The ECONOMIC IMPORTANCE of NEW YORK'S FOREST-BASED ECONOMY 2013

North East *State* Foresters Association

I. Introduction

From Long Island, to Buffalo, to Plattsburgh, the trees and forests of New York provide New Yorker's and visitors alike with multiple values and amenities. These range from easily recognizable and measurable economic and recreational benefits, to benefits known as "ecological services", such as clean air, clean water, biological diversity, temperature moderation, and carbon sequestration.

Rob Davies, State Forester New York Forest Service

While New York is currently 63% forested, just over 80 years ago the state was covered by only half this area of forest. New York has benefited immensely from this unprecedented and dramatic reforestation, while at the same time maintaining a diversity of other land cover such as farms, water, urban, other open spaces. In recent decades, economic benefits in all corners of the state have grown because the forests have grown. The increased forest supports a critically important wood products industry, as well as an increasingly active population looking for added recreational opportunities. This report, "The Economic Importance of New York's Forests" provides a brief overview of the value of one of New York's most important assets.

Robert Davies, State Forester
New York Forest Service
Fall, 2013

Acknowledgements: Funding for this report was provided by the State of New York and the U.S. Endowment for Forestry and Communities through the Northern Forest Center.

This report is an update of a series of similar reports that have been published for the State of New York by the North East State *Foresters Association since the early 1990s. The goal is to capture the economic value of the forest-based economy of the State and provide analyses of trends for key economic indicators. The sectors covered in this report include forestry and logging, related trucking, wood products manufacturing, wood furniture and related products manufacturing, pulp and paper manufacturing, wood energy, and the forest-based recreational economy that includes camping, hiking, hunting, downhill skiing, cross-country skiing, snowmobiling, fall foliage viewing, and wildlife viewing. Additional discussions in this report, compared to past reports, include use of economic multipliers to give a truer picture of the forest-based economy, carbon content of the forests of New York and the relationship of ecosystem services to the forest-based economy.*

Data for this report come from federal, state and private sources. For a full list sources, please see the end of this report.

We would like to thank the many people who assisted with the development of this report including Robert Davies and Sloane Crawford of the New York Division of Lands and Forests, Department of Environmental Conservation.

II. Executive Summary

- Forest area and species – **New York's forests cover just over 19 million acres** of land or **63% of the State land area** and have increased rapidly beginning in early 20th century and largely been at current levels since the 1980s. **Northern hardwood forests, dominated by beech, birch and maple, make up over 53%** of the forest cover.
- Forest ownership – New York's forests continue to be largely privately owned by **individuals/families and business who together own over 76% of the forest**.
- Forest inventory, growth vs. harvest – The forests of New York continue to add to the inventory of tree volume as net growth exceeds harvest annually by a ratio of nearly 2.5 to 1. Currently, **New York's forests grow 716 million cubic feet per year while approximately 331 million cubic feet of timber is harvested annually**. New York's standing forest contains 52 billion cubic feet (652 million tons) of timber 5 inches in diameter or larger which includes reserve lands. For timberland acreage, the forest contains 38 billion cubic feet.
- Value of forest industry economic sectors – The annual value of sales or output of **New York's forest products industry totals over $ 9.9 billion while the forest-based recreation economy is worth $8.2 billion**. Approximately **43,912* workers are employed in the forest products, maple and Christmas tree sectors** while another **31,926 jobs are found in the sectors that include and support the forest recreation economy**. Approximately one-half of all timber growing, harvesting and forest products manufacturing jobs and economic output value are related to the use of timber products harvested from New York's forests.
- **Using multipliers** generated through IMPLAN, an economic model, **it is estimated that the forest products sector has $12.4 billion in economic output and 61,171 jobs** when taking into account the rippling effect this industry has on the other parts of the economy.
- **Economic output and number of jobs in the forest products sector have been reduced since peaks in the 1990s and early 2000s**. This has mirrored similar trends in other manufacturing sectors in the U.S. as more and more manufacturing has moved to other parts of the world.
- While most of the timber harvested in New York is processed in New York, timber products flows freely in the regional economy. In 2011, **2,960,000 cords of timber were harvested in New York, 2,600,000 cords were processed in New York while 431,000 cords were exported, mostly to Canada, and 71,000 cords were imported**.
- The sale of timber products in New York provide forest owners with around $250 million of revenue annually. Many owners rely on these funds to pay real property taxes related to their ownership.

Table 1.

Gross Output, Forest-based Manufacturing & Recreation, New York, 2011

	millions of	jobs*
Forestry, logging & trucking	$470	2,300
Wood products manufacturing	$1,100	8,866
Furniture and related product manufacturing	$2,500	14,500
Paper manufacturing	$5,700	16,500
Wood energy	$137	700
Christmas trees and maple syrup	$24	1,046
Sub-total direct	$9,931	43,912
Sub-total with multipliers	$12,362	61,171
Forest Recreation	$8,200	31,926
Total	$20,562	93,097

GSP, Forest Products Manufacturing	$3,171
GSP, All Manufacturing, New York	$63,088
GSP, Total for New York	$1,205,930

*full-time equivalent jobs

GSP – Gross State Product includes value added, which is equal to its gross output minus its intermediate purchases from domestic industries or from foreign sources.

Gross Output – Includes the total value of all products produced and shipped by all producers (essentially sales).

III. The Forest Resource

Forest Area

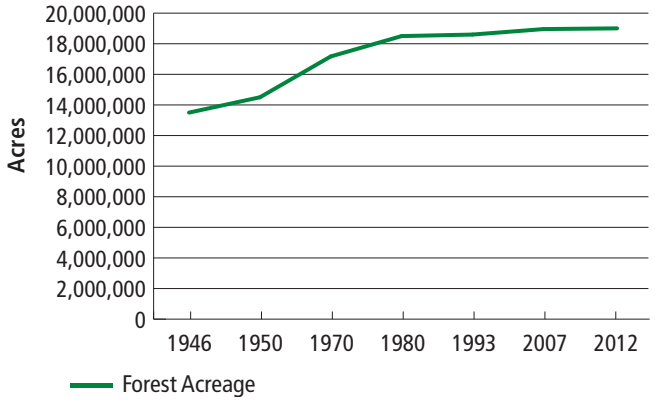
New York is 63% forest cover and the area of forests has been increasing since the late 1880s when agricultural land was abandoned for more fertile lands in the mid-west. Of the 19 million forested acres in New York, nearly 16 million acres are considered "timberland", meaning these lands are capable of producing timber crops and are not classified as "reserved" forest where timber harvesting is not permitted.

Data from the USDA Forest Service Forest Inventory and Analysis shows that there was a slight increase in forestland area from 2007 to 2012 of 47,512 acres.

Longer term forest trend data (Figure 1) shows that forest acreage has been steadily increasing since 1946 and likely since the 1880s (but data is not available before 1946). In 1946, New York forests covered approximately 13,500,000 acres. Forest acreage has been relatively stable over the last 35 years.

Figure 1

New York Forest Acreage



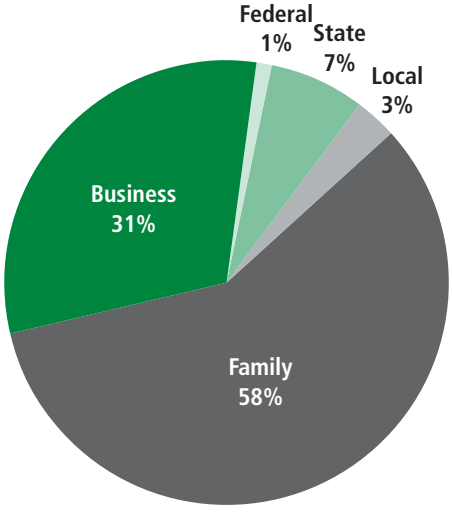
Source: USDA Forest Service, Forest Inventory and Analysis, Harvard Forest – multiple data sources

Forest Ownership

The individual or family forest owner sector continues to dominate the ownership of New York's forest. Fully 76% of New York's forests, or 14.4 million acres, are owned by individuals or families (Figure 2). The State of New York owns 22% or approximately 4.2 million acres of New York's forest and local government, another 3% at 510,000 acres.

Figure 2

New York Timberland Ownership, 2012



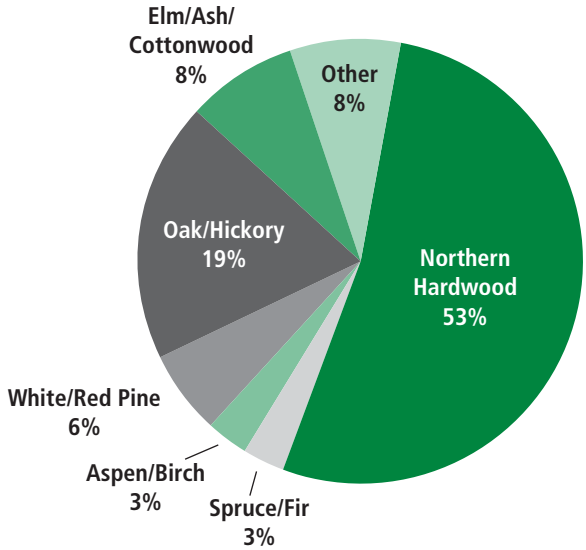
Source: USDA Forest Service, Forest Inventory and Analysis & private data

Forest Types

New York's forests are dominated by the northern hardwood type. There are more than 8.4 million acres of northern hardwood in the New York woods. Oak/hickory types cover 3.0 million acres and elm/ash/cottonwood type is a distant third at 1.2 million acres while all other species are at a similar acreage.

Figure 3

New York Forest Types, 2012



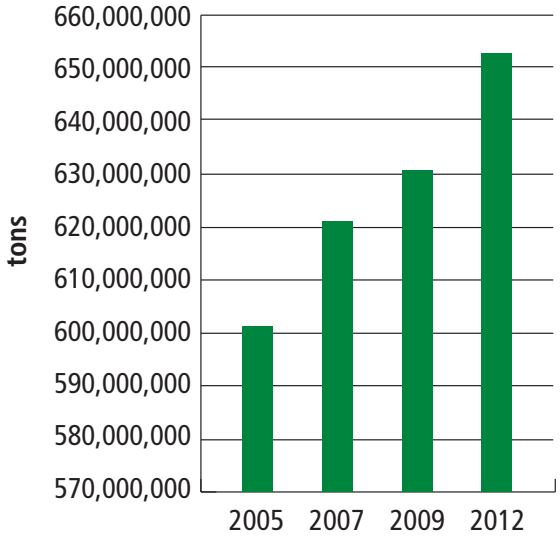
Source: USDA Forest Service, Forest Inventory and Analysis

Timber Inventory

To understand the volume of wood growing in the forests of New York, it is most useful to look at inventory trends over time rather than just current static volumes. Growth, mortality and harvest levels determine the overall changes over time. At gross volume levels, Figure 4 shows that standing volume of timber in New York increased over 8% from 2005 to 2012. Standing volume is over 652 million tons of wood in trees 5 inches and larger.

Figure 4

Biomass on Timberland - dry weight of merchantable boles 5" and up - New York

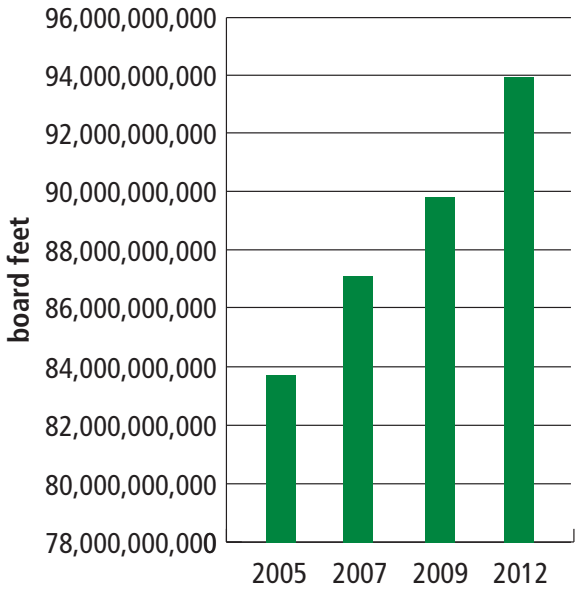


Source: USDA Forest Service, Forest Inventory and Analysis

From a timber value perspective, it is important to know what is occurring over time with the sawtimber component of the timber inventory in New York since sawtimber products are generally much more valuable than lower quality timber products such as pulpwood, firewood and energy chips. In Figure 5, we see that the volume of sawtimber trees also increased from 2005-2012, in this case, by over 12%.

Figure 5

Net Volume of sawtimber trees on timberland, in board feet (International 1/4-inch rule) in New York



Source: USDA Forest Service, Forest Inventory and Analysis

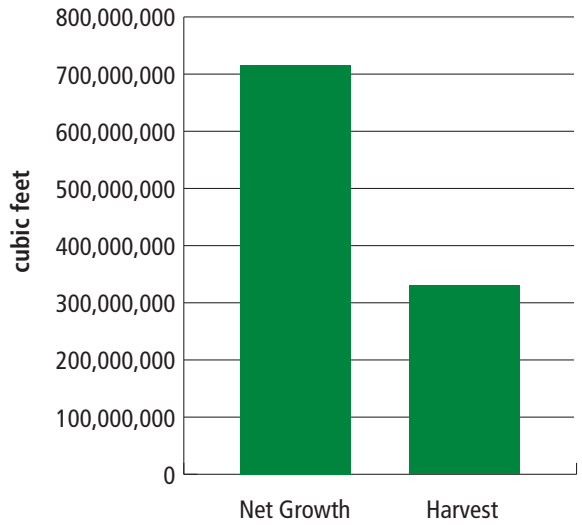
Sustainability - Growth, Mortality and Removals from New York's Forests

New York's forest inventory, in terms of volume, is increasing over time. To understand this better, we need to look at growth, mortality and tree removals. The USDA Forest Service's Forest Inventory and Analysis (FIA), where much of the data discussed so far in this report is derived, is also the best source for understanding growth, mortality and removals. The FIA data set in New York is derived from a series of about 3,000 fixed, on-the-ground plots that are re-measured over time, roughly every five years. Each on-the-ground plot represents approximately six-thousand acres and has been providing forest data for over 50 years.

In Figure 6 below, the current FIA data shows that, statewide in New York, annual net growth[1] in New York's forests, on timberland acreage, is over 716 million cubic feet per year. At the same time, approximately 331 million cubic feet of timber is harvested annually. The difference between the net growth and harvests – 385 million cubic feet – is the annual extra growth that accounts for the increasing inventory of trees in New York.

Figure 6

2012 Annual Net Growth of live trees 5" + vs. harvests in New York



Source: USDA Forest Service, Forest Inventory and Analysis

1. Net growth means the growth of the trees in the forest less the mortality of trees

The difference between forest net growth and harvests is a key measurement for understanding the sustainability of the use of the forest. There are other aspects of forest management, including the following, that further add to understanding the status of forest sustainability in a state:

a. **Certified forestland** – There are a substantial number of acres of certified lands under the American Tree Farm System, Forest Stewardship Council and Sustainable Forestry Initiative in New York. Nearly 2 million acres of New York's forests are certified through one of these systems. In addition to the sustainable harvest levels discussed above, these voluntary standards cover a full range of requirements covering forestry/ecological, economic, and social issues. Although not officially a "certification program", NY's 480-a Forest Tax Law does require landowners enrolled to use good timber harvesting prescriptions, and address threatened and endangered species and water quality BMPs.

b. **Best Management Practices for Water Quality Protection** – The biggest impact to forests, aside from their conversion to a non-forest use, is forest harvesting activities. Truck roads, skidder trails, and presence of heavy equipment are integral to forest harvesting operations. Water quality degradation and soil erosion can result if proper procedures are not followed. New York, along with virtually all forested states in the country, has had in place for many years voluntary Best Management Practices for Water Quality Protection, commonly called BMPs. The certification programs mentioned above all require use of BMPs and, more importantly, use of BMPs on forestry operations has become integrated into most forest operations in the last 10 or more years. States also have water quality regulations in place to protect soil and water resources. These backstop "voluntary BMPs" extend the Federal Clean Water Act protections.

c. **Use of professional foresters and loggers** – The use of foresters and certified loggers is one key to encouraging sustainable harvesting operations, whether lands are certified or not. Information from the National Woodland Owners Survey of the USDA Forest Service shows that foresters are involved in forest operations on over 34% of family forest owner land ownerships in New York. Additionally, a high percentage of loggers operating in New York are either trained or certified through the New York Logger Training or Master Logger programs.

Carbon in New York's Forest

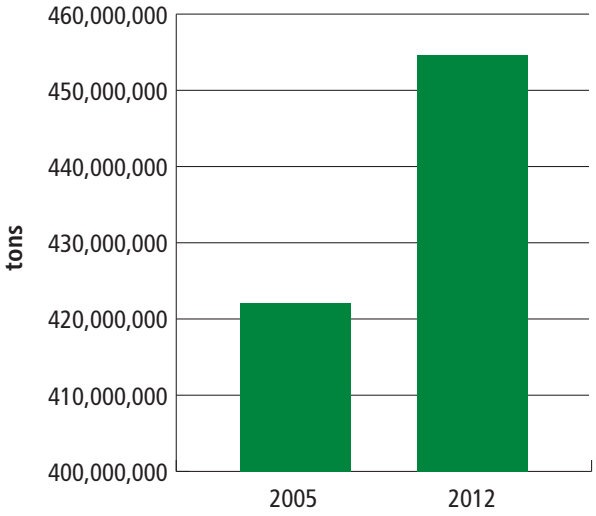
It is well known that trees and forests are an important element of the Earth's carbon equation. Science has shown that carbon dioxide levels are increasing, likely in large part due to emissions associated with human industry and transportation. Most scientists believe that this increase in carbon dioxide and other "greenhouse gases" is the key reason why planetary temperatures, on average, are on the rise. Forests naturally take carbon dioxide out of the atmosphere in their normal practice of photosynthesis, and the by-product emitted to the atmosphere is the oxygen that we breathe.

The result of this natural phenomenon is that as forests grow, and if their inventory of wood increases over time, they act as positive carbon sinks where atmospheric carbon dioxide is turned into carbon in the wood of the tree. Forests with increasing volumes and carbon mass can provide a positive benefit in the greenhouse gas equation. Further, markets for sequestering carbon in forests are developing and a limited number of landowners are now receiving monetary returns for agreeing to sequester more carbon than normal on their forests for long periods of time.

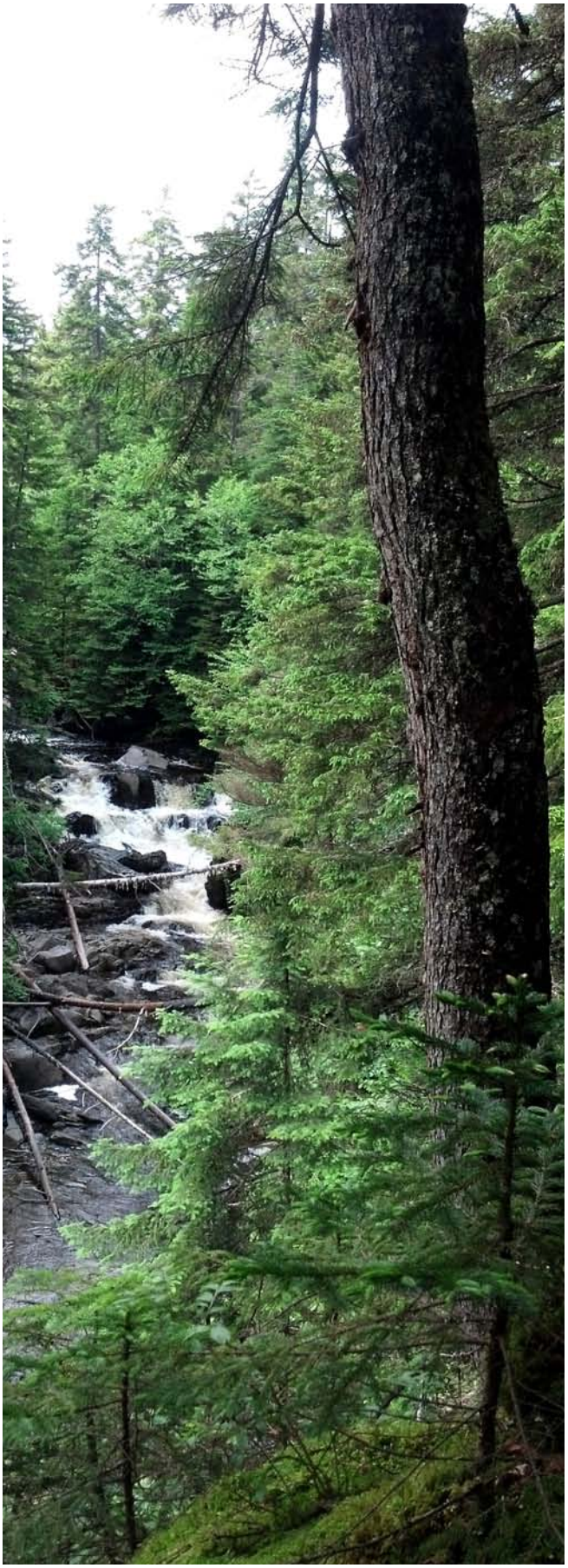
According to FIA data, the carbon in the above ground portion of trees one inch in diameter or more has increased in New York nearly 8% from 2005 to 2012.

Figure 7

Aboveground carbon in live trees 1"+ in New York



Source: USDA Forest Service, Forest Inventory and Analysis



New York's Forest Projections

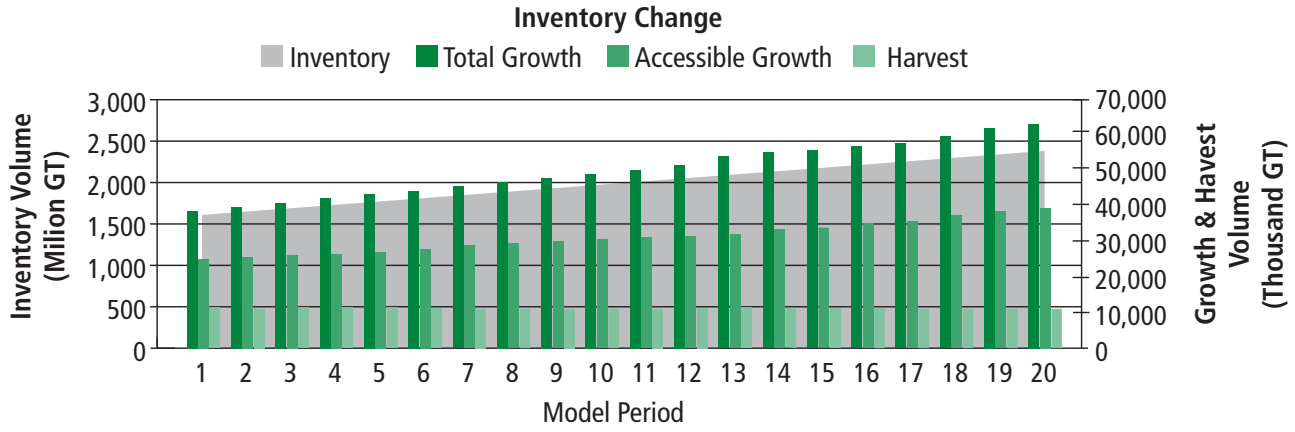
Using the Northern Forest Biomass Project Evaluator[2] tool developed by the North East State Foresters Association through a grant provided by the USDA Forest Service, we are able to take a look at a possible future inventory of the forests of New York. The evaluator provides a computer model of net growth based on input of a number of variable factors. Figure 8 shows a 20 year future projection of the forest resource in New York based on assumptions that harvest levels stay constant, timberland acreage is reduced slightly over time and the growth rate is reduced slightly over time.

In this future projection based on certain assumptions made in the model run, the total growth and accessible growth increases and the total inventory increases from 1,625 million tons of standing forest at the beginning of the period to 2,384 million tons at year 20 including all live woody biomass. This represents a 47% increase in standing volume of the forests of New York, across all ownerships and acreages.

Figure 8

Northern Forest Biomass Project Evaluator – A steady state run for New York for 2013-2033

Inventory totals are for all live, above-ground biomass on timberland.



2. Go to www.nefainfo.org to obtain a working version of the model for your own use.

Forest Health

Though forest health is not a focus of this paper, it is important to touch on it. The three insects of greatest concern today are hemlock wooly adelgid, emerald ash borer and Asian longhorned beetle. At the moment, the Asian longhorned beetle has been eradicated in some locations where it has been found in the Northeast but it has continued in others and new populations are emerging in other locations. The other two are real threats, but fortunately only to two tree species: ash and hemlock. No big losses have occurred yet in New York, but hemlock wooly adelgid is being found in at least 29 counties in the southern and western part of the state now, which makes it probably the bigger threat now. Outside of that, there is talk that spruce budworm may show up again which could affect a small acreage in New York. The last outbreak was in the late 1970s, and it resulted in the mortality of vast acreages of spruce-fir forests from Maine to New York. Should another outbreak of spruce budworm appear, it could have significant effects in the very spruce-fir forests that regenerated beginning in the late 1970s following the last outbreak.

Invasive plants, such as autumn olive, buckthorn, multi-flora rose, barberry, and garlic mustard all appear to be growing in area and reach. As they become more established, forest trees are being affected and in some cases are crowded out by invasive plants. Climate change may stimulate growth of valuable trees but it also allows invasive plants to get established and grow faster as well.

High-grading, the practice of harvesting only the highest quality and value timber while leaving the rest, affects both the value of the standing timber and the health of the remaining forest since the practice leaves the least valuable and, generally, least healthy specimens in the forest.

Lastly, the effects of climate change on the forests of New York remain uncertain. This phenomenon may even increase forest growth due to increased CO_2 levels, and we simply do not know enough to suggest long-term effects on the trees directly from climate change.

IV. Forest-Based Economy – current status and trends

The forest-based economy of New York includes removing forest products and non-consumptive uses of the woods. It is also one of the oldest sectors of the state's economy.

On the wood forest products side of the equation, it starts in the forest and includes the forestry, logging, and trucking components in which management, harvesting, and transportation move the raw material from the forest to various markets for processing. From there, primary products are manufactured in many subsectors, including solid wood products from sawmills, plywood mills and other specialty product mills. These primary products are then used by secondary manufacturers in making finished goods such as furniture, moldings and millwork, flooring and wooden pallets. Pulp and paper manufacturing facilities are both primary and secondary manufacturers. Lastly, the growing wood energy sector is found at large wood-fired power plants, medium to small sized commercial facilities using woody biomass to create heat and/or electricity and at the residential level where homeowners heat their homes with firewood or wood pellets. A number of wood pellet production facilities in New York also provide feedstock for the growing wood energy sector.

On the non-consumptive side, forest-based recreation is a large and growing part of the economy. Thousands of people visit New York's forests for camping, hiking, hunting, downhill skiing, cross-country skiing, snowmobiling, wildlife viewing, and fall foliage viewing.

It must be noted that some of the data included in the next sections are from 2012 but most are from 2011. Activity and output in the forest products manufacturing sector has seen a big upturn in 2013 as the country comes out of the recession. The data on the next page do not show this.

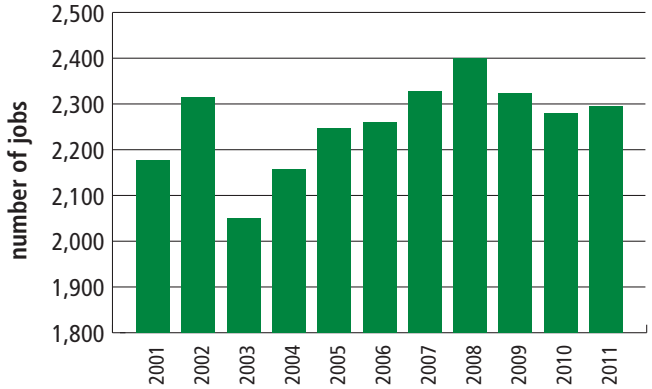
Forestry, logging, and trucking

The forestry, logging, and primary trucking sectors of the economy do one thing – get the logs, pulpwood, firewood, or chips from the forest to their primary manufacturing market. Employment in this sector is estimated at 2,300 jobs down from a high of over 2,400 in 2008 (see Figure 9). Payroll for forestry and logging in New York exceeds $130 million annually (Figure 10).

The annual economic activity for forestry trucking, found in the form of annual sales or value of shipments, is over $ 170 million (Figure 11).

Figure 9

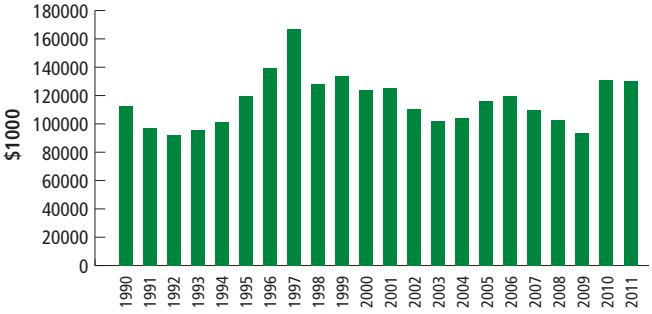
New York forestry, logging & trucking jobs



Source: U.S. Census Bureau – Census of Manufactures 2013 & industry estimates

Figure 10

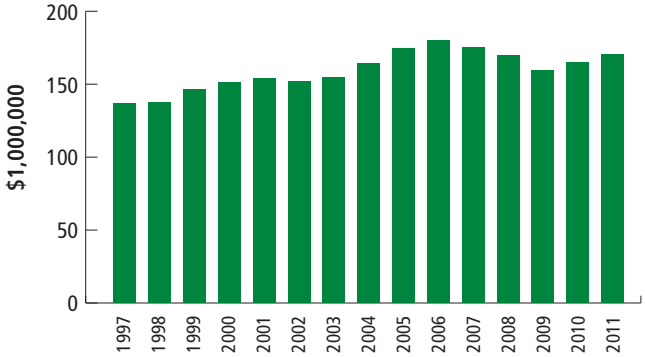
New York forestry and logging payroll



Source: U.S. Census Bureau – Census of Manufactures 2013

Figure 11

Forest products truck transport annual sales for New York



Source: U.S. Census Bureau – Census of Manufactures 2013 and trucking industry non-published data

ECONOMIC MULTIPLIERS

The data used for economic output and jobs in this report are for direct jobs and output. All sectors of the economy have connections to other parts of the economy that are not recognized in direct jobs and output numbers. Economic multiplier formulas are often applied to better represent the effect of a sector on the economy. In the past reports like this from NEFA, economic multipliers have not been used for the forest products sector and sub-sectors. As in the past reports, the way the forest recreation jobs and economic value have been developed is by an industry standard that uses a multiplier-like approach to value the effect that the recreation economy has on New York.

There are a number of readily acceptable economic multiplier formulas and we have chosen to use IMPLAN here because it was created with the forest products industry in mind. Compared to an annual value to the economy of $9.9 billion, with IMPLAN multipliers, the forest products economy output is valued at over $12.4 billion annually. Without multipliers, the forest products economy jobs are estimated at 43,912 and with multipliers 61,171 jobs.

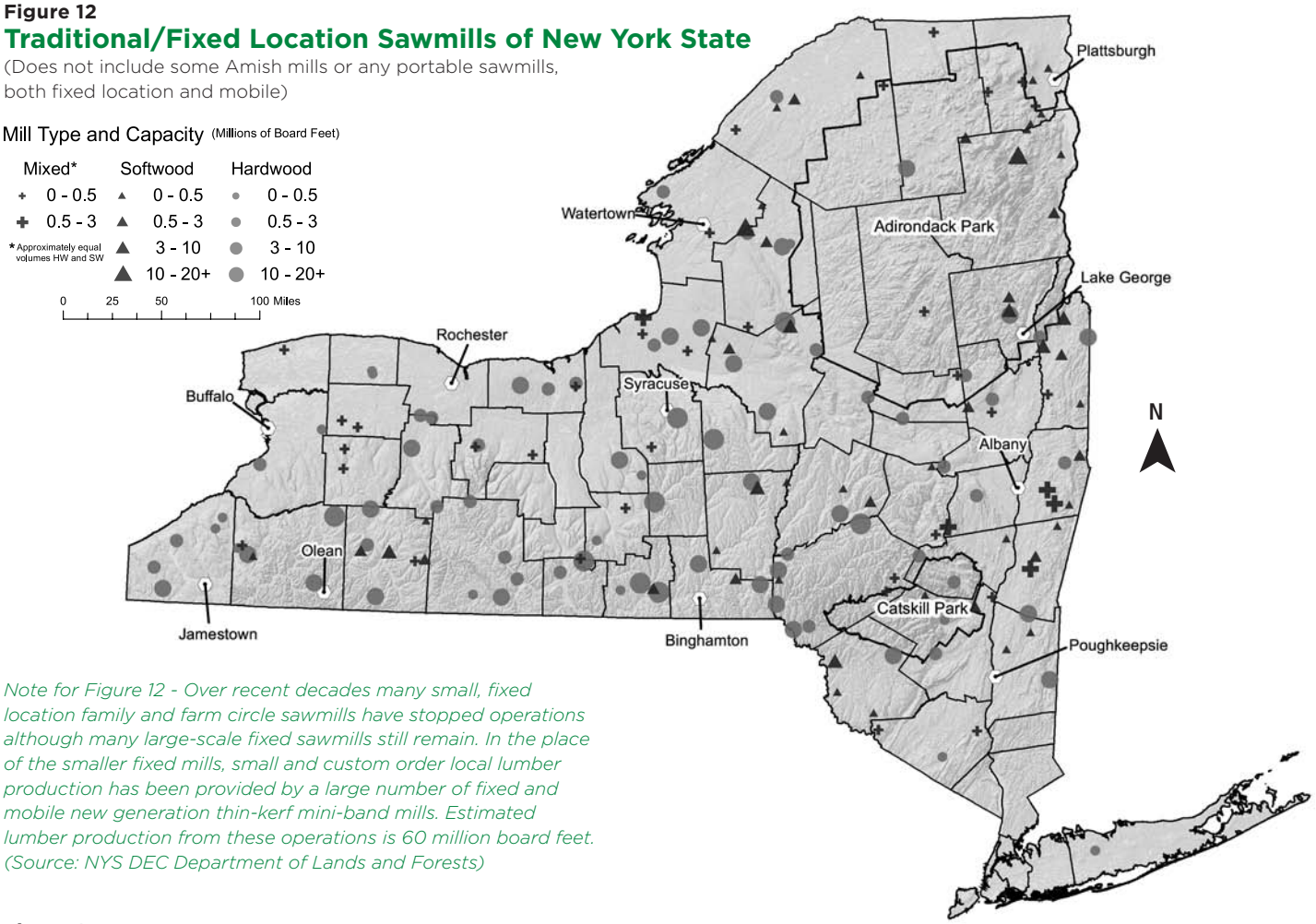
Primary manufacturing – wood products

Manufacturers of lumber, plywood and other primary wood products employ 8,866 workers, which is down from a high of approximately 13,000 in the year 2000. Interestingly, during the period from 1997 to 2011, worker productivity increased. In 2011, it took about 75% the number of workers to produce the same value of wood products as in 1997[3]. Payroll in the wood products sector is approximately $247 million annually. As seen in Figure 14, payroll has decreased since a high of $ 347 million in 2005.

Figure 12

Traditional/Fixed Location Sawmills of New York State

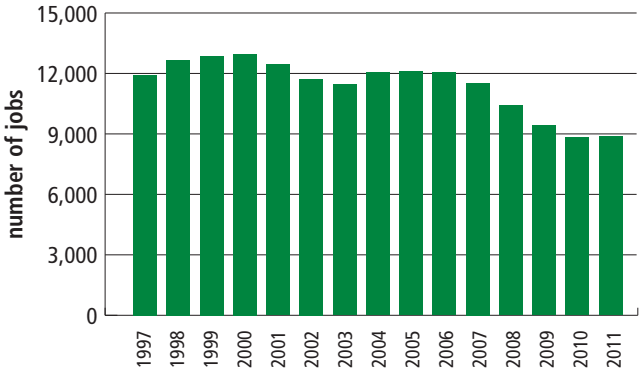
(Does not include some Amish mills or any portable sawmills, both fixed location and mobile)



Note for Figure 12 - Over recent decades many small, fixed location family and farm circle sawmills have stopped operations although many large-scale fixed sawmills still remain. In the place of the smaller fixed mills, small and custom order local lumber production has been provided by a large number of fixed and mobile new generation thin-kerf mini-band mills. Estimated lumber production from these operations is 60 million board feet. (Source: NYS DEC Department of Lands and Forests)

Figure 13

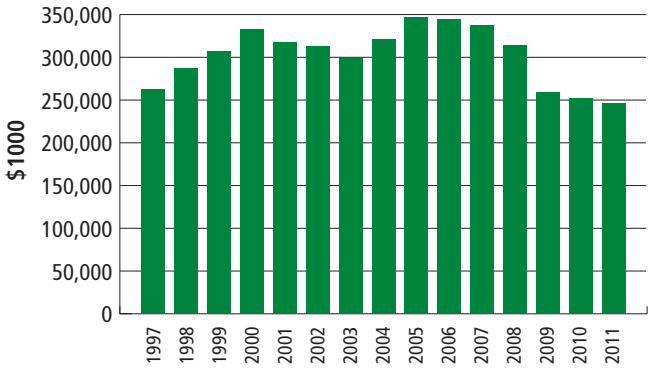
New York primary lumber manufacturing jobs



U.S. Dept. of Commerce – Bureau of Economic Analysis

Figure 14

New York primary lumber products manufacturing payroll



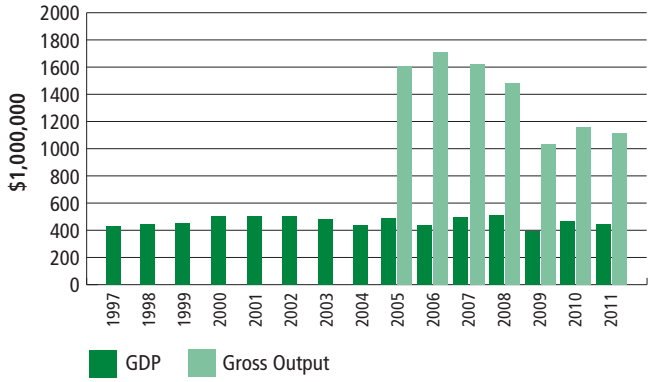
U.S. Dept. of Commerce – Bureau of Economic Analysis

3. Worker productivity analysis based on value of product rather than volume is complicated by the fact that prices per unit of product tend to rise with inflation over time.

Lastly, annual economic output, in the form of annual sales or value of shipments for the wood products sector is approximately $1.1 billion in New York. This sector peaked with economic output of approximately $1.7 billion in 2006.

Figure 15

New York manufacturing output



U.S. Dept. of Commerce – Bureau of Economic Analysis & Census of Manufactures

GDP – Gross Domestic Product includes value added, which is equal to its gross output minus its intermediate purchases from domestic industries or from foreign sources.

Gross Output – Includes the total value of all products produced and shipped by all producers (essentially sales).

Pulp and paper

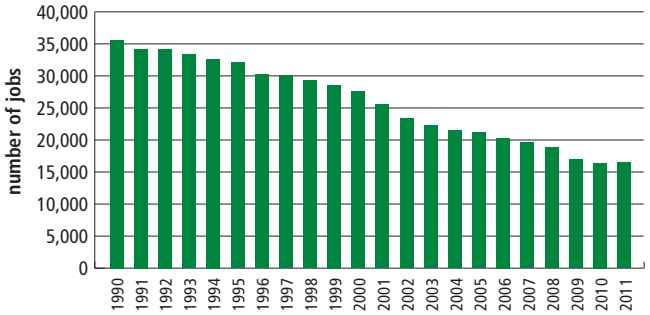
The pulp and paper industry combines primary manufacturing in the pulp facilities and secondary in the papermaking section of the plant. In New York, most secondary paper related manufacturing happens in plants not associated with primary pulp mills. These facilities employ over 16,500 workers, down from approximately 35,000 in 1990. Worker productivity in paper manufacturing has also increased over the last 20 years with pulp and paper workers today able to produce double the amount of pulp and paper product value per worker. Payroll in the paper sector is approximately $907 million annually. Payroll has decreased since a high of nearly $1.2 billion in 2000.

Annual economic output, in the form of sales or value of shipments for the pulp and paper sector, is approximately $5.7 billion in New York (Figure 18).

The price of pulp and paper affects sales trends, so actual pulp and paper production more clearly reflects what has occurred over time. Figure 18 shows that current production is higher than 1970 production but lower than the peak in 2000. Since pulp and paper produced in the northeastern U.S. are commodity products competing with similar products produced throughout the world, the drop-off since then is largely the result of the reduction in worldwide paper consumption and purchasers buying their paper elsewhere.

Figure 16

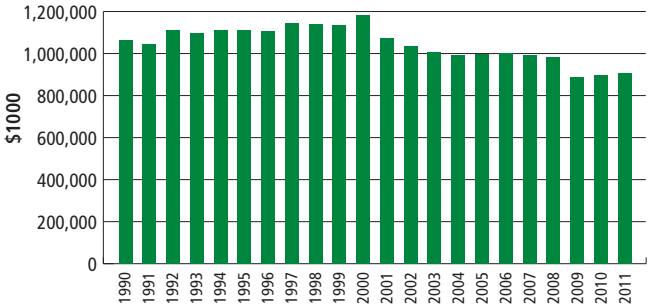
New York pulp and paper manufacturing jobs



U.S. Dept. of Commerce – Bureau of Economic Analysis

Figure 17

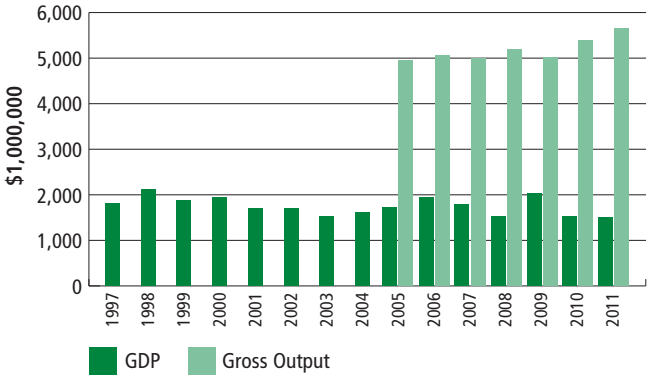
New York pulp and paper worker annual payroll



U.S. Dept. of Commerce – Bureau of Economic Analysis & New York Department of Labor

Figure 18

New York pulp and paper output



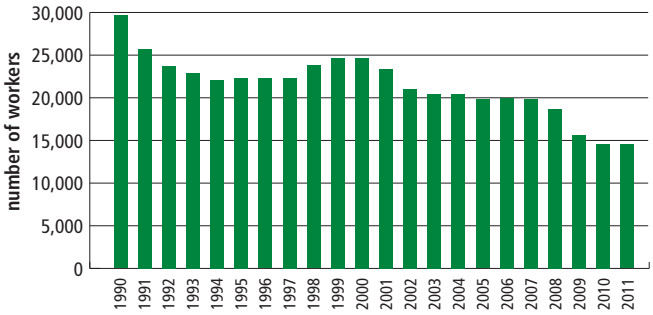
U.S. Dept. of Commerce – Bureau of Economic Analysis & Census of Manufactures

Secondary manufacturing (furniture and related) – wood products

In the secondary wood products manufacturing sector – furniture, moldings, turnings and all production where the primary solid products are transformed into final or parts for final consumer products – New York employs just over 14,500, which is down from a high of approximately 29,000 in 1990. As in other sectors, worker productivity has increased rapidly over the last 20 years. In 2011 it took only 67% of the workers it took to produce a unit of value in the secondary wood products sector as it did in 1997. The secondary wood products sector payroll in New York is approximately $544 million annually. It has decreased since a high of $700 million in 2000 and 2007 but has started to increase again in the last several years. Lastly, annual economic output, in the form of sales or value of shipments for the secondary wood products sector is approximately $2.5 billion in New York (Figure 20).

Figure 19

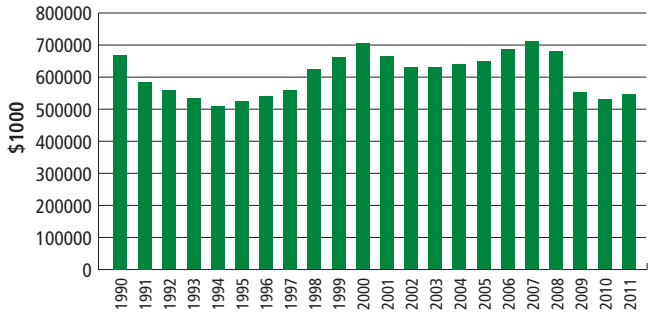
Number of workers in secondary wood products manufacturing in New York



U.S. Dept. of Commerce – Bureau of Economic Analysis

Figure 20

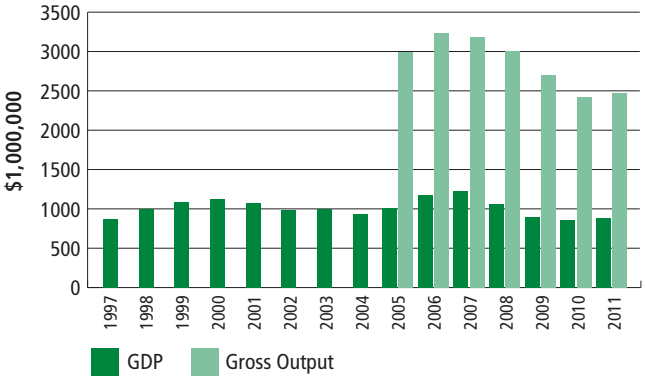
Secondary wood products manufacturing payroll in New York



U.S. Dept. of Commerce – Bureau of Economic Analysis & New York Department of Labor

Figure 21

New York secondary wood products manufacturing output



U.S. Dept. of Commerce – Bureau of Economic Analysis & Census of Manufactures

While the three forest-based manufacturing sectors—primary lumber, pulp & paper and secondary manufacturing—are reported in the document, it should be noted that portions of each of these sectors are more directly related to the forests of New York than others. For instance, the two integrated pulp and paper mills located in New York use locally harvested timber products so the employment and economic outputs of these facilities have a direct connection to New York's forests. On the other hand, a vast majority of paper related products manufacturing in New York use wood material harvested from forests outside the state and country.

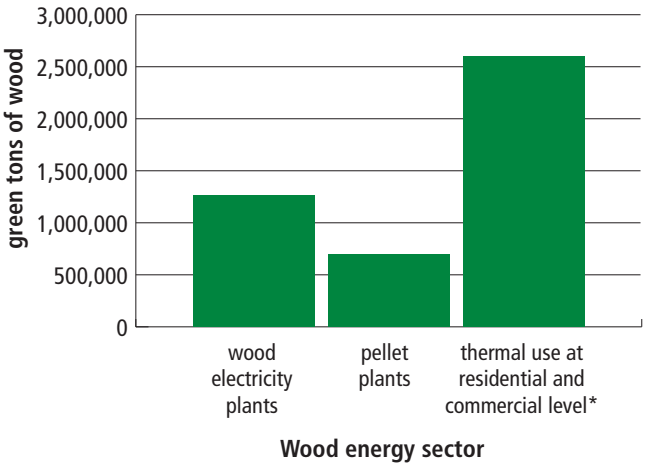
Wood Energy

While the last decade has seen wood energy gain increased attention at the national level, New York has a long history of using wood for thermal and electric energy generation. Many New York homes use wood as a primary or supplemental form of heating, and community-scale biomass applications such as heating schools and other municipal buildings with wood boilers, continues to gain interest, acceptance, and modest levels of growth. New York has three utility-scale biomass plants (one is idled), generating renewable electricity and wood-fired electricity generation occurs at pulp and paper facilities as well. Heating with wood using modern, small-scale high efficiency/low emission boilers is the next significant economic opportunity in New York in terms of wood energy.

Biomass fuel, which includes firewood use at an estimated 1 million cords (2.5 million tons), is approximately 4.5 million green tons of wood annually largely harvested from New York's forest as part of normal timber harvesting operations.

Figure 22

Annual wood use for energy by sector in New York



**includes 1,000,000 cords of firewood*

Source: New York State DEC, Division of Lands and Forests and Innovative Natural Resource Solutions LLC

Wood use for heating using wood chips and wood pellets continues to grow in New York. Wood pellet manufacturing plants in New York consume an estimated 695,000 green tons of feedstock raw material annually.

According to the U.S. Census Bureau, 2011 American Community Survey, an estimated 3% of New York homes used wood as the primary or significant heating source, and a large number of homes also use wood as supplemental heat. This percentage includes the greater New York City area and it is assumed that the percentage is much higher for just upstate New York homes. In recent years wood has been fueling community-scale heating, such as schools and municipal buildings. Over 25 facilities use wood chips or pellets for heating in New York, and the number of wood users is increasing steadily. Thousands of New Yorkers also use wood pellets or firewood to heat their homes.

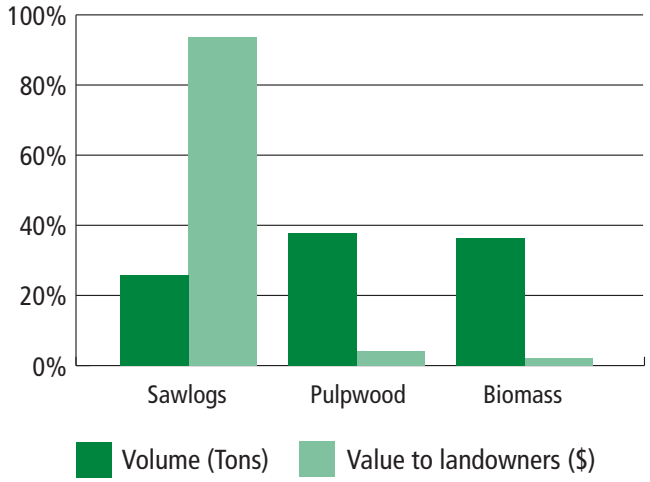
Biomass energy generates electricity, provides heat, and is expected someday to be a source for liquid fuel. Biomass is a locally sourced fuel, and - unlike most other energy sources used in New York – benefits the local economy through jobs in the harvesting, processing, and use of wood. Switching to biomass from fossil fuels often brings emissions reductions, depending upon the application and the fuel being replaced or offset. Biomass fuel is made from mill residues and low-grade wood that is generally not suited for higher value markets. In providing a market for low-grade wood, it provides landowners and land managers options and opportunities for practicing forestry. In many applications, biomass is cost competitive, and can provide consumers with an opportunity to save money, use a renewable fuel, and support the local economy. Today, homeowners who switch from using fuel oil to wood pellets can save up to 50% on their heating fuel bill. It is estimated that there are 700 direct jobs in the wood energy sector not including the timber harvesting and trucking sectors which are counted in another section of this report.

The public sometimes question whether wood use for energy can be sustainable in New York. Overall, as shown in Figure 6, New York is harvesting far less than the forest is growing, which allows for the inventory of trees to increase over time. The value of harvesting trees for wood energy is very low relative to other products such as sawlogs that go to a mill to be processed into boards. Figure 23 shows that the economics of wood energy products make it unattractive for landowners to harvest only biomass since its value is too low. Today, a typical forest landowner in the northeastern U.S. will receive only $1 per ton of biomass chips harvested. Nor do loggers profit much from selling biomass. A logging company most often harvests a full suite of products – from sawlogs to pulpwood to firewood and biomass chips – allowing them to cover their costs and make a small profit on the overall harvest. Typically, they cannot survive on harvesting biomass chips alone.

Regardless of the kind of harvest, loggers have trended towards adopting best management practices to protect water quality, and millions of acres are enrolled in certification programs in the state. This helps ensure the sustainability of the harvesting on those lands.

Figure 23

Typical volume vs. value of timber harvested in the Northern Forest region



Source: From typical harvest volumes and values in Maine, New Hampshire, Vermont and New York – state data

Most of the energy wood harvested in New York stays in New York or in the immediate region. The value of the wood, which is low relative to its volume and weight, usually makes it cost prohibitive to ship very far from where it is harvested. Some wood pellet mills in the southern U.S. are exporting pellets to Europe, but that is not occurring yet from New York mills. The local demand for New York-produced wood pellets continues to be strong.

Christmas trees and maple syrup

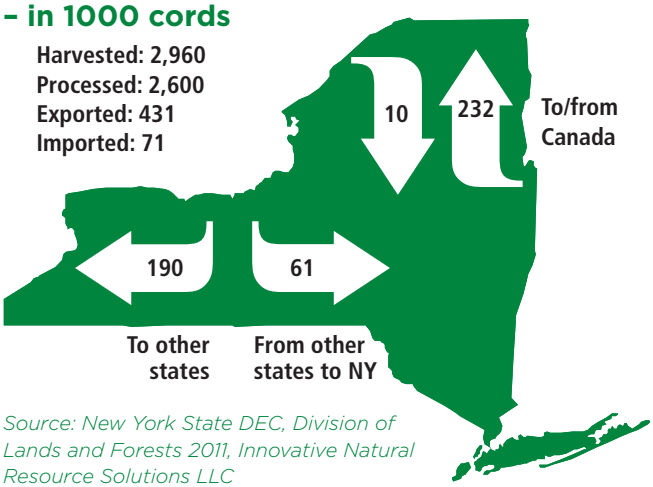
The Christmas tree and maple syrup industries are small but well-recognized as important to the local economy. New York is the second leading maple syrup producing state in the U.S. In 2012, the wholesale and retail sale of maple syrup and related products totaled over $20 million while Christmas tree sales were $4.2 million. While most jobs in these sectors are seasonal, it is estimated that there are over 1000 full-time equivalent jobs in the maple and Christmas tree sectors in New York.

Wood Flows and harvest over time

Timber harvested in New York does not all stay to be processed in New York. Timber processed in New York is not harvested exclusively in New York. Wood flows into and out of New York are based on many factors including proximity to markets, travel routes, backhauls, and business relationships, among others. Figure 23 shows the flows of wood in and out of New York.

Figure 24

Wood Flows to and from New York 2011 – in 1000 cords

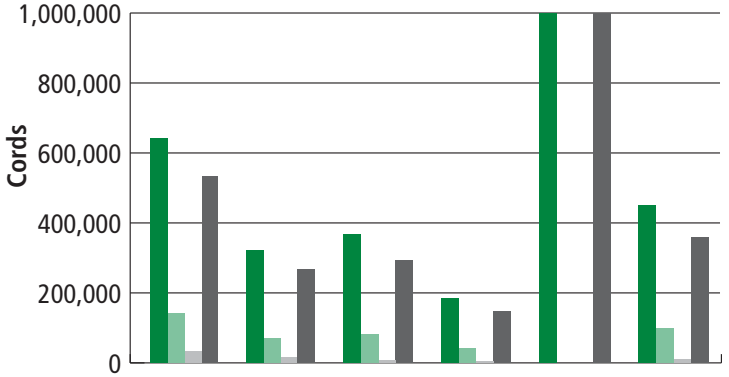


Source: New York State DEC, Division of Lands and Forests 2011, Innovative Natural Resource Solutions LLC

Wood flows freely in the regional economy. States cannot regulate flow of wood products among states or to and from Canada under the interstate commerce laws.

Figure 25

Wood Flows in New York, 2011

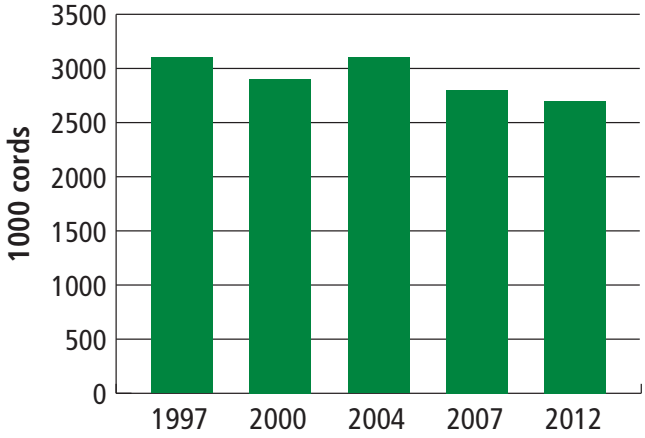


	Hardwood Sawlogs	Softwood Sawlogs	Hardwood Pulpwood	Softwood Pulpwood	Residential Firewood	Biomass Chips
Harvested	640,400	320,199	366,668	183,331	1,000,000	450,000
Exported	140,888	70,443	80,667	40,332	-	99,000
Imported	33,823	16,908	7,346	3,666	-	9,000
Processed	533,336	266,664	293,348	146,665	1,000,000	360,000

Source: New York DEC, Division of Lands and Forests, Innovative Natural Resource Solutions LLC

The forest products trend data shown elsewhere in this report clearly show a smaller, more efficient forest products industry exists today compared to 15 or 20 years ago just as the other manufacturing sectors in our U.S. economy have changed during this period. During that time period, however, the volume of timber harvested from New York's forest has dropped only slightly from just over 3.1 million cords in 1997 to just under 2.7 million cords in 2011, with the latter year still part of the recession period (Figure 26).

Figure 26
New York harvest levels



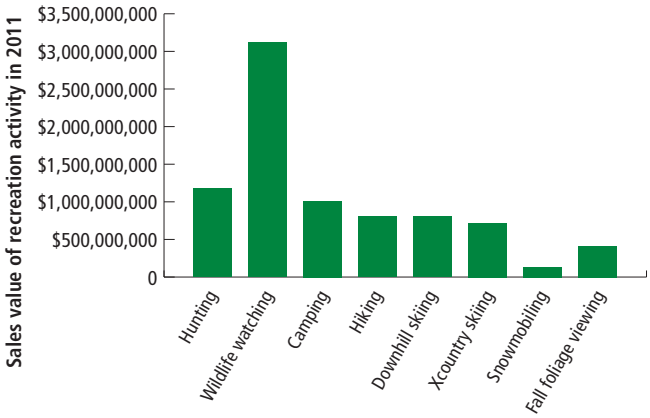
Forest-based Recreation/Tourism

Forests dominate New York's landscape, so a large percentage of recreation and tourism activities in New York are linked to the forest. Still, it is challenging to estimate the specific contribution made by the forest environment to recreation and tourism expenditures. Some activities take place primarily in the forest environment, including camping, hiking, hunting, downhill skiing, cross-country skiing, snowmobiling, fall foliage viewing, and wildlife viewing. In this analysis, we assume that 75% of the value of these activities is directly attributable to the forests of New York. For fall foliage viewing, we assume a percentage of 100%. It is important to note that the method used for the forest recreation sector is a multiplier-like approach so that, if comparisons between the forest products sector and the forest recreation sectors are made, they should be based on the multiplier applied output and employment numbers previously reported.

The key data source for the economic value of forest recreation in past NEFA publications like this one has been National Survey on Recreation and the Environment from the USDA Forest Service. While this source is used again, additionally we have used results from the new National Survey of Fishing, Hunting, and Wildlife-Associated Recreation conducted most recently in 2011 by the U.S. Fish and Wildlife Service of the federal Department of Interior. Because of this new data source, numbers in this report are not directly comparable to past reports for recreation and so trend data is not shown.

The forest-based recreational activities listed above contribute $8.2 billion in sales annually to the New York economy. These are distributed among purchases at food and beverage stores, service stations, lodging places, eating and drinking establishments, and a host of other retail trade or service sectors. Wildlife watching viewing is the largest contributor with over 38% of the total sales, and is followed by, in order, wildlife watching, hunting, camping, downhill skiing, hiking, cross-country skiing, fall foliage viewing and snowmobiling (Figure 27).

Figure 27
Economic value of forest recreation in New York 2011



Sources: Multiple sources including National Survey on Recreation and the Environment from the USDA Forest Service and National Survey of Fishing, Hunting, and Wildlife-Associated Recreation

About 32,000 people are employed in forest-based recreation and tourism related sectors with payrolls of $965 million annually. Trend data is not supplied here as it is not directly comparable to past reports because of the use of new data sources. The recreation economy in New York has, overall, not changed a significant amount since 2007 given the lead up and then recovery from the recession.

Figure 28
Jobs and Annual Payroll – New York forest recreation economy

Jobs	Payroll
31,926.40	$64,462,723

Value of Ecosystem Services

The purpose of this publication is to show the economic value of the forest-related economy in New York. The data provided shows those parts of the goods and services provided by New York's forests that can be measured and, generally, has a monetary value placed on it within the economy. Other goods and services from New York's forests are not so readily measured in dollars and cents, especially the natural assets called ecosystem services. Forest ecosystems are ecological life-support systems that provide a full suite of goods and services that are vital to human health and livelihood. They include wildlife habitat and biological diversity, clean air, clean water and watershed services, scenic landscapes, and carbon storage, which we discussed briefly but did not place a monetary value on. It should be noted that ecosystem services are highly valued within the New York City watershed that covers a large area of southern New York state.

Carbon in forests and, more accurately, a tree's ability to sequester carbon from carbon dioxide in the air into wood through photosynthesis is now taking on monetary value for a limited number of forest owners through the California greenhouse gas regulatory process. Prices being paid in 2013 range from $10 to $12 per ton of carbon sequestered but prices in this infant market can fluctuate wildly. A rough average of carbon being sequestered in New York's forest that can be monetized in these new markets is likely between .5 ton and 1.5 tons of carbon per acre per year, depending on the age, forest type and stocking of the forest, among other factors. Though modest, it may be the start of converting valuable ecosystem services to an economic form humans understand best – money in a marketplace. Regardless, ecosystem services not yet monetized should be considered a valuable part of the forest-based economy in New York.

Position of forest-based economy in the overall economy

The forest-based economy plays a significant role in the overall economy of New York. Figure 28 shows that the annual value of the forest-based economy output including forest recreation is $18.1 billion. Gross State Product for all of New York's Forest Products Manufacturing is $3.2 billion while the GSP of all Manufacturing is $63.1 billion.

Figure 29

Gross Output, Forest-based Manufacturing & Recreation, New York, 2011

	millions of	jobs*
Forestry, logging & trucking	$470	2,300
Wood products manufacturing	$1,100	8,866
Furniture and related product manufacturing	$2,500	14,500
Paper manufacturing	$5,700	16,500
Wood energy	$137	700
Christmas trees and maple syrup	$24	1,046
Sub-total direct	$9,931	43,912
Sub-total with multipliers	$12,362	61,171
Forest Recreation	$8,200	31,926
Total	$20,562	93,097

GSP, Forest Products Manufacturing	$3,171
GSP, All Manufacturing, New York	$63,088
GSP, Total for New York	$1,205,930

*full-time equivalent jobs

Sources: U.S. Dept. of Commerce – Bureau of Economic Analysis & Census of Manufactures; USDA statistics, private data, IMPLAN

GSP – Gross State Product includes value added, which is equal to its gross output minus its intermediate purchases from domestic industries or from foreign sources.

Gross Output – Includes the total value of all products produced and shipped by all producers (essentially sales).

Issues with potential to affect the future forest economy

There are a number of issues that could affect the future forest-based economy in New York.

- **Access to forestland for forest management** – If access to significant acreages of forestland is lost, those acres may still provide the important access necessary for the forest recreation/tourism and ecosystem services parts of the economy but will no longer provide the raw material for the forest products manufacturing sectors of the economy. The State of New York has invested almost $130 million over the last 15 years to keep forests as working forest through acquisition of working forest conservation easements - the preferred tool in the state.
- **Loss of markets** – For the forest products sector from the woods to the mill, robust and diverse market opportunities are extremely important. The trend data shown in this report depicts a smaller overall forest products manufacturing industry than 20 years ago with trends suggesting continued contraction likely resulting from foreign competition or product substitution. The positive sign is that the industry is producing more product per worker than ever before. The wood energy sector may be the only bright spot with markets growing over time.
- **Federal and state tax and other policies** – Business owners in the forest products and forest recreation sectors in New York have long said that stable public policies are important for business.
- **Cost of travel** – A large portion of the forest-based recreation economy in New York is based on individuals traveling from other locations to visit New York and enjoy the beauty of this heavily forested state. The price of transportation fuels is a key factor in whether tourists decide to travel to New York. As transportation fuels continue to increase, fewer out of state tourists will visit the forests of New York. On the other hand, an upward trend in transportation fuels can also result in more local populations choosing to stay for local recreation.
- **Climate change** – In the short-term, slightly longer growing seasons resulting from shortened winters and slightly warmer temperatures, given all other things being equal, may increase the growth of New York's trees and provide for slightly longer warm weather periods each year for recreation in the woods. Shortened winters may have negative effects on that portion of the recreation economy. This phenomenon may benefit parts of the forest-based economy. Should climate change also result in increased forest pest problems and reduce overall annual rainfall (or result in other changes), the perceived benefits could be offset. Additionally, significant storm events often have negative consequences to forests. Over the long-term any positive effects from climate change could disappear should temperature increases and climate changes not modify over time.

NEW YORK DEC

The New York Division of Lands and Forests within the Department of Environmental Conservation is a multi-service agency that has a dual purpose: both that of regulation of forestry practices and outreach, education and information on the forests of New York. More specifically, the New York Division of Land and Forests manages public lands in New York State and provides leadership in forestry and forest management. The Department of Environmental Conservation cares for about four million acres of state owned land or 13 percent of the land area of New York State. This includes the Adirondack and Catskill Forest Preserves, State Forests, Wildlife Management Areas, and Forest Conservation Easements. The Division of Lands and Forests is responsible for the management, protection and recreational use of these lands, the care of the people who use these lands and the acquisition of additional lands to conserve unique and significant resources.

The Division of Lands and Forests is made up of five programs: Conservation Easements, Forest Preserve Management, Private Land Services, Real Property and State Land Management. The Division of Lands and Forests has offices in 9 Regions in New York

You can reach the Division at (518) 402-9405 or at www.dec.ny.gov/about/650.html

The National Association of State Foresters, a non-profit organization that is made up of the individuals who head the state forestry agencies in the U.S., periodically reviews information about the state agencies that oversee forestry in their respective state. The most recent report on this topic is "State Foresters by the Numbers: Data and Analysis from the 2010 NASF State Forestry Statistics Survey" and can be found at www.stateforesters.org website under publications.

Sources

A Survey of Business Attributes, Harvest Capacity and Equipment Infrastructure of Logging Businesses in the Northern Forest, Jeffrey G. Benjamin & Bennet H. Leon, University of Maine, 2012

Canham, H.O., *Economic Impact from Forest-Related Recreational Activities in New York, 2010*. Report prepared for North East State Foresters Association (NEFA).

Cordell, H.K. et al. 2004. Outdoor recreation for 21st Century America, A report to the nation: the national survey on recreation and the environment. Venture Publishing, Inc., State College, PA.

Forest Statistics for New York 1980 and 1993 The Authors Carol L. Alerich Forester David A. Drake Forester Forest Inventory and Analysis Unit Northeastern Forest Experiment Station USDA Forest Service Radnor PA Manuscript received for publication 13 April 1995 USDA Forest Service Radnor Corp. Ctr. Suite 200 Radnor PA 19087-4585 August 1995

Forest Statistics of New York, 1980, Thomas J. Considine Jr., Thomas S. Frieswyk, USDA Forest Service, Northeastern Station, NY State Dept. of Environmental Conservation, Resource Bulletin NE-71

Harvard Forest long-term forest acreage dataset, 2013

IMPLAN, State of New York

Innovative Natural Resource Solutions, LLC, various privately developed data

National Association of Manufacturers manufacturing economic data

National Land Cover spatial dataset, US Geological Survey, 2013

National Resource Inventory, USDA Natural Resource Conservation Service, 2009

National Survey of Fishing, Hunting, and Wildlife-Related Activities. USDI. Washington, DC.

National Survey on Recreation and Environment, USDA Forest Service, 2013

National Survey on Recreation and the Environment (NSRE) Outdoor recreation for 21st Century America, A report to the nation: the national survey on recreation and the environment. Cordell, H.K. et al. 2004, 2006 & 2011. Venture Publishing Inc. State College, PA.

NEFA, 2004 & 2007. *The Economic Importance of New York's Forest*. www.nefainfo.org

New England/New York Ag. Statistics, USDA Maple Syrup 2012

New York Department of Labor, New York Wood Industries, New York Labor Market Information Analysis, 1990-2012

New York Division of Lands and Forests, harvesting and wood processor reports, multiple years up to 2011

New York Maple Producers Association

Northeast Midwest Institute economic data

Northern Forest Biomass Project Evaluator, North East State Foresters Association, 2013

Statistics Canada

Stynes, D.J. & E.M. White 2006. Spending profiles for national forest recreation visitors by activity. Report to the U.S. Forest Service. Dept. of Park, Rec. and Tourism. Michigan State Univ. East Lansing, MI.

The Timber Resources of New York, George R. Armstrong, SUNY-ESF & John C. Bjorkbom, USDA Forest Service, Northeastern Forest Experiment Station

The Timber Resources of New York, USDA Forest Service Bulletin NE-20 by Roland H. Ferguson and Carl E. Mayer, 1970

The Wood-Supply Situation in New York State with a Special Reference to Wood for Pulping, V. L Harper and J. C. Rettie Northeastern Research Station, USDA Forest Service 1949

Trends for Forestry Best Management Practices Implementation, George G. Ice, Erik Schilling, and Jeff Vowell, Journal of Forestry, September 2010

U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, 2011. www.bea.doc.gov/bea/regional

U.S. Department of Commerce, Bureau of Economic Analysis, Regional Economic Accounts, 2011, www.bea.gov/regional

U.S. Bureau of the Census, 2011 Economic Census, Summary Statistics for New York, NAICS Basis, Manufacturing, ME. www.census.gov

U.S. Bureau of the Census, Manufacturing, Mining, and Construction Statistics, Annual Survey of Manufacturers, Geographic Area Statistics, 2011 (issued November 2012). www.census.gov

U.S. Bureau of the Census. Population estimates. US Dept. of Commerce, Bureau of the Census. Washington DC.

U.S. Census Bureau, 2005 – 2011 American Community Survey, New York

U.S. Department of Labor, 2011 Labor Statistics

U.S. Department of the Interior. 2011. National Survey of Fishing, Hunting, and Wildlife-Related Activities. USDI. Washington, DC.

U.S. Bureau of Labor Statistics. Consumer price index. US Dept. of Commerce, Bur. of the Census. Washington DC.

U.S. Dept. of Labor, Bureau of Labor Statistics, www.bls.gov/eag/eag.nh.htm

USDA Forest Service, Forest Inventory and Analysis webpage, http://fia.fa.fed.us

USDA Forest Service, National Woodland Owners Survey.

USDA, New England Agricultural Statistics Services, 2010.

North East *State* Foresters Association (NEFA)

NEFA'S Mission

The North East *State* Foresters Association (NEFA) is the State Foresters of Maine, New Hampshire, New York, and New York cooperating with the US Forest Service State & Private Forestry on issues of common interest (see www.nefainfo.org).

This booklet is part of a series on the economic importance and value of forest-based manufacturing and forest-related recreation and tourism of the four states in the NEFA region. Past reports can be viewed at www.nefainfo.org

This publication was funded in large part through the New York Department of Environmental Conservation and the U.S. Endowment for Forestry and Communities through the Northern Forest Center.

State North East Foresters Association
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NEFA
The State Foresters cooperating with the US Forest Service State and Private Forestry

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