dedicated personnel, resources, facilities and expertise throughout our campus network to directly support and assist FOR/Maine's committees and activities to provide the greatest potential for success moving forward.

In addition to FOR/Maine, UMaine directly supports and facilitates a broad-scope of forest-based groups:

- Current forest industry stakeholders: landowners, forest managers and operators, manufacturers, suppliers and support services
- Forest-based business startups, eco-tourism and global corporations exploring investment opportunities in Maine



- Workforce development to educate our citizens on opportunities in Maine's forest economy and align employee skillsets with the needs of a modern forest economy
- Resources focused on Maine's rural communities to develop actionable information-based responses to economic development and resilience
- Delivering knowledge and understanding of sustainable forest practices, economic opportunities and insight on forest-oriented industry-tourism-ecology dynamics

It is through these cumulative activities that the University of Maine continues to strive to create and innovate for Maine and beyond, grow and steward partnerships and foster learner success.

440+

# University of Maine Forest Network

**Over forty colleges, departments, research units and groups across the University of Maine are directly involved or support our state's forest-based economy.**

Our dedicated scientists, engineers and professionals work collaboratively across the campus to provide the greatest access to university resources, knowledge and technology possible.

**This section outlines our most primary organizations** which directly engage our state's forest stakeholders and provide our greatest insight on the state of Maine's forest economy.



## School of Forest Resources

Since 1903, forestry has been a consistent presence at the University of Maine. Growing from a locally oriented program to a nationally recognized leader in integrating research and teaching to enhance sustainable working forests, the overarching focus for the last century has been contributing to the economic, social and cultural well-being of Maine and its forest-based economy.

Working with Maine's forests from sapling through finished goods, the School is engaged in all stages of the life cycle and supply chain of Maine's forests.

- Administrative home of several forest-focused programs and research units, including the Barbara Wheatland Geospatial Analysis Laboratory and University Forests
- Educational hub for Forest Operations, Bioproducts and Bioenergy, Parks, Recreation and Tourism and Forestry
- Land management research and education activities including GPS, GIS, geospatial assessment, silviculture, forest planning, ecology, pest management, environmental impact, watershed and soil sustainability

- Forest harvesting and planning including infrastructure and transport, best management practices, operations efficiency and optimizing recovery & timber yield
- Forest communities including outcomes-based forest management, family forests, public attitudes towards forestry and forests, community-based social capital in local forests, forest-based recreation, community resiliency and economic diversification
- Forest products including traditional wood products, wood-based composites and mass timber
- Emerging technologies including nanocellulose-based products, biomass energy, energy efficient housing systems and carbon-neutral construction practices

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## Barbara Wheatland Geospatial Analysis Laboratory

Founded in 2012, the Barbara Wheatland Geospatial Analysis Laboratory serves to provide both the University of Maine and Maine's forest communities access and education on state-of-the-art measurement and analysis resources related to Global Positioning System (GPS), Geographic Information Systems (GIS) and geospatial analysis. In the past two decades, these technologies have become the new cornerstone of modern forestry and land management professionals for evaluating a wide array of forest conditions on private and public lands. Wheatland Lab serves as a centerpiece for delivering the forest resources curriculum in geospatial skills to SFR students, as

well as training students in natural sciences across the campus. The lab is also used to advance the geospatial skills of forestry professionals and community planners through continuing education programs.

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# FACTS

## Maine's Forest Economy

Maine has nearly three times more people employed per capita in forest-based careers than the national average

3X

## Economic Support

Maine's public use of private forests tradition provides diverse outdoor experiences to both our citizens and visitors, offering local economic opportunities in rural communities

\$8.5 billion of Maine's GDP (or 5%) is based on our working forests



Maine's forest industry provides over \$250 million to the state and local tax system

# Jobs

33,500+

Our forest economy supports over 33,500 jobs in Maine

## University Forests

Founded in 1946, the University Forests group is responsible for managing over 13,500 acres of forest lands across forests and timberlands owned by the University of Maine System and the University of Maine Foundation. With locations across Maine, the University Forests coordinates all research and forest activities utilizing the land, developing and maintaining active management plans, and ensuring the long-term sustainability of forest health. These lands are used for research and education across a broad set of interests, including wildlife ecology, forest operations, soil and watershed sustainability, forest health, timber harvesting, silviculture, and invasive and

pest management. The showcase of these lands is the Penobscot Experimental Forest, a 3,800-acre long-term research and education laboratory for sustainable forestry practices collaboratively operated since the 1950s between the university and the U.S. Forest Service.

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## Center for Research on Sustainable Forests

Founded in 2006, the Center for Research on Sustainable Forests (CRSF) builds on the University of Maine's rich history of leading forest research by further enhancing our understanding of Maine's forest resources in an increasingly complex world. By harnessing the unprecedented availability of data provided from high-resolution digital imagery and GPS, the Center for Research on Sustainable Forests consolidates resources and expertise throughout the region to support critical emerging areas of forest management and environmental stewardship. The Center coordinates the development, integration, and application of these emerging technologies to address current and future issues in natural resources. In addition to supporting programs related to forest management, nature-based tourism and the impact of climate in forest ecosystems, the Center has developed and hosts a number of forest-related research tools, including the Northeast Forest Information Source (NEFIS) and the Maine Forest Dashboard, and coordinates activities for several forest-based programs:

- Intelligent GeoSolutions – Providing broad-scale, up-to-date geospatial information on forest and landscape conditions relevant to forest management or conservation actions through highly accurate geospatial information scalable to

large areas using satellite imagery and US Forest Service plot data.

- Northeastern States Research Cooperative (NSRC) – a collaborative research network jointly directed through the USDA Forest Service, Northern Research Station and four university research groups across the Northeastern U.S. actively engaging in research related to sustainable forest industry, communities, ecosystems and protecting land biodiversity.
- Nature-Based Tourism – Conducts collaborative research, education, and outreach which promotes sustainable tourism in Maine's forests.
- Forest Climate Change Initiative – Researching changing climate conditions in Maine and the related impact on forest health and operations, ecosystem, wildlife habitat and forest recreation.

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## Cooperative Forestry Research Unit (CFRU)

Founded in 1976, the Cooperative Forestry Research Unit is an industry-university cooperative managed under the Center for Research on Sustainable Forests (CRSF) and is funded through members of Maine's forest economy to direct and support applied research across both the University of Maine System and a regional collaborator network relevant to the forest sector. The 35-member organizations supporting the Cooperative Forestry Research Unit represents landowners, land managers, manufacturers, state agencies and forest-based non-profits controlling over 8 million acres of Maine's forestland.

The stakeholder-driven research coordinated by the Cooperative Forestry Research Unit covers a variety of forest economy oriented subject areas, including improved forest mapping and surveying technologies, outcomes-based best management practices, increasing harvesting efficiencies and yield, improving forest ecology and wildlife habitat, and sustainable forest management.

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# Advanced Structures & Composites Center

Founded in 1996 as the Advanced Engineered Wood Composites Center, the Advanced Structures and Composites Center (ASCC) is a world-leading, interdisciplinary center for research, education, and economic development encompassing material sciences, manufacturing, and engineering of forest-based products, composites and structures. The ASCC operates a 100,000 ft<sup>2</sup> manufacturing and testing facility and serves as a hub for several forest products-based research, commercialization and economic development activities.

Maine's economy has always drawn upon its forests. The ASCC's wood composites research not only follows this tradition, but expands it for future generations to advance the use and application. Examples of these include composite-reinforced glulam and mass timber structures for infrastructure and commercial construction, ballistic and hurricane resistant wood structures, structural and non-structural wood-based composite panels, lumber and forest-based thermoplastics in building materials, nanocellulose reinforcements and additive manufacturing applications.

The ASCC services a highly diverse list of industrial clients on state, national, and international levels – ranging from small, start-up companies to large, Fortune 500 corporations. The ASCC also serves hundreds of industrial clients by providing ISO 17025-accredited testing on many internationally recognized testing standards and procedures, providing accountable and reliable performance data for code agencies and governing bodies throughout North America.

The areas of technology, development and commercialization include:

- Wood composites – from laboratory scale to full-size panel sections, the ASCC's wood composites pilot feasibility line allows production of up to 4' x 8' (1.2 m X 2.4 m) oriented strand board (OSB), laminated strand lumber (LSL), particle board, wood fiber panel and insulation, and other forest-based composites on a near-industrial scale: from log to panel, all stages of the manufacturing process are explored and evaluated

- Mass timber – through assembly and testing of large-scale mass timber product such as cross-laminated timber, nail laminated timber, structural composite lumber and glulam beams, the ASCC serves to develop technologies that increase performance, reduce cost and explore new application opportunities
- Thermoplastic composites – with benchtop and pilot-scale production capabilities, the ASCC's able to quickly and efficiently examine a variety of polymers, fillers and processing conditions for improving current applications and exploring new uses for forest-based and filled plastic systems
- Material testing – the performance of wood-based materials (from micro-to-macro scale) is empirically collected, providing reliable and documented results used throughout the world

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## Maine Mass Timber Commercialization Center

Founded in 2017, the Maine Mass Timber Commercialization Center (MMTCC), teams with industrial partners, trade organizations, construction firms, architects, and other stakeholders in the region to promote emerging wood technologies, such as mass timber and tall wood construction in Maine and New England.

Through conferences, seminars, and in-person meetings, the Maine Mass Timber Commercialization Center serves to educate stakeholders and the public on mass timber technologies and benefits while promoting Maine's timber supply and geography as an ideal location

for mass timber manufacturing facilities to support the growing mass timber industry needs of the Northeastern United States.

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# FACTS

## Sustainability

**Maine's forests are diverse: 65 different tree species grow throughout the state (39 used commercially for forest products) and supports over 20,000 species of wildlife**

**By volume, Maine's forests are a 50:50 split of softwoods and hardwoods**

**98% of Maine's forest growth is generated naturally, maintaining forest diversity and increasing resilience to pests and disease**

**Maine's forest growth exceeds our annual harvests, resulting in a net growth**

**97% of Maine's logging activities are centered around partial harvesting and shelterwood harvesting, not large-scale clearcutting, with separation zones and setbacks to reduce impacts to soil, ecology, watersheds and wildlife**

**Maine's forests sequester over 19 billion pounds of carbon from the atmosphere and generates enough oxygen for over 38 million people annually**

**Half of Maine's working forests (over 8 million acres) are FSC, SFI and ATFS certified for sustainability**



## Department of Chemical and Biomedical Engineering

Founded in 1908, The Department of Chemical and Biomedical Engineering has served as a nationally recognized source of excellence in paper manufacture and chemical processes.

For over a century the Department has supported Maine's forest-based economy through research, development, education and innovative chemical processing technologies related to chemical modification and processing, woody biomass conversion, pulp and paper manufacture, biopolymer synthesis and nanoparticle manufacture and analysis.

The department serves as the center of activity in wood-based chemical processing technologies, housing the Process Development Center, the Forest

Bio-products Research Institute and the Paper Surface Science Program. With an extensive network of professional engineering alumni, the department is globally competitive in providing a broad-based education together with a thorough training on the theory and application of chemical and biomedical engineering through a mixture of education, research and professional internship experiences.

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## Paper Surface Science Program

Founded in 2005, the Paper Surface Science Program is an industry-university cooperative funded through members of the chemical supply and the pulp and paper industries to develop and advance the fundamental and applied knowledge of paper surface treatment processes (sizing, coating, printing, and gluing) and structure-performance relationships in paper-based products. The goals of these research efforts are to discover new applications and market opportunities for renewable paper products to displace traditional petrochemical-based packaging and consumer goods. Through participation in Paper Surface Science Program research, University of Maine graduate students gain applicable experience in performing scientific research on projects of value to the sponsoring industries and offers expanded opportunities for post-graduation employment.

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## Forest Bioproducts Research Institute

Founded in 2006, the Forest Bioproducts Research Institute has marshalled a broad array of scientists, businesses and research partnerships to create fossil fuel reduction solutions centered on sustainable forest management and the creation of innovative bio-products. The focus of the Forest Bioproducts Research Institute lies in exploring and commercializing opportunities in forest-based substitutes for almost everything that is now made from petroleum: fuels, energy, chemicals, composites, coatings, and plastics.

The Institute's research areas involve science, inquiry, and product development from the forest floor to the factory floor, with the goal of building the research and commercialization infrastructure which supports developing a forest-based biorefinery industry in Maine, using trees instead of oil to generate sustainable biofuels, chemicals and plastics to diversify the state's forest economy. UMaine is actively developing technologies to augment the pulp and paper and building products industries with new revenue streams of high-profit margin chemicals, plastics and nanotechnology products as well as new sources of energy. Best of all, these bioproducts would leave a smaller, lighter ecological footprint.

In support of these goals, the Forest Bioproducts Research Institute opened a new pilot facility named

the Technology Research Center. The Technology Research Center is a forest-focused, one-stop shop for processing and analysis of forest-focused technologies. The 40,000-square-foot facility, located on the grounds of Nine Dragons Paper in Old Town, features state-of-the-art process control and information systems. The Center validates, demonstrates, and helps commercialize developed fuel, chemical and advanced material technologies from forest bioproducts at an industrially relevant scale. The showcase technologies of the Technology Research Center include the biomass to bioproducts pilot plant (B2P2) for converting forest residuals into various chemical compounds and the thermal deoxygenation (TDO) reactor for converting bio-based chemicals into biocrude, the foundation for an array of biofuel solutions. With these technologies Maine's forest professionals and potential investors have the opportunity for collaborating with university researchers to create innovative forest-based solutions.

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## University of Maine Pulp and Paper Foundation

Founded in 1950, the University of Maine Pulp and Paper Foundation is a non-profit organization focused on the advancement, promotion and support of University of Maine student education related to the pulp and paper industry. The oldest Pulp & Paper Foundation in the country, the Foundation provides scholarships to nearly 100 students annually in a variety of engineering and forestry programs across the university and connects hundreds of students with the pulp and paper industry for co-op and post-graduation employment opportunities.

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## Process Development Center

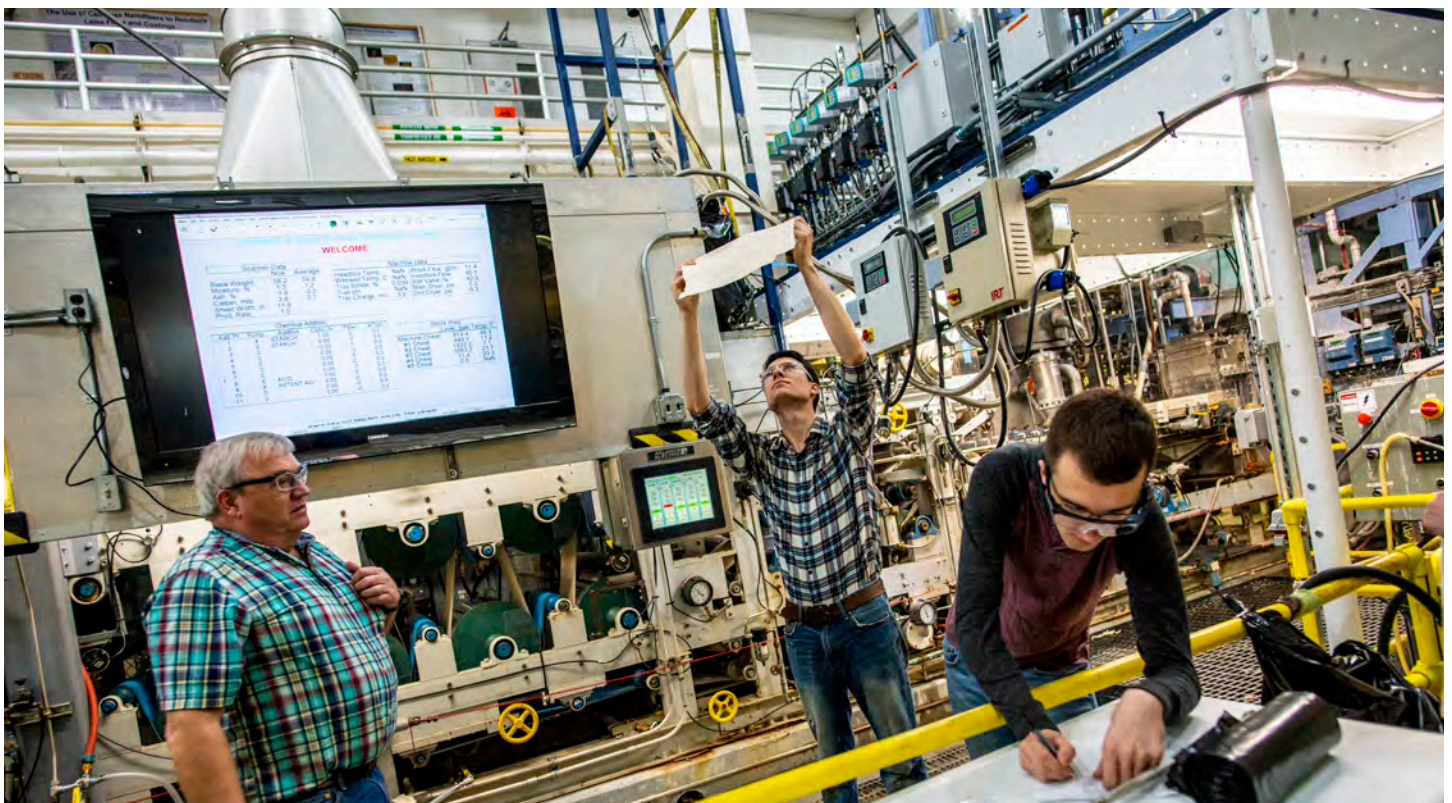
Established in 1987, The Process Development Center (PDC) at the University of Maine has served as a partner to the pulp and paper industry of Maine and beyond in developing product applications, improving performance and efficiency, reducing environmental impact and delivering new technologies to maintain global competitiveness.

The PDC facility houses a pilot paper machine, pilot paper coater and laminating equipment, pulp refining equipment, pulping equipment, and associated testing equipment. The PDC employs full time professional staff, many with advanced degrees, to support client projects. The PDC has a long history of collaboration with industrial partners to meet the emerging and constantly shifting needs of the marketplace. The PDC's staff works closely with clients across all stages of product development, from conceptual beginnings to successful commercialization. The PDC has collaborated with hundreds of private sector clients, on both long and short-term projects, providing timely service and delivering innovative and cost-effective solutions.

Recent collaborations include efforts to advance fiber processing and packaging technologies, in response to market demands for sustainable products, and pioneering specialized nanotechnologies. The PDC has developed and patented technologies on the production of nanocellulose, and in collaboration within dozens of University of Maine and external research partners, is actively exploring new applications and uses for this technology to diversify Maine's pulp & paper industry. The PDC's cellulose nanofiber (CNF) pilot plant opened in 2012 and has produced over 20 tons of CNF for companies around the world. PDC staff have conducted many R&D and contract research projects evaluating a variety of feedstocks to produce CNF, as well as using CNF in a wide variety of paper and paper coating applications.

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## Office of Strategic Partnerships

The Office of Strategic Partnerships, Innovation, Resources and Engagement (SPIRE) drives innovation to grow Maine's economy. The Office links businesses to university resources and expertise; facilitates the commercialization of innovations both developed at UMaine as well as by external stakeholders into marketable products and services. UMaine's SPIRE Office works to assist the growth of innovation across Maine, creating future innovators and new jobs to enhance the state economy. The Office also is a responsive liaison, facilitating strategic partnerships among the University of Maine and businesses, government officials, investors and development organizations.

The Office promotes new and expanding business support through a variety of services, including access to laboratory and office space through the UpStart Center for Entrepreneurship, connection to expert members of the business community, assistance with seeking funding and grants, entrepreneurial training and experiences, and consulting opportunities in business practices and innovation.

In addition to supporting business development, SPIRE operates the Foster Center for Innovation to educate and mentor UMaine students in business, innovation and entrepreneurship and facilitates connections between students and Maine's businesses for employment and internship opportunities which creates a more diversified training experience to build a more well-rounded and agile workforce in Maine.

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## Margaret Chase Smith Policy Center

Founded in 1989, the Margaret Chase Smith Policy Center serves as a nonpartisan, independent research and public service unit which informs public policy processes and societal decision-making through timely research and applied public policy activities focused on critical issues facing Maine and the nation.

The Policy Center serves as the state's premier resource for applied public policy research and engagement. In the spirit of the Honorable Margaret Chase Smith, the Policy Center strives to advance a tradition of independent, objective research designed to support effective, transparent, and equitable policy processes. The Policy Center values open communication grounded in civility and a willingness to engage respectfully across differences. Building a sense of community through collaboration is core to the Policy Center's aspiration to improve policy, and values inclusive communication that aims to advance relationships among policymakers, community leaders, and students, faculty, and staff of the University of Maine.

Examples of the Policy Center's involvement in the forest sector include:

- Analysis of the forest products sector economy
- The economics of biofuels, biomass supplies and alternative energy in Maine
- Maine's forest-based recreation economy
- Policy analysis of energy consumption and production in Maine
- Sustainable bioplastics feasibility in Maine

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## Department of Wildlife, Fisheries, and Conservation Biology

Founded in 1935, the Department of Wildlife, Fisheries and Conservation Biology serves to protect and sustain our natural resources through continual research on ecological and conservation issues facing Maine, the nation and the world.

Across a wide breadth of areas including wildlife ecology and biology, conservation biology, and wildlife management, the department works collaboratively with federal biologists, university

researchers and other government agencies to determine applicable science-based solutions which maintain and support the natural resources of Maine.

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## Energy Testing Laboratory

The Energy Testing Laboratory provides technical analysis of forest-based biomass materials and building products to researchers and manufacturers throughout the region. As the only accredited pellet fuel testing lab in the Northeastern U.S., the Energy Testing Laboratory provides performance and quality evaluation of pelletized fuels, such as energy value and pellet durability, to manufacturers under ALSC/PFI certification. Testing services include combustion efficiency for biomass energy consumers, particle size screen, wood species identification, loss on ignition analysis, and biomass composition.

Technical analysis services on building products provide insight into the thermal conductivity of building materials and systems, allowing researchers to quickly evaluate and explore new building materials and practices for energy efficient structures.

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## Maine Agricultural and Forest Experiment Station

Founded as an agricultural research station in 1883, the Maine Agricultural and Forest Experiment Station (MAFES) has expanded their scope of programs to enhance the profitability and sustainability of Maine's natural resource-based industries, protect Maine's environment, and improve citizen health.

Over 60 faculty members lead research and development projects at the station, these scientists use cutting-edge tools to address new challenges for Maine's natural resource-based industries and develop new knowledge that fuels innovation. These projects center around protecting Maine's

environment, promoting public health, and assisting rural communities.

Discoveries are delivered to the public through publications outlining new production techniques, pest management and disease treatments, new value-added products, and updated information for community leaders.

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## Mitchell Center for Sustainability Solutions

Founded in 2009, the Mitchell Center for Sustainability Solutions has been building its capacity for stakeholder-engaged, solutions-driven research which helps solve pressing problems. Maine and many other regions are facing complex challenges at the intersection of economic, environmental, and community issues. Concerns regarding the future of Maine's towns and cities, energy supplies, fisheries, forestry, and tourism are all examples of problems that defy easy solutions.

The Mitchell Center draws from the field of sustainability science that seeks to create a brighter economic, social and environmental future by connecting diverse forms of knowledge and know-how to help society make informed choices. Working with partners representing government, citizens' groups, business, industry and non-governmental organizations, our projects are helping to create more resilient strategies and sustainable practices in a changing environmental landscape.

The Mitchell Center is deeply committed to addressing the needs and concerns of diverse stakeholders, and strives to promote open communication, mutual respect and trust to solve problems where multiple values and goals are often present. Examples of Mitchell Center activities for the forest industry include:

- Compiling and analyzing socioeconomic indicators for the Katahdin region to provide focus for economic development and community resiliency initiative planning.
- Working in partnership with the Maine Indian Basketmakers Alliance (MIBA) to prevent, detect, and respond to the invasive emerald ash borer. Maine's native population relies on ash to make splints and sweetgrass baskets, the oldest documented arts tradition in New England.
- Critical investigation of forest certification and the Maine Forest Practices Act, to determine how it relates to landscape-level changes in economically, ecologically, and culturally important forest species and structures.

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## New England Combined Heat and Power Center

Beginning in 2017, the University of Maine was selected by the Department of Energy as one of eight regional partnerships dedicated to the promotion, technical support and deployment of cost-effective and highly efficient combined heat and power (CHP) technologies nationwide. UMaine currently operates the New England Combined Heat and Power Center (NECHPC) in partnership with the University of New Hampshire, University of Massachusetts Amherst and Watson Strategy Group to increase the infrastructure resilience of New England by focused on developing greater implementation of combined heat and power installations in the region by providing technical resources, engineering analysis, and techno-economic analysis support to interested companies.

Combined heat and power, also known as cogeneration, is an efficient and clean approach to generating electric power and heat from a single fuel source in lieu of independent pieces

of equipment. Heat and power can be produced on-site, reducing the need to purchase electricity from the distribution grid, greatly increasing energy security and resiliency. The focus of the New England Combined Heat and Power Center in Maine is centered around utilizing forest-based residuals as a fuel source instead of fuel oil to deliver consistent power to rural communities and businesses, develop “micro-grids” which reduces power outage risks associated with adverse weather, lower peak and overall demand of Maine’s electrical grid and support local economies by using state-based resources versus imported fuels.

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## Ecology and Environmental Sciences Program

The Ecology and Environmental Sciences Program provides an interdisciplinary education and research approach to equip students with the skills and knowledge necessary to address today's complex environmental problems. By focusing on delivering courses and research opportunities with world-class faculty spanning over a dozen academic disciplines ranging from ecology to environmental engineering and anthropology, the Ecology and Environmental Science program is preparing our next generation of professionals to solve complex environmental problems in Maine's forests, waters, farms and

human communities. The program emphasizes the inextricable link between humans and their environment: both the impact of their activities, and the social ownership of their communities.

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[umaine.edu/ecologyandenvironmentalsciences](http://umaine.edu/ecologyandenvironmentalsciences)

## Advanced Manufacturing Center

The mission of the Advanced Manufacturing Center program is to link the traditional University of Maine activities of education and research with the University's active industrial support and economic development programs. Dedicated to promoting economic development and supporting the expansion of manufacturing knowledge in Maine, the Center provides manufacturing, process improvement, rapid prototyping capabilities and turnkey production designs for businesses, entrepreneurs, and researchers throughout Maine, and North America.

With the capacities to design and build prototype and development projects ranging from large scale fabrications to machined parts with micro-millimeter tolerances, the Advanced Manufacturing Center program is committed to maintaining a first-class facility equipped with the latest manufacturing technologies and providing access to industry to expand its range of expertise by working with engineering faculty, other UMaine research centers, and our partners in private industry.



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### CONTACT INFORMATION:

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# University of Maine System Forest Partners



## UMFK: Applied Forest Management Program

Serving as Maine's only accredited two-year forestry program, the Applied Forest Management Program is designed to prepare students for careers in forestry. The program emphasizes field-orientated, hands-on learning throughout its curriculum, providing our students a broad forestry education developing marketable skills in demand with our state's forest industry.

Students are trained a range of forestry topics including timber harvest planning and layout, forest inventory and mapping supervision of harvesting, thinning, and planting crews and boundary surveying. Our faculty works closely with professionals in the forestry industry and in the Maine Forest Service to maintain a curriculum aligned with the timely needs of the state. UMFK graduates provide skills that are the foundation of good forestry and conservation in Maine further expanded with advanced forest management

technologies including Global Information, Global Positioning and LiDAR (Light Detection and Ranging) technologies. These technologies are crucial to success in today's forestry profession for accurate forest inventory, forest road layout and surveying.

This associate degree offers our students the flexibility to diversify their education and pursue a baccalaureate in business management, rural public safety, environmental studies, or other fields at UMFK. Through our partnership with the University of Maine, students can elect to continue their forestry education in Orono in a baccalaureate or more advanced degrees.

### CONTACT INFORMATION:

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## Maine Center for Business and Economic Research

Founded in 1974, the Maine Center for Business and Economic Research is a collaboration between the University of Southern Maine and University of Maine to promote economic development for all Maine residents by drawing upon university expertise to address the most pressing economic challenges facing Maine.

For over forty years the Maine Center for Business and Economic Research has been an essential resource in supporting Maine's economy by linking expertise from the University of Maine System with public and private organizations shaping Maine's economy. Serving as Maine's nationally designated University Center by the U.S. Economic Development Administration, the Center works with our state's seven Economic Development Districts and other public and private agencies to provide strategic research and technical assistance and connects expertise across the University of Maine System with organizations to support economic prosperity for Maine's residents and businesses.

Through our economic modeling and forecasting capabilities, the Center examines a range of economic issues, including economic impacts, the impacts of policies, as well as population and economic forecasting. With our participation in the New England Economic Partnership, the Center remains engaged and current on New England's state economies and topics of regional interest, such as energy, infrastructure, and innovation. Beyond economic forecasting, the Center provides capabilities in an extended suite of services, including strategic planning, demographic research, industry cluster analysis and feasibility studies.

### CONTACT INFORMATION:

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## UMPI: Geographic Information System Laboratory

Geographic Information System (GIS) is a powerful computer technology allowing Maine's landowners, forest managers, development organizations and regional planners to develop and maintain accurate and up to date digital maps and databases. To provide greater support of the Northern Maine region, the University of Maine at Presque Isle has invested in the GIS Laboratory, a state-of-the-art computing facility with cutting-edge GIS and GPS technologies, one of the best in its kind in New England.

Providing training and professional development services throughout Northern Maine, the GIS program emphasizes hands-on-training experiences and development of applicable in demand skills. Through our partnership network of northern Maine cities, towns, and non-profit

organizations, students work on projects collecting GIS data with advanced GPS technology, develop GIS databases, conduct GIS analysis, and cartography. These activities culminate in developing professional documents and presentations to the stakeholders. Through successful completion of the GIS program, certified students can work as an independent GIS specialist, become a greater asset in their current employment, or increase their opportunities in a high-demand market.

### CONTACT INFORMATION:

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[umpi.edu/academics/environmental-science/gis-certificate](http://umpi.edu/academics/environmental-science/gis-certificate)



# Facts

## Maine Forests

**Maine is the most forested state of all 50 states by percentage (89%)**

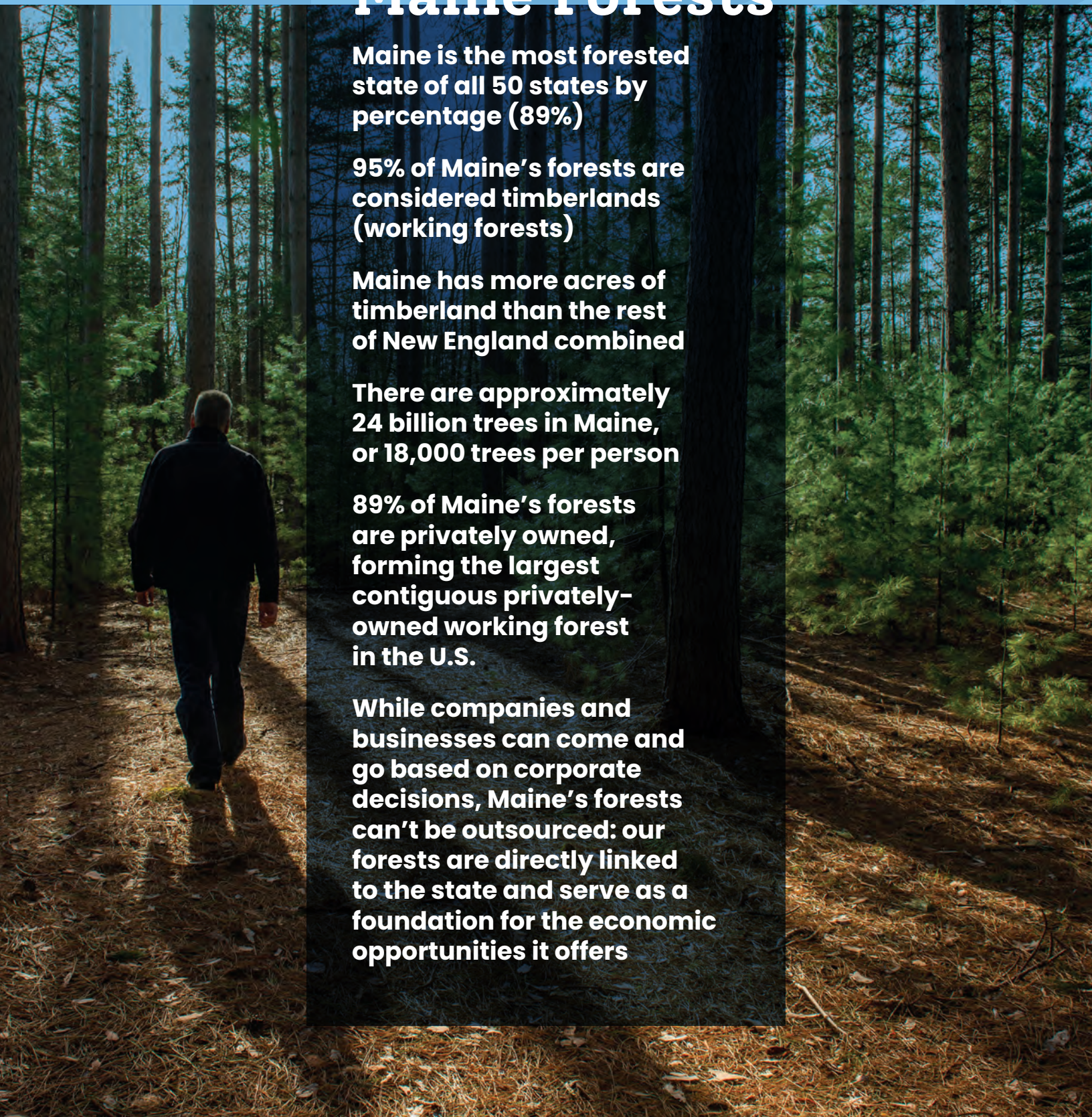
**95% of Maine's forests are considered timberlands (working forests)**

**Maine has more acres of timberland than the rest of New England combined**

**There are approximately 24 billion trees in Maine, or 18,000 trees per person**

**89% of Maine's forests are privately owned, forming the largest contiguous privately-owned working forest in the U.S.**

**While companies and businesses can come and go based on corporate decisions, Maine's forests can't be outsourced: our forests are directly linked to the state and serve as a foundation for the economic opportunities it offers**





[umaine.edu/foresteconomy](https://umaine.edu/foresteconomy)

In complying with the letter and spirit of applicable laws and pursuing its own goals of diversity, the University of Maine System does not discriminate on the grounds of race, color, religion, sex, sexual orientation, transgender status, gender, gender identity or expression, ethnicity, national origin, citizenship status, familial status, ancestry, age, disability physical or mental, genetic information, or veterans or military status in employment, education, and all other programs and activities. The University provides reasonable accommodations to qualified individuals with disabilities upon request. The following person has been designated to handle inquiries regarding non-discrimination policies:

Director of Equal Opportunity, 5713 Chadbourne Hall, Room 412, University of Maine, Orono, ME 04469-5713, 207.581.1226, TTY 711 (Maine Relay System).

**BMB-001-10-24039**