



A mill gone quiet. East Millinocket. All photos by author.

WHEN THE MILL GOES QUIET: MAINE'S PAPER INDUSTRY 1990–2016¹

By Lloyd C. Irland

The paper industry has been a mainstay of Maine's economy for over a century. Paper mills in all corners of Maine employed numerous workers, purchased wood and supplies locally, and contributed significantly to the state's industrial base. This conferred not only local recognition but political influence in Augusta. All concerned viewed the paper industry, based on Maine's extensive forests, proximity to large Northeastern paper markets, abundant hydropower, and a trained workforce, to sustain these communities for another century. By 1990, however, a series of slowly shifting forces began to accelerate, threatening the industry's cost competitiveness. Larger mills based on low-cost fiber appeared globally. At a dizzying pace, electronic communications replaced traditional print media, the principal market for most Maine mills. One after another, leading national companies cut back or closed mills, sold land, and finally sold surviving mills to investment groups. The quarter century after 1990 became a challenging time that left a number of former mill towns with lost tax bases, high unemployment, and uncertain futures.

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Governor John Baldacci arrived late at his 2003 inaugural ball. He had just returned from Millinocket, where he attempted to negotiate a package of measures that could enable the mills there to survive. While one of the more dramatic moments in the governor's public career, it was not the only emergency trip in hopes of saving the economic base of a town. As local mini-dramas like these played out in the news cycles, few foresaw that the forces stressing paper mills in Maine were so massive that efforts of the state, workers, communities, and the federal government would be unable to stem the tide. The image of King Cnut of England, calling

on the tides to cease their flowing, came to mind. Only later was it clear that the tide was already turning, as regional and global competition intensified, and then, after 2006, a severe recession and the upsurge of internet-based advertising would change Maine's papermaking communities forever.²

These events mark a significant turning point in Maine's economic history. This article has four purposes: first, to set out what happened in Maine's paper industry from 1990 to 2016, then to sketch national industry trends that affected Maine during this period, next to explain major forces underlying these events, and finally to summarize effects on the state economy and local communities.

Mills That Went Quiet, 1990-2016: Overview

Over this quarter century, thirteen mills closed in the Maine paper industry in locations across the state. These closures represented seventy-five percent of the mills, seventy-three percent of the jobs, and fifty percent of the state's wood consumption. This era brought an end to more than a century of papermaking along the banks of the Penobscot. Most of these mills had a long history at their locations, several going back to before 1900, though they were rebuilt and repurposed numerous times. Maine's industry produced many different grades of paper based on different end uses, fiber mixes, and coatings, with no single grade dominating the list of mill shutdowns. Since markets were generally stable during those years, only one of the shutdowns occurred during the 1990s: S.D. Warren at Westbrook closed its pulp mill in 1999 but continued manufacturing specialty papers from purchased pulp. It is included here as it offered the closest pulpwood market for southern Maine landowners. By December 2016, the S.D. Warren mill at Westbrook was one of only two mills owned by the same firm that had owned them in 1990.

The Great Recession of the late 2000s took three more mills. Seven more closures occurred during the years 2012-2016. During this later period, general economic conditions were improving, showing that the causes of the closing were specific to the paper sector. When the mills closed, three of the mill owners were traded on the New York Stock Exchange (NYSE), and one on a Canadian exchange. Only one, Madison Paper, was a multinational corporation. The rest were either private equity, small private, closely held, or family corporations. Three of the closed mills depended on recycled fiber for their raw material, and another three purchased pulp or paper stock. Shifting to purchased fiber was a common strategy for firms operating small, older mills whose pulp divisions were either obsolete or too costly to fit with pollution control equipment. Because the mills were small, new pulp lines would have been uneconomical.

Of the mills still operating in 2016, a number of important points may be noted. First, only one, Verso at Jay, was owned by a U.S. domiciled entity traded on the NYSE. Two were Canadian owned, two were owned by a South African based concern, and one had Finnish ownership. One, at Woodland, had shifted to tissue products, the only paper grade that was growing in the U.S. market. It was held by an Asian entity based in Hong Kong. None of the primary paper mills were held by a U.S. based Fortune 500 corporation, in stark contrast to six (of eighteen) in 1990. A small converting plant in Auburn owned by International Paper Company was the last trace in Maine of the company that once dominated the entire Northeastern paper industry. The closures and cutbacks represented a retreat of the nation's largest paper companies from the region.

None of the mills still operating in 2016 produced higher strength grades of groundwood fiber. None relied exclusively on purchased pulp, nor did any of them rely heavily on outside sales of pulp. Other than their age, there are no common features shared by all of the shuttered mills.

Table 1
Maine Paper Mills Closed or Repurposed, 1990-2016

Owner in 1990	Mill Location	Product when Closed	Type of Owner in 1990	Year Closed	Type of Owner When Closed	No. Owners Since 1990
SD Warren Div, Scott	Winslow	P & W papers	F500	1997	NYSE	2
Statler	Augusta	Tissue	Private	2001	Bonds publicly traded	2
Eastern Fine	Brewer	Specialties	Private	2005	Private	1
Great Northern	Millinocket	GW specialties	F 500	2008	Private - bankruptcy	6
IP *	Lisbon Falls	Building board	F500	2009	Unclear - likely private?	2
Wausau	Jay	Specialties	NYSE	2009	NYSE	Unknown
Gardiner	Gardiner Paperboard	Paperboard tubes	Private	2012	Private	1
Great Northern	East Mill.	GW specialties	Private	2014	PE	6
Champion	Bucksport	P & W, coated	F500	2014	NYSE	2
Fort James	Old Town	Pulp	F500	2015	PE	9
Lincoln P & P	Lincoln	Tissue	Private	2015	Private	2
Madison	Madison	Supercalendered (GW)	MNC	2016	MNC	2
Cascades	Auburn	Recycled pulp	Private	2016	PT MSE	2
SD Warren Div**	Westbrook	Specialty release papers	F500	1999*	Same: repurposed	2
*Memo: A lot like paper:						
**Memo: Uses pulp, different product		Pulp end closed in 1999.				
		Total of 13 mills closed, 1 repurposed				

NYSE = New York Stock Exchange
PE = private equity
MNC = Multinational Corporation
MSE = Montreal Stock Exchange

National Markets: The Tide Turns – With a Vengeance

During the late 1980s and early 1990s, the U.S. paper industry's long-term growth peaked, and then production went into decline. The Federal Reserve Board's Industrial Production Index for paper stood in the 120 range in the mid-1990's, and fell below 100 by 2016. Production in the printing and writing grades, in which Maine mills specialized, declined even more sharply. Per capita consumption of paper products fell steadily after the mid-1990s, and this decline was accelerated by the Great Recession after 2005. From 1990 to early 2016, prices for key Maine paper grades did not keep up with inflation. The Producer Price Index for all finished goods rose sixty percent over this period, while coated paper grades rose fifty-six percent, and groundwood grades fell by ten percent. Coated paper prices stood at the same levels as in 1972.³

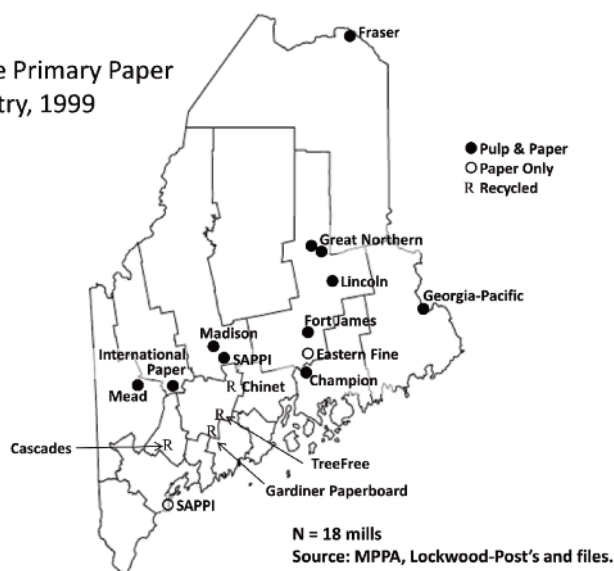
Yet more important than cyclical weakness was the rapid reduction in demand for printing and writing papers. As ninety-three percent of U.S. adults obtained news on the Internet by 2017, the replacement of print media by e-mail, e-publishing and social media proceeded apace. The daily press contracted significantly: in the two decades prior to 2017, U.S. newspapers lost forty percent of their daily circulation, and sixty-three percent of their advertising revenues.

From 2000 to 2014, North American newsprint capacity fell from fifteen million tons to 6.7 million tons, a decline of fifty-five percent. Sales in packaging grades were lost to the rise in imported consumer goods, which were packaged in paperboard produced elsewhere. A specialty groundwood grade, directory paper, began the period using one hundred percent softwood fiber, then became fifty-fifty softwood and recycled, and then orders disappeared.⁴

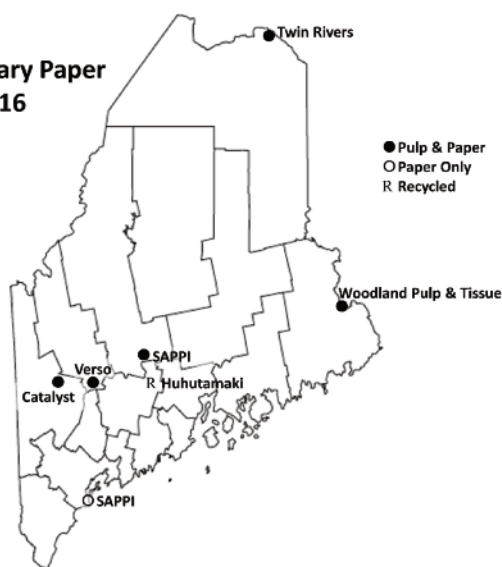
As the decade of the 1990s opened, the paper and allied products industry employed almost 650,000 workers across the country. By 2015, employment had fallen by forty-three percent to 276,000. In 2003 and 2004, a total of 50,000 jobs were lost. The worst years were from 2000 to 2011, when 20,000 jobs per year disappeared. The U.S. paper industry had long been integrated into world markets for pulp, wastepaper, and finished paper, which left it vulnerable to fluctuations in the international exchange rate. The Federal Reserve Board's U.S. dollar exchange rate index rose from 75 in 1990 to 126 by 2002, placing severe competitive strain on U.S. producers. It then declined to 97 by 2011 but rebounded to 123 by late 2016, and this contributed to the burst of mill shut-downs after 2010.⁵

The paper industry has always been cyclical, and it was easy to suppose that the downturn in

Maine Primary Paper Industry, 1999



Maine Primary Paper Industry, 2016



demand would be just another downcycle followed by a recovery. By the early 2000s, though, the extent of the market's secular downturn was becoming evident. Securities analysts considered spending on capital in excess of depreciation foolhardy, but efforts to manage capacity growth were often offset when surviving mills improved quality and increased machine speeds using improved technology, machine rebuilds, and better production scheduling—a process known as “capacity creep.”

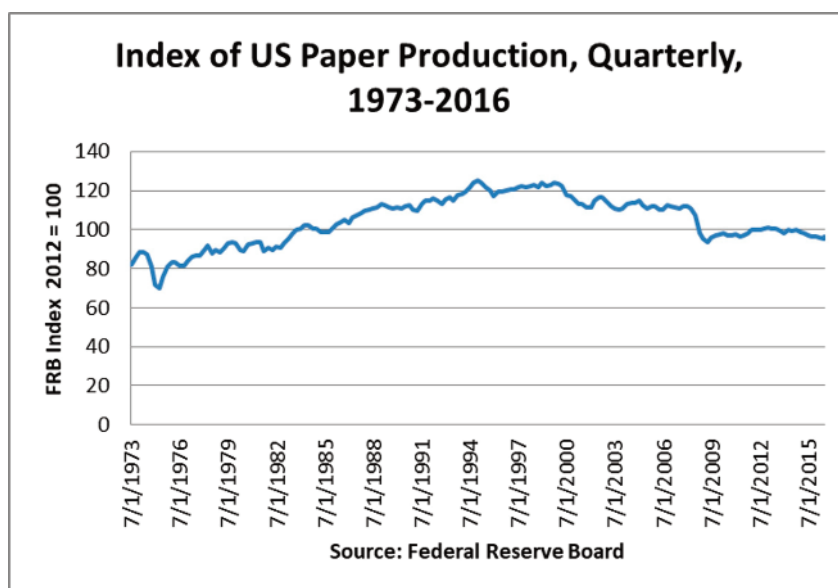
Numerous mergers occurred as companies, on the advice of Wall Street, sought to ways to gain economies of scale from size, operating “synergies,” and pricing leverage. As market growth proved disappointing and then turned to shrinkage, these newly enlarged companies were compelled to shrink by closing down high-cost paper machines or mills and seeking givebacks or concessions from workers by threatening them with closures. Mergers led to an increase in industry concentration. In 1992, the top eight paper manufacturers controlled forty-nine percent of the national value of industry shipments. By 2012, the top eight controlled fifty-eight percent. For some product grades, concentration was higher. If this increased concentration led to any improved ability to sustain product pricing and match production to demand, it could not overcome the effects of shrinking demand.

Maine mill managers found it increasingly



The mills dominated the town's skyline. Bucksport.

difficult to compete internally for capital with their companies' large, low-cost southern mills. Steady growth in demand for printing and writing papers led companies to add white paper lines at their Southern mills, which had low energy and fiber costs and were closer to end users than the Maine mills. Globally, the U.S. lost share of production in major product grades after 2000. In woodpulp its share fell from thirty-three to twenty-eight percent by 2013, and in all paper and board, its share of global output fell from forty percent in the 1960s to eighteen percent by 2013. U.S. paper and board imports increased until the Great Recession and did not recover to their previous peak afterwards. Imports of converted products, however, paused only briefly and then rose above their 2008 level.⁶



Impact on Maine Paper Industry and the State Economy

Pulp and paper production has been a mainstay of the Maine economy for well over a century, and it was particularly important in the early postwar years. From 1947 to 1967 employment in the industry rose from 14,813 jobs to 18,100. By the 1970s, tighter timber supplies and competition from other regions, together with investments in more efficient machinery, began to slowly reduce employment. In 1992 employment stood at 16,000 jobs, which in context represented a modest decline. Following its growth over the twentieth century to its peak of roughly four million tons of paper per year, tonnage began to fall in the late 2000s. By 2016, paper production in Maine had receded to the level of 1970—roughly two million tons.

In 2000 Maine's pulp, paper, and paperboard mills employed 10,374 workers; by 2015 more than 6,000 of these jobs had been lost, a decline of sixty-one percent. In contrast, over the same period, Maine manufacturing in total dropped from 79,000 to 51,000 jobs, a far smaller percentage decline. Losses in the primary paper sector accounted for twenty-two percent of all manufacturing job losses in this period. Mills converting rolls of paper into final products lost an additional 1000 jobs.

Over the full period spanning 1990 to 2016, Maine lost seventy-three percent of its paper jobs. This represented a much more severe decline than in a sample of other major paper producing states. Wisconsin and Oregon, for instance, both lost sixty percent of their paper jobs between 1990 and 2015, while Georgia, with its larger and modern mills and concentration in brown (packaging) papers, lost only forty-one percent. During this period, Wisconsin, a leading competitor in printing grades, lost nineteen mills.

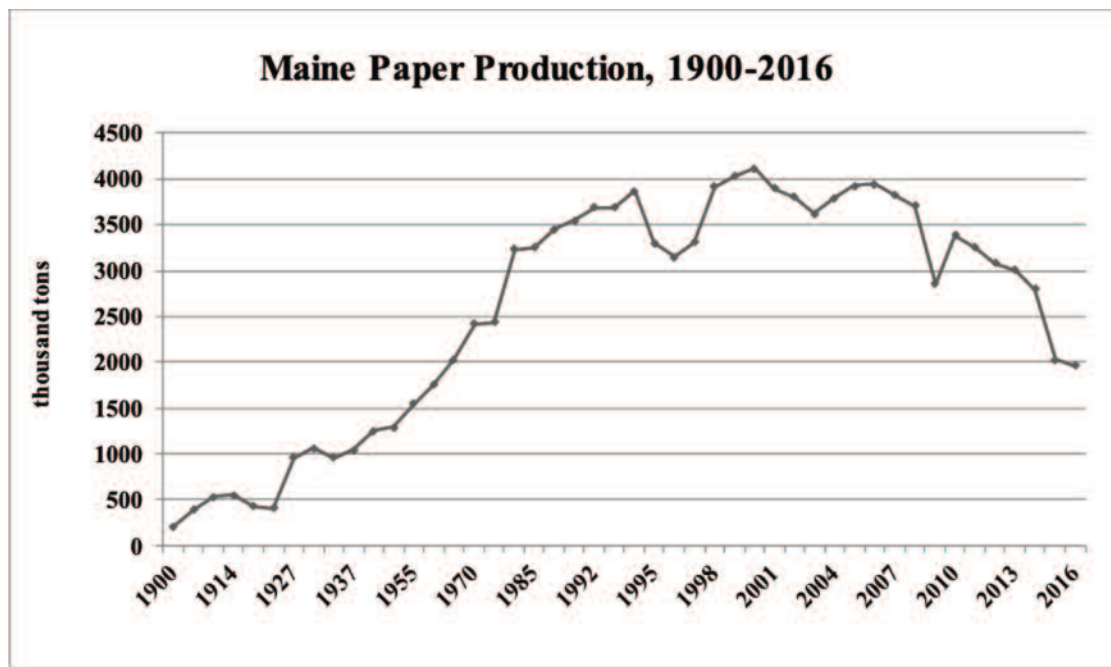
Over these years, wages paid in Maine primary paper and finishing mills declined from \$636 million to \$410 million, a loss of a quarter of a billion dollars per year. This was equal to ten percent of all manufacturing wages paid in 2015. Such a loss in a short time could not fail to affect the state's economy. Much of the industry's production was sold outside of the state

and thus brought dollars into the Maine economy. In 2014 the paper industry's economic contribution was estimated as a direct output of \$4.2 billion, with a total impact, including multiplier effects, of \$6.8 billion; direct employment of 5,922 paper makers led to total employment impact of 21,000 jobs; and direct compensation of \$421 million generated just over one billion dollars in total compensation statewide.⁷

The paper industry's mill closings responded to the same forces that caused the dramatic deindustrialization of the Maine economy. In 1969, thirty percent of the state's GDP originated in manufacturing, but by 1985 this figure had fallen to twenty-four percent; by 2018, it had fallen to only 8.3 percent. This decline reflected absolute shrinkage in manufacturing employment as well as strong expansion in the trade and services sector. In addition to declining market demand over this period, Maine lost one key competitive advantage after another. What were these forces?

Maine's Competitive Advantages Slip Away

In the early 1990s, concerns about the competitive position of Maine's papermakers were already in the air. The mills were aging and often in locations where expansion was difficult. The timber supply was tightening; mills were automating individual processes or closing uneconomic machines. Large modern mills appeared in the South in the 1950s and offshore after the 1990s. The largest world-class mills were as much as ten times larger than the typical Maine mill. In capital-intensive and energy-intensive industries like paper, plant-level scale is critical. Nationally, output per worker, according to U.S. Bureau of Labor Statistics Data, nearly doubled between 1990 and 2015, significantly reducing mill headcounts per ton produced. Ironically, Maine mills had for the most part made the transition from obsolete grades, had met existing environmental standards, and had made large investments in key machinery. In a 2003 conference at the University of Maine, James McNutt, a former Great Northern Paper employee, summarized the competitive position of Maine's paper industry. He found that on av-

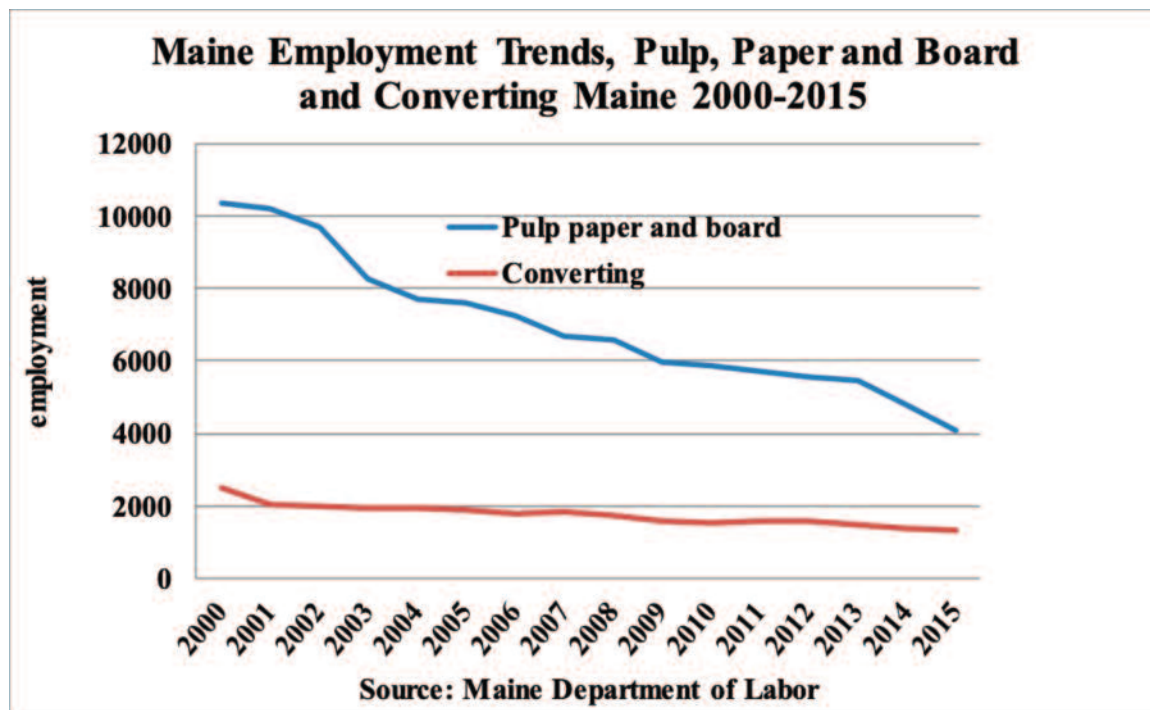


Source: Atlas of the Forest Resources of Maine, Supplement. February 1987, The Forests of Maine, U.S. Department of Commerce Current Industrial Reports to 1989; 1990 to 1997 from American Forest and Paper Association; 1998-2011 from the Maine Pulp and Paper Association; and 2012 to 2016, author estimates based on estimates of fiber usage at Maine mills by Eric Kingsley of INRS, Portland Maine. These 2012-2016 estimates should be considered very rough, for literary purposes only. Given confidentiality concerns, it is possible that actual production volumes for pulp and paper in the past decade or so will never be known, until confidential archives of investment bankers and others can be seen by scholars.

Table 2
Changes in Maine Employment and Wages Paid, 2000 to 2015, by Industry

Industry	Employment			Total Wages Paid		
	2000	2015	Percent Change	2000	2015	Percent Change
Logging	2,583	2,227	-356	70.2	100.7	30.5
Manufacturing	79,450	50,614	-28,836	2,817.4	2,728.4	-89.0
Wood products	7,865	4,658	-3,207	212.8	186.0	-26.8
Furniture and related products	2,199	1,182	-1,017	59.9	52.9	-7.0
Pulp, paper, and paperboard	10,374	4,069	-6,305	576.7	336.1	-240.6
Converted paper products	2,473	1,335	-1,138	86.1	74.3	-11.8
Subtotal within Manufacturing	22,911	11,244	-11,667	935.5	649.3	-286.2
Total, including Logging	25,494	13,471	-12,023	1,006	750	-256

Source: Maine Department of Labor.



erage, Maine mills' fiber costs were a lower proportion of total cost than the U.S. average, probably due to differences in product mix, with its higher value products. Yet Maine's total costs per ton were \$144 per ton higher than the U.S. average. Others viewed the cost position differently at the time, but later analyses confirmed the general picture.⁸

The Maine Legislature established a Commission to Study the Future of Maine's Paper Industry. The report, issued in 1995, relied heavily on a Finnish consulting firm with a global practice. Their analysis found that Maine could be competitive in some grades, and at that time upgrades were being considered by some mill owners. However, the consulting firm, Jaakko Pöyry, considered any large increments in wood consumption beyond normal "creep," a possible single coated free sheet machine, and incremental hardwood usage to be unlikely. In 2001, this writer presented an assessment of several leading grades to the Finance Authority of Maine which was considering applications for loan guarantees. At that time, industry operating rates were strong but early signs of market weakness were becoming evident.⁹

In 2005, another legislatively-mandated assessment found many mills in the high cost quartile compared to the national industry. So long as national demand remained stable, this cost ratio was tolerable, but even as the report was written, signs of the dramatic turnaround in paper demand were becoming unmistakable.¹⁰

Wood supplies were becoming less competitive as well. By 2014, Northeastern costs per ton of delivered fiber were well above other regions. Costs for hardwood were ten dollars per ton higher than in the Lake States and fourteen dollars higher than the South. Softwood averaged sixteen dollars per ton higher than in the South. Roughly four tons of wood are required to produce one ton of dry chemical pulp. This means a forty-eight dollar per ton wood cost disadvantage for northeastern mills: orders can be won or lost on smaller price differences. On a 200,000 ton per year paper machine, a forty-eight dollar per ton cost difference would amount to nearly ten million dollars per year.¹¹

Over most of the twentieth century, transportation of logs by river driving conferred a cost advantage. This practice ended, however, in

1976. Replacing it required a costly network of roads, which not only required initial investments but annual maintenance and winter plowing. In contrast, Southern mills had no snow-plowing costs and could conduct logging for more weeks over a year. All of these factors contributed to delivered wood costs. Another factor was the shrinkage of the Northeast's rail network. As rail service became spottier and less reliable, a downward spiral ensued as speed limits fell, rolling stock aged, and freight rates failed to reflect lower levels of service. As high tonnage customers, the mills needed competition for their outbound freight between the truckers and the railroads. Some customers became desperate enough to invest in rolling stock themselves and even acquire rail branches. Overall, the 1990s brought low profitability and the 2000s, a series of consolidations and plant closures. Maine entered the new century with a fleet of aging, high-cost mills and high-cost energy and raw materials. Investments made in energy systems, machine improvements, and environmental controls were not enough to change this cost position significantly.¹²

Inputs: Timber, Land, Labor, and Energy

A traditional competitive advantage for Maine mills has been the abundant supply of spruce and fir timber which produces strong paper with good printing qualities. Spruce-fir so dominated the fiber mix that many major landowners paid little attention to managing their large hardwood resources because they did not expect to ever need it. But as the spruce-fir resource peaked and became threatened by spruce budworm outbreaks, learning to use hardwood became critical. Soon, papermakers began to seek paper traits that were well served by hardwoods, and the fiber mix changed even more. By 1992, hardwood and softwood were used in equal proportions, and the hardwood ratio rose to eighty-three percent by 2016.¹³

Land ownership was traditionally considered to be a keystone of sustainability for paper companies. Early in the twentieth century, investment bankers required papermakers to con-

trol a portion of their raw material supply by land ownership. In addition, by controlling lands in upstream watersheds, the mills could protect their log driving activities from interference and could control hydropower development rights. Yet, as market growth slowed and profitability weakened for the Maine mills, Wall Street began noticing potential capital locked up in timberland that was carried on the books at original purchase prices from the 1900s to the 1960s. Up to the 1980s, land holdings in the Maine woods turned over from time to time, usually resulting from mergers. In most instances, the mills stayed with the land. By the end of this period, though, all of the mills had disposed of their timberlands. None of the mills that closed during 1990-2016 were operated by companies owning Maine timberland, though at least one (Verso Bucksport) held a long-term wood supply agreement. Of the mills that remained open, several held supply agreements of varying duration. In this new economic environment, then, owning land could not save the mills. In nearly every case, the land had been sold off before the final mill closings took place.¹⁴

At the manufacturing level, Maine's labor environment was probably not a major contributor to the industry's competitiveness issues, when placed in context of the dramatic market declines and the age of the mills. Direct labor is not a large proportion of mill-level cost, compared to wood, energy, and chemicals. Nevertheless, it is true that over the years many mills had become heavily staffed relative to competitors elsewhere. At one mill in the late 1970s, workers with pushpoles were moving pulpwood sticks through sluices to the debarkers, something not seen at any of the same company's world-class mills in the South. Efforts to mechanize, automate, and trim staff contributed to union-management strains at times. From 1990 to 2015 national labor productivity improved by ninety-seven percent, which would naturally reduce employment if production remained constant. By 2010 wage levels in Maine mills were significantly lower than in Georgia and Oregon. But they were significantly higher than in Wisconsin, Maine's leading competitor in paper

Table 3
Companies Operating in Maine in 2016

		<i>Products 2016</i>	<i>Owners 2016</i>	<i>No. Owners since 1990</i>
Sappi	Westbrook	Casting and release papers	MNC	3
	Somerset	Bleached packaging grades	MNC	3
Catalyst	Rumford	Specialties	Can. TSX	4
Verso	Jay	Same	NYSE	2
Twin Rivers	Madawaska	Specialties	Can. PE	2
Woodland Pulp & Tissue	Woodland	Tissue	Asian investment group	3
Huhtamaki	Waterville	Recycled paper plates, etc.	Finnish MNC	2

tonnage, and the premium rose steadily over the period. Strikes in Maine paper mills were uncommon. Causes varied but were usually sparked by conflicts over work rules. During this period, strikes at Boise Cascade, Rumford (1978 and 1986), Great Northern Paper at Millinocket and East Millinocket (1978), and International Paper Company at Jay (1987-88) drew media attention and spawned several books. During one such strike, a mill executive mentioned informally to this author, "it's been so long since we had a strike, we didn't know what to do." It is likely that by the 1990s the episodes of downtime, machine closings, and later outright mill shutdowns induced unions to be more willing to negotiate painful concessions and avoid strikes.¹⁵

In contrast to a fairly placid labor climate in the mills, the industry's supply chain from the forests into the woodyards was fraught with contention and occasional well-publicized disruptions. In 1975 a group calling itself the Maine Woodsmen's Association, consisting of independent woodcutters, organized a "strike" by blocking deliveries of wood to the Old Town mill. In 1979 woodsmen briefly blocked roads from Canada to protest bonded workers coming into the Maine woods. Issues between the com-

panies and the woodcutters ranged from allowances paid to the loggers for use of their chainsaws and wood scaling methods to the piece-rate system and the use of Canadian workers in the woods.¹⁶

By 1990 important changes were underway at the mills and in the woods, including a shift to lower-cost hardwood pulpwood, a rising use of chipping equipment in the woods, smaller logs for softwoods due in part to the losses to spruce budworm, and longer hauling distances associated with more remote operations. Adapting to these challenges was costly, rendering investments in older equipment valueless. Environmental regulations played a more important role in day-to-day operations. The labor intensity of harvesting and hauling declined dramatically as capital intensity rose. A mechanized system capable of cutting trees, limbing and bucking them, and loading them aboard trucks could cost one million dollars in the late 1990s.¹⁷

The relations of employment shifted. Before 1990, most north woods loggers worked at camps operated by the mills, the landowners, or large contractors. After 1990 the system shifted to operators of small to medium-sized contracting firms, often specializing in one phase of the

operation, such as road-building, trucking, harvesting, and even loading. Even though contractor rates were higher than wood costs from company camps, the new owners wished to reduce head counts as much as possible. In parts of the Maine woods it was possible to find a busy harvesting operation with a dozen or more people working, all of them subcontractors and not one of them legally an employee. Some of the more successful contractors operated remote chip plants under contract to paper companies, and some even became substantial timberland owners themselves. The paper companies and landowners wished to avoid company crews that would create a risk of unionizing their supply chains. In addition, Maine's reputation for costly Workers' Compensation motivated them to avoid any direct liability for on-the-job injuries in the woods. At the same time, many loggers preferred the feeling of operating their own businesses granted by working as independent contractors.¹⁸

Periodic strife between the industry and woodworkers led to demands for legislative remedies, but the situation was changing even as analysts sought to understand it. Remedies were elusive and difficult to define, and the economic situation seemed replete with contradictions because of imperfect markets for wood, la-

bor, and logging services. Clearly, geography was important, given the road networks and settlement patterns in Maine and Quebec, but how important distance and geography were in setting conditions of labor supply and demand, wages, and related terms of employment remained under contention. Most analysts recognized high wood costs as an issue for mill competitiveness, but costs rose primarily because of long hauling distances, not higher labor or operating costs on individual logging jobs.¹⁹

Control of hydropower had long appeared to be a major competitive advantage for northeastern paper mills. Great Northern Paper's extensive power system, consisting of six generating sites, thirteen storage dams, and thirty-one generators, supplied half of its electric load. Many of the mills had originally been powered by direct-drive waterpower and later by electricity generated at their own dams. But the mills soon outgrew their own power sources and became dependent on purchased electricity, natural gas, oil, or coal. An example of a mill with no controlled hydropower was Bucksport. Drying finished sheets required coal, oil, or natural gas for the heat. For this reason, Southern mills close to gas wells or pipelines had a significant cost advantage, especially before deregulation of gas prices.

Table 4
Average Annual Pay, Primary Paper Industry (NAICS 3221)
Maine and Competing States, 1990-2015

	1990	2000	2010	2015		1990	2000	2010	2015
	Average Annual Pay					Percent Difference Between Maine and:			
Georgia	\$38,646	\$58,268	\$76,455	\$85,923		129	2,624	9,006	3,159
Maine	\$38,517	\$55,644	\$67,449	\$82,764		0	0	0	0
Oregon	\$43,863	\$60,817	\$77,600	\$84,567		5,346	5,173	10,151	1,803
Wisconsin	\$38,050	\$53,458	\$63,704	\$69,605		-467	-2,186	-3,745	-13,159

Source: U.S. Department of Labor and Maine Department of Labor

As utilities were deregulated in the 1980s and 1990s, northeastern utilities became “wires companies” no longer generating their own power. A wholesale market for power developed, and the price of electricity skyrocketed as oil prices rose. Mills that depended on purchased power were at a disadvantage, especially during occasional periods of natural gas shortages. One company that owned its power system sold its dams because selling the power was better business than using it to make paper. Thus, what had been an advantage during the original development of the paper industry disappeared.

Markets and Money

When production of newsprint and packaging papers shifted to other regions in the late twentieth century, Maine mills adapted by moving to higher value-added printing and writing grades. Rapidly growing markets for these papers buoyed the industry for decades. As markets for these grades declined in turn, no large-scale markets appeared that could absorb the industry’s production. Options to convert to other grades did not exist. Surviving mills adapted to specialty products requiring nimbler marketing and gained skill in producing smaller runs of specialties instead of filling large orders of a single grade as before.

In the 1990s, a new phenomenon appeared in forestry: environmental certification. This system was established by nonprofit groups to “certify” environmental performance of forest owners. After a controversial and bumpy period of development, two certification systems arose, the Forest Stewardship Council and the Sustainable Forestry Initiative. Landowners certified large areas of Maine timberland, often as a defensive measure, hoping that certified owners could realize a “green premium” in their markets as a reward for good environmental management. Today, while many paper items in our mailboxes display FSC or SFI labels attesting to the “controlled” origin of their paper, the hoped-for green premium has proven elusive. In the eyes of some critics, so has the promised high level of environmental performance. In any case,

other states soon caught up with Maine in the area under forest certification.²⁰

Given these complications and considerations, Wall Street securities analysts complained endlessly about low returns on assets and offered a solution: consolidate. A round of mergers ensued, motivated by the undeniable need to boost returns, to capitalize improvements to mills, and to seek enhanced pricing leverage by moving toward a more concentrated industry structure. The merger boom fed on itself, as some companies sought out merger partners to grow large enough to make themselves less appealing takeover targets. Most of these mergers were benign from the standpoint of Maine mills and their communities. At first, the mills were acquired by larger and better capitalized firms. This often led to investments that enhanced their chances for survival, at least for a time. Georgia-Pacific and Great Northern Paper merged to become the largest timberland owner in the state, but their status was short-lived. They soon sold off both their land and their mills. As the demand downturn proceeded, mill acquirers tended to be investment partnerships and single-unit firms. The dominant multinationals were not in the market for more capacity. The various arrangements that led to these acquisitions usually entailed government funding, wage or work rule concessions by unions, or state concessions on environmental issues.²¹

Many of these mills were held by large corporations far longer than they might have survived had they been family-owned, stand-alone companies. It took some time for industry leaders to realize the severity of the long-term decline the industry faced in demand for its products. Not until the after 2010 did the U.S. Forest Service begin to forecast a future of restrained or declining demand.

From Maine’s perspective a shrinking paper industry was a notable event. Yet, in the national perspective it was not surprising. In the 1970s, the Fortune 500 list of companies contained a number of paper companies and lumber and wood companies, including the principal Maine companies. Yet by 2015 the wood and paper firms had been so far surpassed in size by immense technology, telecommunications, phar-

maceutical, and energy companies that they no longer warranted a category in Fortune’s listing. Vertical integration—whether by landownership, control of electric power, or building sawmills to supply chips—could not save the Maine industry from the sharp demand decline of the past quarter century. Nor could consolidation by mergers.

When Paper Mills Go Quiet

The immediate effects of mill cutbacks and closures were dramatic. At most mills, the cutbacks came in small doses over the years in the form of machine downtime, trimmed shifts, or periodic shutdowns due to lack of orders or high energy prices. These events added to a sense of uncertainty, leading finally to a paper machine shutdown that could easily cost one hundred jobs or more. Converting plants suffered proportionately less than did the paper mills. Most visible in press reports were the job losses. Cumulatively over this period, Maine’s paper and converting industries lost a total of 7,400 jobs, a decline of fifty-eight percent. Wages fell by about \$250 million per year. During the same period, Maine suffered a total loss of 28,000 manufacturing jobs. Losses in the forest-based sector were part of a broader trend of de-industrialization.

Because the job losses were concentrated in small communities, the impacts were severe. In many of the affected mill towns, populations had been shrinking for decades due to mechanization, and later, machine cutbacks. Mechanization in logging was also a factor, as the three-million-ton decline in demand for wood forced severe cutbacks in the logging and hauling sector. By 2000, most mill towns had experienced significant population losses, and population adjustment continued through the next two decades. The losses in wage payments over the period had a devastating effect on businesses dependent on year-round local payrolls. Also, paper mills brought a continuous flow of vendors, specialized service providers, and customers to the communities, giving major year-round support to local food service and lodging

businesses. Resulting downtown vacancies and peeling paint become obstacles to attracting affluent tourists and investments in new businesses. These effects spread across the state. In 2010 the Maine Pulp and Paper Association estimated that just five of the mills later to close spent a total of \$557 million on wood, wages and supplies in that year. The closure of even a woodyard in a remote town would cut down sales of diesel fuel, sandwiches, and coffee at the nearby convenience store, resulting in the store failing.²²

Lost papermaking capacity echoed through the forest products economy in numerous ways. Paper industry shutdowns affected landowners and loggers who lost markets for pulpwood and biomass chips. Ironically, the industry that once depended upon its long-fibered spruce and fir, by the end of 2016, used very little. Many landowners and loggers were left without markets for this species of pulpwood. Further, paper mills were tightly linked to suppliers of forest biomass because they used biomass in their energy systems. Finally, sawmills had relied on sales of chips to paper companies for significant portions of their revenues. Between 1977 and 1999, and from 2001 to 2016, an average of nearly one million tons of chip consumption was lost due to paper mill closures. At an average price of forty dollars per ton, this amounted to forty million dollars in lost revenues to the state’s sawmills.

The mills were critical to local tax bases. In a tabulation done in 2001, Maine mill towns relied on the paper mills for as much as eighty-five percent of their tax revenue. Even in the larger, more diversified communities of Westbrook and Winslow the mills were significant taxpayers:

Table 5:

Woodland	85%
Madawaska	67%
Millinocket	42%
Rumford	72%
Skowhegan	60%
Bucksport	63%
Winslow	25%
Westbrook	14%

Disputes with local tax authorities simmered as town officials attempted to sustain revenues in the face of rising costs. Even the mills that survived had to seek relief on property taxes, as their assessed values declined due to weaker market and profit prospects.²³

Paper mill towns always had costly residential real estate, due to the limited amount of private land in the immediate neighborhoods and the fact that low property taxes were capitalized into house prices. Following mill closures, property prices fell, rental vacancy rates rose, and tax valuations declined. Depressed property markets persisted over long periods.

One important effect of a lost paper mill is often not readily apparent in state-level statistics. A unionized manufacturing plant with hundreds of employees under a generous health plan is a critical factor in the survival of the local hospital. Communities were also left with stranded infrastructure investments in water systems, waste treatment plants, schools, and other facilities. Effects on families were complex and generated considerable press and literary comment.²⁴

Slow economic growth, remote location,



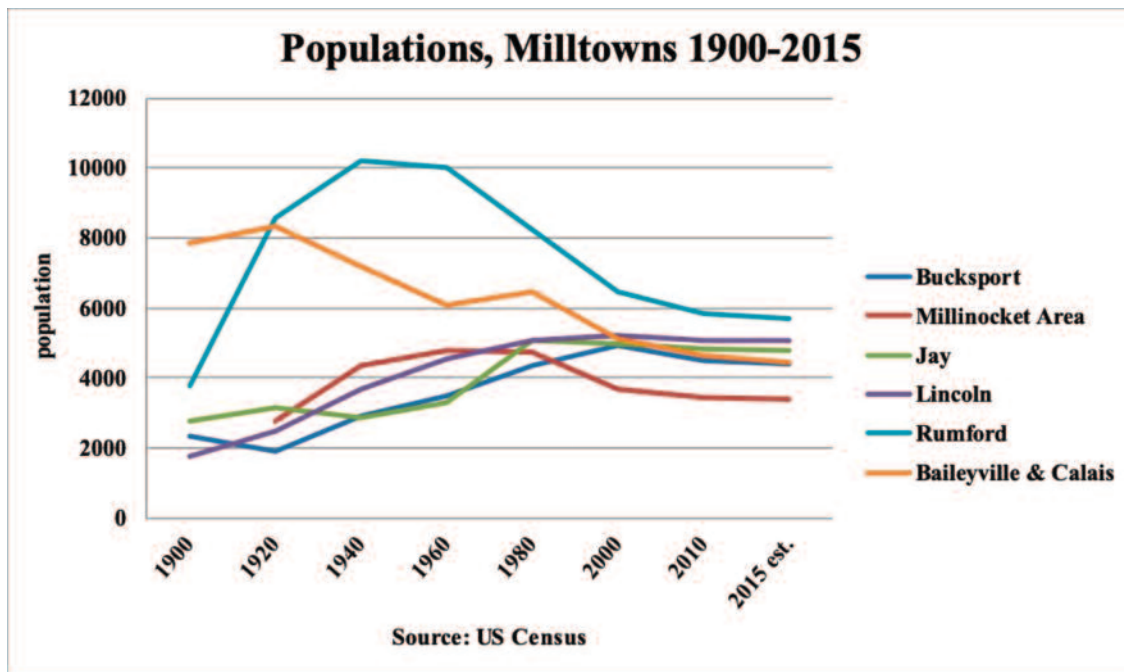
High productivity logging equipment is costly to own. Forwarder, photo taken at 2017 Bangor Logging Show.



Post shutdown Maine street storefront. East Millinocket.

and the sheer number of derelict sites dimmed the prospects for redeveloping tracts of industrial land. In Millinocket, the 1,400-acre mill site was acquired by a local group, Our Katahdin. Indicative of the value of such properties, the price was one dollar. (Actually, the price was negative as the group had to assume a \$1.5 million debt to the town for unpaid taxes.) A proposal for a large biofuels project emerged but would only need a part of the property. In areas closer to population centers, industrial brownfields competed with other aging properties seeking redevelopment. At Bucksport, the mill site was cleared after purchase by a firm specializing in redeveloping industrial sites. Since cleanup and redevelopment of such sites is costly, investors in subsequent uses often seek to extract favorable tax concessions from desperate communities. As a result, communities may never replace the tax revenues once produced by the paper mills. Options that work in urbanized areas may not succeed in mill towns on the edge of the North Woods, where tourism visits are highly seasonal. Many places may end by imitating Augusta's decision to turn the riverside site of a demolished textile mill into an attractive park – to produce amenity instead of tax revenues.²⁵

Two final effects are important in the general picture. First is that the paper industry's de-



clining energy needs—from conversion to wood and natural gas for fuel as well as from shut-downs—has ended their need for power generation at more than a few hydro dams. Large, well maintained dam systems are now owned by utilities or investment companies, an example being Great Northern’s energy system. Many smaller dams were removed, donated to others, or remained with paper mill owners who viewed them as white elephants. Opportunities for improving fish runs often stalled amidst local disputes. Also, in the more remote regions, the passing of the paper companies removed the one force capable of maintaining roads and water crossings to a high standard. After only two generations of low cost use of this private road system, hunters and other visitors complained that mainline roads were deteriorating and that more and more stream crossings on spur roads had been removed. Motorized recreationists today often view the old paper company days with nostalgia.

Closing Reflections

In just a quarter century, an industry once known by its superlatives – biggest mills, fastest paper machines, biggest dams, biggest land ownerships, and biggest logging machines – saw

most of its manufacturing capacity, employment, and payrolls pass into history. It left small communities at the edge of the Maine woods with vacant industrial sites, dashed hopes, and painful adjustments ahead. Maine’s mills saw demand for their products collapse rapidly. There were no high-volume grades to which they could convert. There was no feasible way to compete with new world-class mills elsewhere, some of them ten times as large. While mistakes were made at various levels, in retrospect there was no single cause of this series of events. There was no single corporation with the money and power to alter history. There was no public policy intervention that could have forced the tides of America’s paper industry to cease ebbing.²⁶

Three developments are perhaps diagnostic of the changed place of paper in American life. First, the Newspaper Association of America changed its name to the News Media Alliance in 2016. It had lost 700 members since 2008 alone. In spring 2017, Governor Paul LePage claimed that by publishing legal notices in newspapers, the state was propping up a dying industry, calling it “a taxpayer subsidy of the worst sort.” The old axiom that “you don’t get into an argument with someone who buys ink by the barrel” no longer holds. Finally, the Maine Pulp



Redevelopment opportunities in urban settings include popular brewpubs. Topsham.

and Paper Association, the industry's information and lobbying arm, closed its doors in 2016 after decades of representing the industry.²⁷

Each of these mill town communities has its own history, its own story, but few of these stories have been told. A challenge for historical research is to document them before memories fade and key documents are discarded. Much of the research and writing on the industry in this period addressed specific incidents such as strikes, the immediate effects of shutdowns on individual communities, or specific topics through statistical tools. Other assessments examined national market trends, prices, trade, and interregional and international competition through an economic and business lens. Two eloquent memoirs evoked the industry from the viewpoint of a family, a neighborhood and a community.²⁸

Finally, various official bodies grappled with highly technical and contentious policy conflicts over imports, labor conditions in the woods, and pollution regulations as they erupted over the decades. Their reports offer important documentary information even if they were unable to resolve all the issues. Sifting through all of this information does not yield a clean set of historical judgments, but even this complicated un-

derstanding of what happened to Maine's paper industry and why will help government leaders, as well as historians, and the public, to appreciate a key event in Maine's economic history.²⁹

Author's Note

While this article focuses on the period from 1990 through 2016, the following updates on mill towns through the date of publication may be helpful to readers. First, though, national paper production fell a further 4.7 percentage points from 2015 to 2019, before slipping yet another 5% by the third quarter of 2020 due to the COVID pandemic.

Rumford

This mill was owned by Catalyst briefly before being acquired in 2018 by ND Paper, a subsidiary of Nine Dragons Paper Holdings, the largest containerboard producer in Asia. Your computer monitor might have been delivered in a box made by ND. Nine Dragons is publicly traded in Hong Kong. The Rumford mill produces a mix of specialty papers and pulp.

Old Town

The implied "RIP" in the first table may have been premature. This property became enmeshed in a scheme to supply pulp and energy for a major conversion of the University of Maine to renewable energy. This project collapsed among bitter disputes over University contracting procedures and other issues. Then in 2018 the mill was purchased and refurbished by ND Paper, a subsidiary of Asia's largest containerboard producer. The firm plans to increase capacity and produce only softwood pulp. ND plans to boost production well above its level prior to the last shutdown. Production was restarted in late 2019. As of year end 2020, planned production levels apparently had not yet been reached due to technical issues.

ND also owns mills in Wisconsin and West Virginia. The company's interest in U.S. pulp sources was caused by the Chinese government's decisions to end imports of waste paper, Nine



GNN Stock certificate purchased by author at a souvenir stand in Guilford Connecticut many years after the company was acquired by Georgia Pacific and its stock certificates were recycled.

Dragons' principal fiber source. These acquisitions at Rumford and Old Town, in addition to the ownership of the mill at Woodland, mark a new era of Asian capital in the Maine paper sector.

Madison

The property was acquired in 2017 by GoLab, a Belfast, Maine startup firm planning to produce an innovative wood-based insulation product. As of June 2020, the firm planned to close on major financing in summer 2020 and begin production in 2021.

Millinocket

As of 2016, Thermogen, a planned biofuels project, was in development by a New Hampshire investment firm, Cate Street Capital. This

proposal collapsed in the midst of financing delays, issues over technology, and recriminations over alleged financing irregularities. In Jan. 2017, the property was sold to Our Katahdin, a local economic development group.

At both Millinocket and Lincoln, efforts to attract a plant to manufacture wood-based construction products continue. In 2018, a North Carolina firm a producer of Cross-Laminated Timber and other laminated products, leased land at Our Katahdin's site. Concerns over tax obligations inherited by Our Katahdin ended that proposal. The company, renamed Ligna-Terra, then relocated, announcing a plant at Lincoln on the former millsite there. This plant will probably not replace the wood demand formerly represented by the area's paper mills. In February 2021, Standard Biocarbon Corporation signed a letter of intent to lease part of the Millinocket site for a plant that will produce

“biochar,” a specially processed charcoal-like product with a variety of uses.

Jay

In 2018, Verso upgraded its No. 3 paper machine. In late 2019, the mill was sold to Pixelle Specialty Solutions. In April 2020, a digester explosion temporarily closed the mill. Paper production was restarted using purchased pulp. In December 2020, Pixelle announced that it would not be able to make the investment to restart pulp production there, but would run two paper machines using pulp from its other mills plus purchased outside pulp.

In 2018, yet another major assessment of

Maine’s forest resource and industry potential was completed, again with a Finnish consultant and with wide industry and stakeholder involvement. This was funded by the federal Economic Development Administration. These reports supply a detailed look at the global and regional competitive position of Maine’s wood-based industries. For all reports see www.formaine.org.

To close out the decade, in December 2020 the Governor’s Climate Council issued a major report outlining long-term goals for reducing the state’s CO₂ emissions, with important implications for forest management and for the energy-intensive paper industry. See <https://www.maine.gov/future/initiatives/climate/climate-council>.

NOTES

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