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# Forest sector investment in the United States - trends and implications of capital investment and annual expenditure

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## Keywords

annual expenditure, capital investment, Montreal Process reporting, private investment, public investment, sustainable forest management, USA

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## ABSTRACT

Investment is essential to ensure that forests are properly restored, protected, and managed to meet the various needs of society, including a wide range of public and private organizations. This article offers an overview of capital investment and annual expenditures related to forests in the United States, encompassing both the public and private sectors. In 2020, the total capital investment and annual expenditure were $242 billion (in 2020 dollars). Our findings indicate that private investment is surpassing public investment. However, there were differences in the types of investments made between the private and public sectors and differences in investment and annual expenditure levels can be observed in different geographical contexts. We also elaborated on potential sustainability impacts and identified knowledge gaps that present opportunities for future research.

## INTRODUCTION

Consistent investments in forest restoration, protection, and management, as well as forest-related industries and ecosystem services are considered crucial for maintaining and enhancing the benefits provided by forests. Inadequate funding for forest protection, management, and utilization can result in the deterioration or loss of these benefits (Montreal Process Liaison Office 2015). Measuring the level of investment and expenditure in forests, forestry, and forest product markets also helps identify the level of relative importance and development of these sectors within the overall economy, and evaluation of temporal or spatial trends can help identify strengths, challenges, and past or emerging issues (Frey et al. 2022; Skog et al. 2010).

The Montreal Process is an international agreement under which signatory countries with temperate and boreal forests have agreed to track information on various aspects of forests and forestry in order better to assess whether they are sustainable (Montreal Process Liaison Office 2015). This manuscript focuses on capital investment and yearly spending in forest management, as well as the industries reliant on wood and non-wood forest products, ecosystem services, recreation, and tourism in the United States (U.S., a Montreal Process signatory).

The aim of the research is to summarize the value of capital investment and annual expenditure in the forest sector that is allocated to producing, maintaining, and acquiring goods and services from forests. Where possible, we tracked these values over time and by region within the U.S. Our research does not encompass in detail many important aspects related to forest sector that are interlinked and reported under Criterion 6 (Maintenance and enhancement of long-term multiple socio-economic benefits to meet the needs of societies, including forest research, education and extension activities (See e.g., McGinley et al. 2019), and 7 (Legal, institutional and economic framework for forest conservation and sustainable management (See e.g., Buttler 2016). Instead, we will compare the investment trends in public and private sector and elaborate on the interlinkages with roundwood consumption and employment trends. Furthermore, we will briefly discuss our findings concerning private-sector investment from the perspective of strategic industrial management and sustainability.

## DATA AND METHODS

We make a distinction between annual expenditures and capital investment to align with commonly used accounting methods. Examples of capital investment that are relevant for forest protection, management and utilization include new plants and equipment rebuilds by industrial firms, new forest infrastructure (such as roads, bridges, and buildings), acquisition of additional forest land, and major investments by public agencies in management and protection (Skog et al. 2010). Annual expenditures typically include periodic costs such as rent, utilities and taxes. In this work, we include forest sector related to program costs, including administration expenses and other costs, under the annual expenditures.

To quantify total annual expenditure in protecting and managing forests that provide multiple ecosystem services, we consider both public and private entities. Public entities, such as federal, provincial/state agencies, and local governments, along with private entities, including forest product industrial firms, concessionaires, forest-based recreation and tourism firms, and other non-governmental organizations, all play a role in forest protection, management, and utilization.

This manuscript replicates, updates, and expands upon previous work by Skog et al. (2010). We gathered existing public data from multiple sources to develop the most complete available picture of the U.S. forest-sector (i.e., forests, forestry, and wood products) capital investments and annual expenditures. We have collected data on annual operating expenses and capital investment costs for various entities involved in forest, forestry and wood products. The data are described in Table 1. We aggregate the data into four overarching topics: public annual expenses, public capital investment, private annual expenses, and private capital investment. All time-series are inflation-adjusted year 2020 values using the GDP deflator (World Bank 2023). We report values as they are and refrain from applying, e.g., rolling average annual values that are calculated over a number of years. The investment and expenditure levels are moderately stable and indicative of averages over long term in the forest sector, and as we are recovering from the Covid-19 pandemic, we perceive no need to adjust the variation in the data.

*Table 1. Description of data for capital investments and annual operating expenses.*

| Type of activity/private or public entities | Annual operating expenses | Annual value of capital investments | Geographical and temporal scope |
|---|---|---|---|
| **Protecting and managing forests** | | | |
| USDA Forest Service | Annual operating expenses for the National Forest System, Forest Rangeland research | Capital improvement and maintenance in facilities, roads and trails | Regional, 2006–2022. |
| State forestry agencies | Annual program costs | | All states (with some gaps) for 1998, 2002, 2004, 2012, 2014, 2016, 2018, 2020 |
| Wood product industry Paper product industry, wood furniture industry | Annual costs for payroll and materials | Annual capital investments | Wood and paper product industries: regional. 1997, 2002–2006, 2012–2020.<br>Wood furniture industry: National, 2012–2021 |
| Wood pellet industry | | Forisk Consulting (2022) data about commercial scale pellet mill capacity and investment. *Data on location and company not reported*. | National, announcements in Q3/2022. |
| **Recreation** | | | |
| **USDA Forest Service | | National Forest System appropriations to Recreation, Heritage, and Wilderness | National, 2006 – 2020. |
| **National Park Service | Expenditures on facility operations and maintenance | | National, 2000–2020. |
| **Concessionaires in national parks | Total revenue obtained by concessionaires, and fees paid to the National Park Service; a portion of fees were used for facilities improvements | | National, 2000–2020. |
| Forest-based environmental services | Not obtained | Some overlap with 6.27 | |
| Non-wood product industries | Not obtained | some overlap with 6.31 | |

*** Due to the inherent challenge of attributing these data points to forest-based recreational activities, thus excluded from the present study. These data are available on request.*

## RESULTS

### Summary of results

The total capital investment and annual expenditure amounted to a total 242 billion in 2020. The forest sector's public capital investment for the year 2020 (section 3.2) amounted to a total of $535 million. Additionally, the public annual expenses for the same year amounted to $7.8 billion (section 3.3).

We found that private capital investment in the forest sector totaled $13 billion in 2020 (section 3.4). The corresponding private annual expenses for the year amounted to $220 billion (section 3.5). All investment and expenditure levels have seen an increase since 2012, with the most growth being a 62% increase in private capital investment. For a yearly breakdown, refer to Table 2.

Regarding recreation expenditures, the USDA Forest Service National Forest System allocated $262 million as annual expenditure on Recreation, Heritage, and Wilderness (Section 3.8).

*Table 2. Total private and public capital investment and annual expenditure (million 2020$)*

| | Public sector capital investment | Public sector annual expenditure | Private sector capital investment | Private sector annual expenditure | Total |
|---|---|---|---|---|---|
| 2012 | 394 | 5,451 | 8,229 | 149,180 | 163,253 |
| 2013 | 328 | | 8,716 | 164,004 | 173,048 |
| 2014 | 331 | 6,136 | 11,133 | 175,606 | 193,206 |
| 2015 | 355 | | 11,043 | 183,815 | 195,214 |
| 2016 | 384 | 6,930 | 11,078 | 188,619 | 207,011 |
| 2017 | 391 | | 10,920 | 205,051 | 216,362 |
| 2018 | 505 | 7,672 | 10,415 | 224,289 | 242,881 |
| 2019 | 531 | | 13,544 | 229,272 | 243,347 |
| 2020 | 535 | 7,806 | 13,329 | 220,749 | 242,419 |
| *2012/2020 % change* | *36* | *43* | *62* | *48* | *48* |

### Public sector capital investment

USDA Forest Service—Capital Investment— In 2020, The USDA Forest Service allocated $535 million capital investment towards managing and protecting forests, up from $531 million in 2019 and $505 million in 2018 (2020 dollars). This represents a 70% increase since 2006 (Table 3).

These funds are allocated towards a range of activities, including the development of facilities, roads, and trails, as well as the improvement of infrastructure. Additionally, they support the acquisition and donation of lands, waters, and related interests within the National Forest System, which align with the agency's goals of restoration, outdoor recreation and public access, habitat for wildlife, and protection of water quality.

In 2020, the USDA Forest Service made its largest investments in roads and facilities, which together accounted for approximately 85% of its total investment in Capital Improvement, Maintenance and Land Acquisition. Specifically, the agency allocated $301 million towards road development and maintenance, and $154 million towards facilities improvement and construction.

*Table 3. U.S. Department of Agriculture Forest Service, Capital Improvement, Maintenance and Land Acquisition 2006–2020 (million 2020$).*

| | Facilities | Roads and trails | Land acquisition | Total |
|---|---|---|---|---|
| 2006 | 91 | 195 | 28 | 314 |
| 2007 | 96 | 206 | 29 | 331 |
| 2008 | 92 | 215 | 30 | 338 |
| 2009 | 94 | 250 | 35 | 379 |
| 2010 | 102 | 214 | 47 | 362 |
| 2011 | 108 | 246 | 48 | 401 |
| 2012 | 112 | 241 | 41 | 394 |
| 2013 | 59 | 226 | 43 | 328 |
| 2014 | 63 | 231 | 37 | 331 |
| 2015 | 65 | 249 | 41 | 355 |
| 2016 | 67 | 259 | 58 | 384 |
| 2017 | 67 | 272 | 52 | 391 |
| 2018 | 148 | 293 | 64 | 505 |
| 2019 | 151 | 305 | 75 | 531 |
| 2020 | 154 | 301 | 80 | 535 |

*Source: USDA Forest Service 2006–2021.*

**Public sector annual expenditure**

In 2020, the USDA Forest Service allocated a total of $4.96 billion dollars as an annual expenditure towards various programs, with the National Forest System and Wildland Fire Management programs receiving the largest share of funding. Specifically, the National Forest System program received $2.0 billion dollars, while Wildland Fire Management received $2.3 billion dollars. State Forestry and Private Forestry received $347 million dollars, while Forest and Rangeland research received $305 million dollars (Table 4). Wildland Fire Management program accounted for 47% of the total reported program costs in 2020.

*Table 4—U.S. Department of Agriculture, Forest Service annual expenditure program costs by segment, 2008–2021 (million 2020$).*

| Year | Forest and Rangeland Research | State and Private Forestry | National Forest System | Wildland Fire Management | Total |
|---|---|---|---|---|---|
| 2008 | 202 | 186 | 345 | 2,301 | 3,035 |
| 2009 | 205 | 184 | 342 | 1,616 | 2,347 |
| 2010 | 225 | 222 | 1,117 | 1,515 | 3,079 |
| 2011 | 233 | 230 | 1,158 | 1,571 | 3,192 |
| 2012 | 230 | 197 | 1,209 | 1,536 | 3,172 |
| 2013 | 240 | 205 | 1,261 | 1,589 | 3,294 |
| 2014 | 246 | 193 | 1,257 | 1,816 | 3,512 |
| 2015 | 258 | 203 | 1,302 | 2,033 | 3,796 |
| 2016 | 260 | 212 | 1,351 | 2,135 | 3,958 |
| 2017 | 269 | 213 | 1,411 | 2,642 | 4,535 |
| 2018 | 292 | 330 | 1,890 | 2,784 | 5,295 |
| 2019 | 307 | 345 | 1,968 | 2,562 | 5,182 |
| 2020 | 305 | 347 | 1,958 | 2,351 | 4,960 |

*Source: USDA Forest Service 2006-2021.*

Table 5 shows that in 2020, the total annual expenditures for state forestry agency programs reached nearly $2.9 billion dollars. The North, South, and Rocky Mountains regions all faced an increase in program expenditures, while the Pacific Coast region showed variability in expenditures from year to year. Specifically, the annual expenditures for the North, South, Pacific Coast, and Rocky Mountains regions were $468 million, $531 million, $497 million, and $217 million, respectively. Appendix A provides a broader perspective on state-level expenditures for forestry agency programs over time, ranging from $2 million in Delaware and Rhode Island to $1.2 billion in California spent on the forest health and wildfire prevention.

*Table 5. State forestry program expenditures/costs by region, 1998, 2002, 2004, 2012, 2014, 2016, 2018, 2020 (million 2020$).*

| | North | South | Pacific coast | Rocky mountain | Total |
|---|---|---|---|---|---|
| 1998 | 156 | 168 | 381 | 62 | 944 |
| 2002 | 173 | 238 | 495 | 114 | 1,020 |
| 2004 | 197 | 259 | 654 | 96 | 1,205 |
| 2012 | 332 | 457 | 347 | 209 | 2,279 |
| 2014 | 375 | 427 | 629 | 178 | 2,624 |
| 2016 | 434 | 517 | 555 | 211 | 2,972 |
| 2018 | 423 | 513 | 243 | 238 | 2,377 |
| 2020 | 468 | 531 | 497 | 217 | 2,846 |

*Source: National Association of State Foresters 2022 (years 2012–2020). Years 1998–2004 from Skog et al. 2010.*

**Private sector capital investment**

The total capital investment in the wood product industry was 3.5 billion dollars in 2020, 8.7 billion in the paper product industry, and 0.7 billion dollars in the wood furniture industry. Figure 1 shows the overall trends in the wood products, paper products and wood furniture industries. See Appendix B for specific North American Industry Classification System (NAICS) categories.

Total capital investment in the wood product industry has grown from $1.4 billion in 1997 to $3.5 billion in 2020 with some fluctuation over the years. During the global financial crisis, the total capital investments declined by 62% from $3 billion in 2007 to $1.1 billion in 2009. After 2009, the total capital investments increased until 2018. Between 2018 and 2020, the total capital investments have declined 11%, from $4 billion in 2018 to $3.5 billion in 2020. See Appendix C for more detailed data.

The capital investment in the paper product industry grew by 109% from $4.2 billion in 1997 to $8.7 billion in 2020. There has been an upward trend since 2009. During 2018-2020, capital investment in the paper product industry increased from $5.6 billion to $8.7 billion, peaking at $9.0 billion in 2019.

Additionally, the capital investment for wood furniture has consistently increased from $0.4 billion in 2012 to $10.6 billion in 2021.

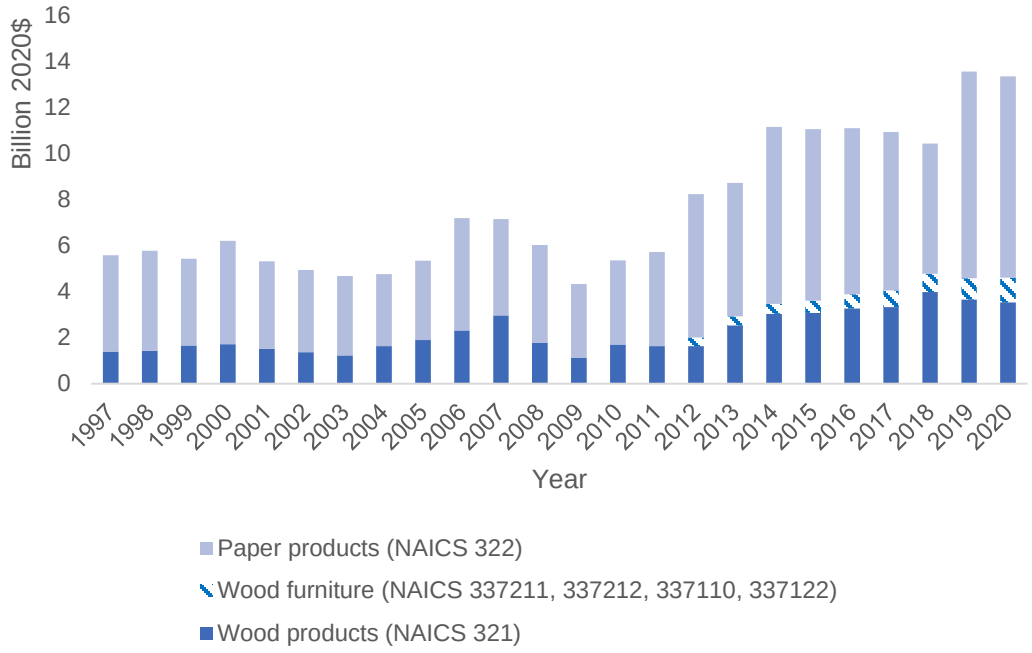


*Figure 1. Private sector capital investments in wood products (NAICS 321), paper products (NAICS 322) and wood furniture industries (NAICS 337211, 337212, 337110, 337112) (billion 2020$). Refer to Appendix C for detail data. Source: Years 1997 – 2006 Skog et al (2010). United States Census Bureau 2023a-d.*

**Private sector annual expenditures**

In 2020, the wood product industry spent $81 billion on payroll and materials, while the paper industry spent $120 billion (Figure 2). The wood product industry maintained relatively stable expenditure levels, with slight increases and decreases during 2018 and 2020. In contrast, the paper industry experienced a decline in expenses. Additionally, the combined payroll and material expenditure for various segments of the wood furniture industry amounted to $16.4 billion dollars in 2020 (Appendix D).

The annual expenditure in the private sector has increased steadily over time. Between 2012 and 2020, the total annual expenditure increased from $149 billion in 2012 to $221 billion in 2020, indicating a 48% increase (Figure 2, Appendix E). In the wood product industry the growth was 76% from $46 billion to $81 billion, in paper products 32% from $91 billion to $120 billion, and in wood furniture 59% from $12 billion to $20 billion between 2012 and 2020.

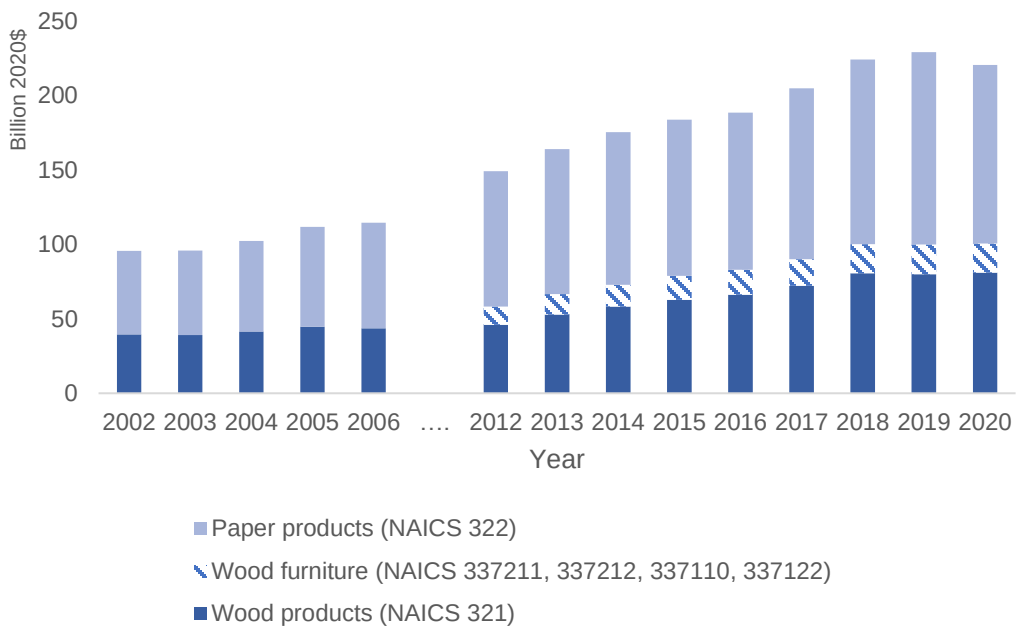


*Figure 2. Private sector annual expenditures - payroll and materials expenditure in wood product (NAICS 321), paper product (NAICS 322), and wood furniture (NAICS 337211, 337212, 337110, 337112) industries (billion 2020$). Refer to Appendix E for detailed data. Source: Skog et al. (2010), United States Census Bureau 2023a-d.*

**Regional differences in wood and paper product industries' capital investment and annual expenditure**

The Southern region claimed the largest share with $6.7 billion, representing 55% of the total capital investment (Appendix F). The Northern region followed with $4.1 billion (34%), the Pacific coast with $1.1 billion (9%), and the Rocky Mountain region with $0.3 billion (2.2%).

The Southern and Northern regions experienced growth in capital investment since 1997. In the Southern region, investment surged by 148% compared to the $2.7 billion invested in 1997 (Figure 3). Similarly, the Northern region witnessed 97% growth from its $2.0 billion investment in 1997. The Pacific coast and the Rocky Mountain regions also experienced considerable growth, with 82% ($0.6 billion in 1997) and 83% ($0.1 billion in 1997) increases, respectively.

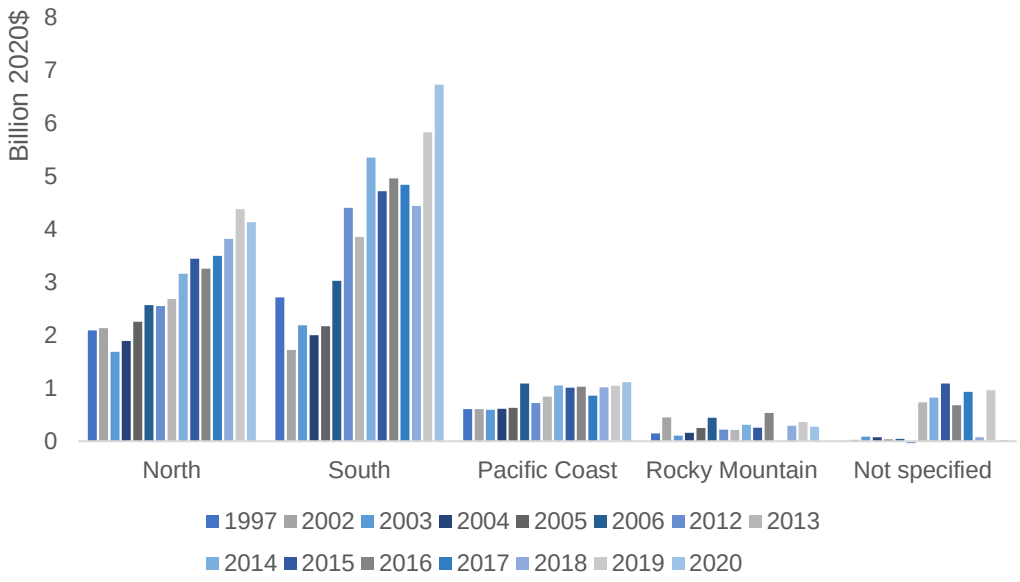


*Figure 3. Private Sector Capital investment in wood product (NAICS 321) and paper product industries (NAICS 322) by region (billion 2020$) 1997–2020. Refer to Appendix F for detailed data. Source: Skog et al. 2010, United States Census Bureau 2023a-d.*

In 2020, the North accounted for $75 billion (39% of the total), South - $80 billion (40%), Pacific Coast - $26 billion (13%), and Rocky Mountain - $8 billion (4%) of the total private sector annual expenditure.

Between 2002 and 2020, the total annual expenditures grew by 110% (Appendix G). During this period, the South experienced the highest growth at 166%, followed by the Pacific Coast at 139%, the North at 85%, and the Rocky Mountains with a decrease of 40% (Figure 4). However, please note that these numbers may be influenced by a relatively large "not specified share," so they should be interpreted with caution.

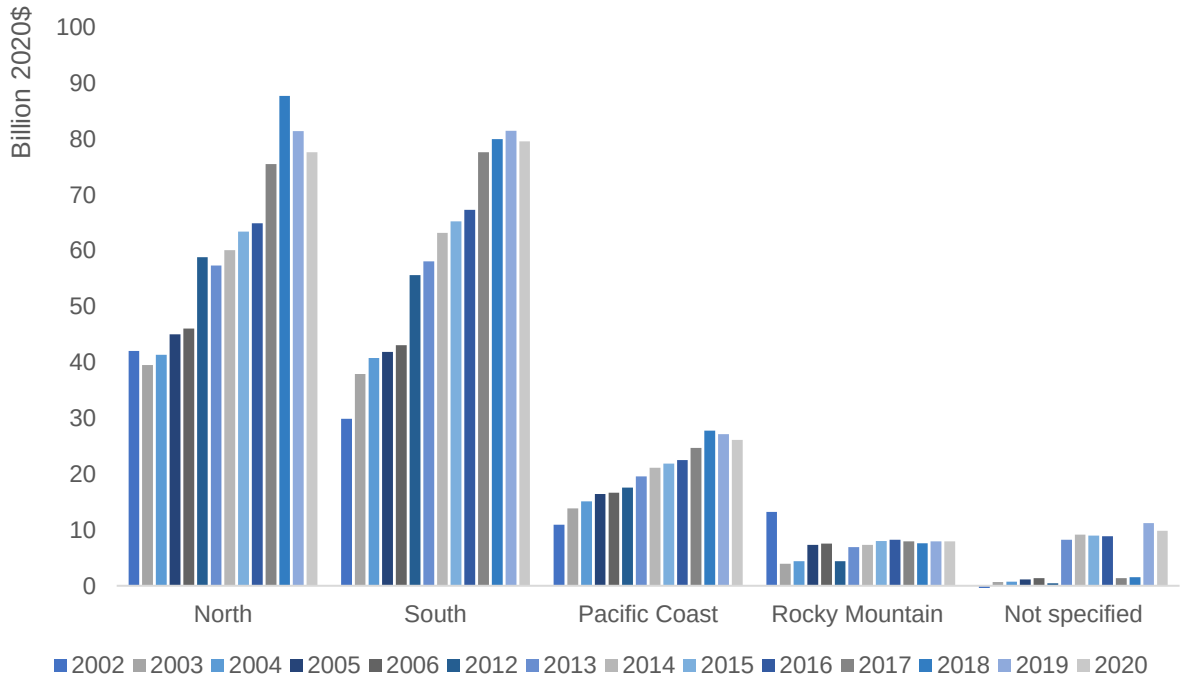


*Figure 4. Private Sector Annual Expenditure in wood product (NAICS 321) and paper product industries (NAICS 322) by region 1997–2020(billion 2020$). Refer to Appendix G for detailed data. Source: Skog et al. 2010, United States Census Bureau 2023a-d.*

### COVID-19 pandemic impacts on new capital investment

The COVID-19 pandemic affected new capital investments in the wood and paper product industries during 2020. Both sectors experienced declines compared to the preceding year, i.e., 2019. Specifically, the wood product industry saw a 25% decrease, with the capital investment dropping from $5.2 billion in 2019 to $3.9 billion in 2020. Similarly, the paper product industry witnessed a 23% decrease, with capital investment falling from $11 billion in 2019 to $8.7 billion in 2020 (Figure 5, Appendix H).

In 2021, the wood product industry rebounded with increased new capital investments, amounting to $6.0 billion. This represented a 16% increase from the pre-pandemic investment levels in 2019. On the other hand, the paper product industry received $10.2 billion in 2021, which was 10% lower than the investment level in 2019. Between 2019–2020, the total annual expenditure in wood and paper manufacturing experienced a 7% decline (Figure 5).

Despite the challenges posed by the pandemic, the capital investment in the wood furniture sector continued to grow. During the period between 2019 and 2020, capital expenditure in the wood

furniture industry grew by 11.3%, while payroll and materials expenditure increased by 0.8%. Between 2020 and 2021, there was a 13% increase in total capital investment in wood furniture, although detailed data on old and new capital investment and annual expenditure were not available (Figure 1).

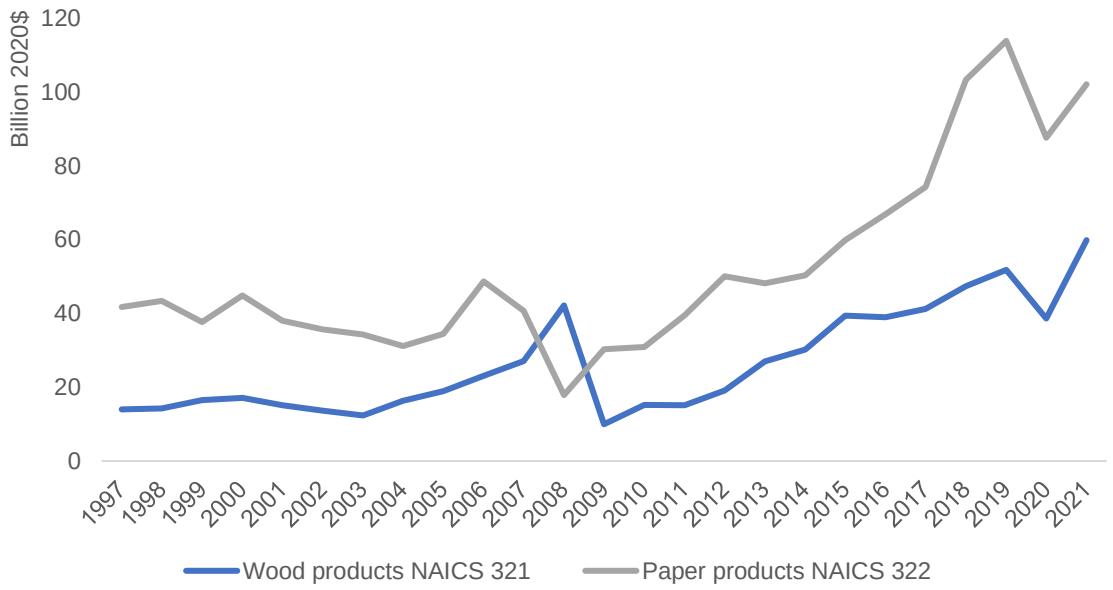


*Figure 5. Private Sector New Capital Investment for wood product and paper product industries (NAICS 321 and 322) 1997–2021 (million 2020$). Refer to Appendix H for detailed data. Source: United States Census Bureau 2023a-d.*

**Announced new capital investment in wood pellet and lumber industry in 2022**

As energy is one of the emerging business areas within the country and internationally, we collected information on the announced new capital investment in wood pellet industry in 2022 based on the data acquired by Forisk Consulting (2022). To complement Forisk Consulting (2022) data on investment capacity, we gathered data pertaining to investment announcements from diverse sources, including media outlets and corporate webpages. Based on these data, we calculated a rough estimation of an average wood demand for every million-dollar investment.

According to data from Forisk Consulting (2022), for the third quarter of that year, there were seven pellet mill announcements within the U.S. (under NAICS 321), which would result in a demand for seven million tons of wood at capacity. We were able to obtain investment announcements for five of these projects, totaling $760 million dollars based on public data. Figure 6 illustrates the relationship between expected mill investments and wood demand at capacity. On

average, a one million dollar investment in a pellet mill would require annually 8,922 tons of wood (at capacity). However, the impact on total wood demand will depend on other capacity investments and mill closures.

Additionally, as per Forisk Consulting (2022), eight lumber mills are set to be constructed, resulting in a demand of 7,886,000 MMBF[1] (18.3 billion m3) of wood at full capacity. Upon further investigation, we obtained investment announcements for seven of these projects, which were estimated to total $1.2 billion dollars (as depicted in Figure 7).

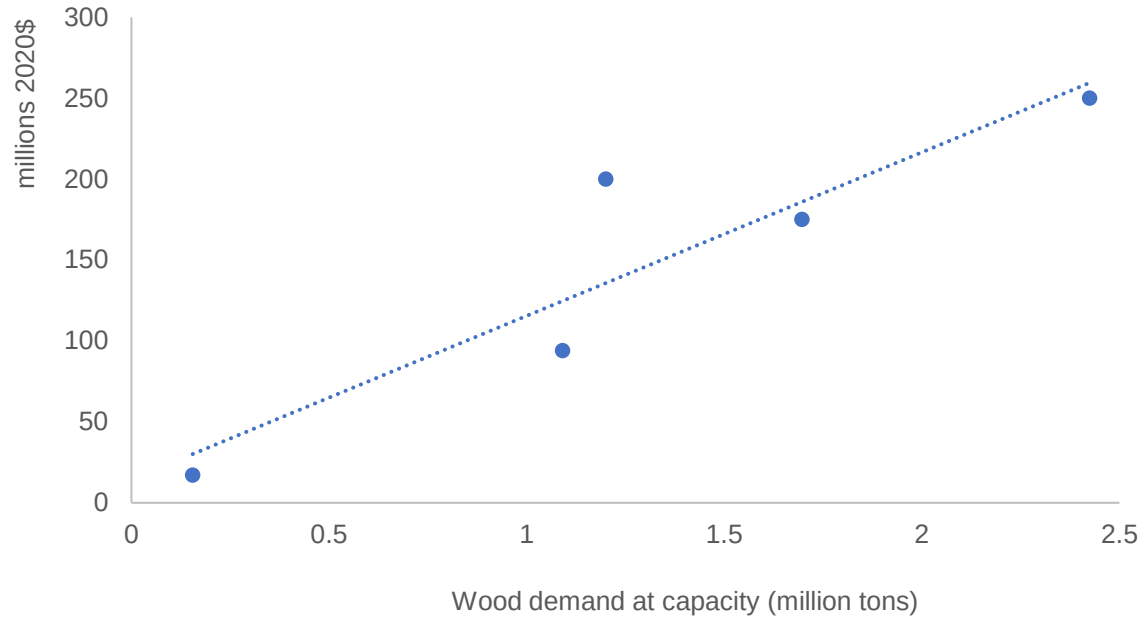


*Figure 6. Announced pellet mill investment and wood demand at capacity (Q3/2022). Source Forisk Consulting 2022, public announcements.*

[1] MMBF stands for millions of board feet of timber.

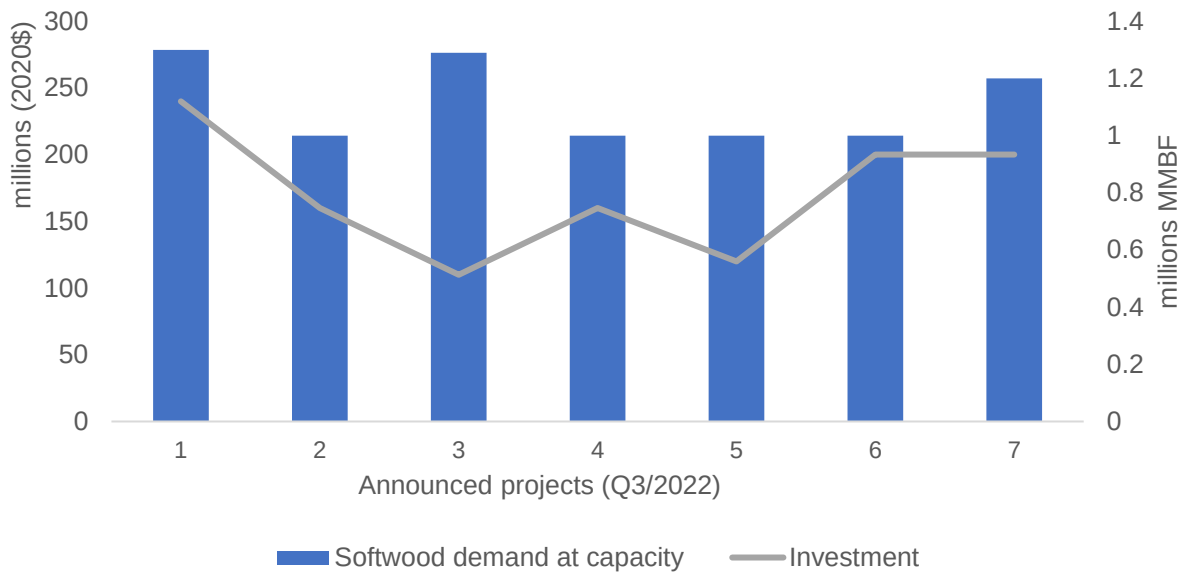


*Figure 7. Announced lumber mill investment and wood demand at capacity (Q3/2022). Source Forisk Consulting 2022, public announcements.*

## DISCUSSION AND CONCLUSIONS

The sustainable benefits of forests, encompassing both wood and non-wood products, recreation, and environmental services, are closely linked to the levels and trends in capital investment and annual operating expenses. These factors also impact the competitiveness of U.S. wood and non-wood product firms relative to foreign firms. Additionally, capital investment levels affect employment rates, wages, and community resilience. This report complements but does not cover capital investment in research, development, education, and extension activities, which are addressed separately as part of the Montreal Process indicator. Additionally, despite the efforts, we were unable to procure comprehensive data for forest-based recreation. Limitations on forest-based recreation data have been previously identified and discussed (e.g., Frey et al. 2021), and information regarding private investments in forest recreation infrastructure in the United States remain missing (Skog et al. 2010). Data were available for the National Forest System appropriations to Recreation, Heritage, and Wilderness by the USDA Forest Service. Data for National Park Service expenditures on facility operations and maintenance as well as

Concessionaires in national parks have been gathered (NPS 2023). These recreation-related data can be made available upon request.

Based on our data and findings, it looks like private investment is outpacing public investment. Both capital investment and annual expenditures in the private sector witnessed a more rapid increase between 2012 and 2020 compared to the public sector. This surge in private investment aligns with simultaneous increases in wood consumption and employment. For instance, during the same period, industrial roundwood consumption rose from 336 million m3 to 363 million m3, reaching a peak of 383 million m3 in 2018 (FAOSTAT 2023). The full-time equivalent workforce in wood and paper product manufacturing increased from 744 thousand to 771 thousand between 2012 and 2020, peaking at 811 thousand in 2019 (USBLS 2023).

There were differences in the types of investments made between the private and public sectors. Capital investment in the private sector outpaced annual expenditure growth, whereas the public sector exhibited the opposite trend. Despite the capital investment numbers lagging in the public sector, the annual expenditure growth in the public sector assimilated the private sector's investment trends. Comparing annual expenditure is particularly meaningful as public sector investments primarily focus on land management for multiple purposes, involving extensive knowledge-based operations and programs. In contrast, private sector investment data tends to emphasize production facilities, as the forest industry heavily relies on capital investments. The private and public sectors have distinct objectives, and unequal investment could jeopardize the long-term production of ecosystem services.

Although specific geographic numbers for federal forest programs were not extracted, trends in state-level programs suggest that similar development patterns exist across different regions. There have been significant increases in public sector programs both nationally and at the state level, with similar trends observed in different regions.

Regarding private sector investment, the North and South regions were approximately at the same level in 2006. However, by 2012, the South region had significantly increased its investments. The South region adopts a more plantation-oriented forest management model and has a high share of private forestry (Oswalt et al. 2019), making it an attractive area for investors. Nevertheless, this growth may exert pressure on forest ecosystem services. In contrast, the Pacific Coast and Rocky Mountain regions have remained relatively stable, with significantly lower private sector

investment levels. The Pacific Coast region is particularly prone to wildfires, and increasing fire treatment may necessitate additional investment in production facilities and innovation capacities in the future.

The growing demand for forest and other biobased products is transforming the investment landscape, potentially accounting for the uptick in investments in the forest sector. In the United States, there has been a rapid surge in sustainable investing in recent decades (Hale 2021), and the trajectory of the forest sector hinges on its alignment and involvement in this form of investment. Within the ubiquitous sphere of sustainable investing, the Environmental, Social, and Governance (ESG) criteria stands out as one of the most contemporary approaches (Townsend 2020). ESG criteria are applied to minimize material risks associated with environmental, social, and governance issues. In the forest sector, substantial changes in tangible assets, such as production facilities, machinery upgrades, and greenfield investments, necessitate substantial capital investment in the multimillion-dollar range. Consequently, investors' perception of material risks within the sector may impact future capital availability.

Considerable uncertainty pervades the landscape of forest investment, encompassing variations in perceptions of risk versus opportunities and preferences for public versus private governance and investment (Begemann et al. 2023). Investments in the U.S. forest sector are influenced by both domestic and international markets and policies. However, a comprehensive examination of regional future strategic orientations and their intersections and divergences is uncommon in this context (Cubbage et al. 2022).

Forest sector befits for preparing for multitude future scenarios (Zhang et al. 2023, Duden et al. 2023, West et al. 2021), that are closely tied to the risk and reward profiles of investments. The unexpectedly high demand and disruptions in supply chains during the COVID-19 pandemic created an excessive demand for lumber, leading to a surge in prices in late 2020 and Early 2021 (Riddle 2021). As Bruck et al. (under review) have reported, although the COVID-19 pandemic posed challenges for landowners, loggers, and wood mill workers, the concurrent surge in lumber prices potentially improved the industry's investment capacity. This can be observed in new capital investment data (Figure 5). After a decline in 2020, the investment began to recover in 2021. Overall, private sector capital investments have trended upwards since 2012 (Figure 1), with particularly significant increases in the U.S. South (Figure 3).

The difference in public and private investment amount and growth rates may appear larger than they are. Public restoration and ecosystem management programs, such as Bipartisan Infrastructure Law (2021), have a substantial impact on forests, and these activities are carried out through various public organization, including the Bureau of Land Management, and Bureau of Fish and Wildlife, which fall out of scope of this report. For example, private forest landowners in the U.S. can receive direct payments for ecosystem services payments through markets, subsidies, and hybrid approaches, from both governmental and non-governmental sources (Frey et al. 2021). Nevertheless, we opted not to estimate the share of such forest-related investment of public organizations, as well as investment in environmental services due to inadequate precision under current capital investment and annual expenditure classification systems. Frey et al. (2021) provide estimates on the revenues from ecosystem service, which serves complementary information to ours. The increased orientation to restoration and conservation, coupled with the incorporation of the value of carbon (Mei 2023) and biodiversity (Panwar et al. 2021), may translate into renewed forest sector business models in the future that will continue to blur the traditional organizational and sectoral boundaries (Hurmekoski et al. 2018). Globally, increasing investor attention is being geared toward non-wood forest products and ecosystem services such as carbon payments, conservation easements, hunting licenses or other non-wood forest products (Chudy and Cubbage 2020), which may further shape the outlook of the forestry sector in the long-term.

In the section on announced new capital investment in wood pellet and lumber industry in 2022, we combined data from media outlets and company reports for investment amounts and wood use at capacity of announced investments in energy and lumber sector based on data by Forisk Consulting (2022). Consequently, the wood use at the capacity cannot be interpreted as an additional wood demand, and the broader evaluation of the industrial wood demand is beyond the scope of this study. These encompass an interplay of factors, encompassing structural realignments within the industry itself and the nuanced dynamics of market forces, including the introduction of novel product categories (Hurmekoski et al. 2018). While we are unable to break down the data geographically due to privacy agreements, prior research has emphasized the significant role of the U.S. South in the energy sector, as this region supplies a substantial quantity of pellets worldwide (Visser et al. 2022). Diverse perceptions regarding the sustainability of wood use especially for energy purposes persist, and potential regulatory changes related to wood sustainability classifications and carbon policies in importing regions may impact the outlook of

the U.S. forest sector. However, given the multiple ongoing crises affecting the energy markets globally, major shifts are unlikely to occur soon, and bioenergy is likely to remain a sector with investment potential.

Similar to Skog et al. (2010), data are not available for certain entities responsible for forest protection and management, including family forest owners, local governments, NGOs, and some corporate landowners such as conservation organizations, Timber Investment Management Organizations (TIMOs), and Real Estate Investment Trusts (REITs). Moreover, information on businesses dealing with non-wood products or forest-related recreation remain unavailable. Additionally, accurate data on entities providing "environmental services from forests" are lacking, as we currently do not have sufficient information at the organizational level regarding capital investment and annual expenditure. Such data may be limited in scope, covering specific regions, and time periods. Similarly, there are not sufficient data on the non-wood forest product industry.

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## DISCLAIMERS

The findings and conclusions in this publication are those of the authors and should not be construed to represent any official USDA or U.S. Government determination or policy.

## CONFLICT OF INTERESTS

The authors declare no conflict of interest.

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## APPENDIX A. STATE FORESTRY ANNUAL EXPENDITURES 1998, 2002, 2004, 2012, 2014, 2016, 2018, 2020 (MILLION 2020$).

| | 1998 | 2002 | 2004 | 2012 | 2014 | 2016 | 2018 | 2020 |
|---|---|---|---|---|---|---|---|---|
| Alabama | 11 | 17 | 14 | 13 | 17 | 7 | 7 | 8 |
| Alaska | | 7 | 19 | 31 | 55 | 85 | 49 | 25 |

| | | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Arizona | 1 | 2 | | 6 | 6 | 12 | 11 | |
| Arkansas | 6 | 11 | | 13 | 16 | 22 | 18 | 23 |
| California | 194 | 336 | 477 | 638 | 712 | 1,025 | 962 | 1,167 |
| Colorado | 9 | 14 | 19 | 28 | 10 | 14 | 12 | 16 |
| Connecticut | 1 | 1 | 2 | 2 | 2 | 3 | 3 | 3 |
| Delaware | 1 | 1 | 1 | 1 | 2 | 2 | 2 | 2 |
| District of Columbia | 1 | 3 | 4 | 0 | 0 | 0 | 13 | 13 |
| Florida | 24 | 47 | 51 | 64 | 75 | 102 | 105 | 111 |
| Georgia | 18 | 25 | 20 | 33 | 37 | 55 | 60 | 55 |
| Hawaii | 1 | 9 | | 7 | 9 | 13 | 5 | 23 |
| Idaho | 9 | 41 | 13 | 22 | 46 | 52 | 55 | 59 |
| Illinois | 3 | 4 | | 3 | 4 | 4 | 6 | 8 |
| Indiana | 4 | 4 | 9 | 10 | 12 | 10 | 9 | 11 |
| Iowa | 1 | 2 | 3 | 0 | 5 | 5 | 4 | 5 |
| Kansas | 1 | 1 | 1 | 1 | 2 | 2 | 3 | 4 |
| Kentucky | 5 | 8 | 11 | 12 | 13 | 16 | 15 | 20 |
| Louisiana | 6 | 10 | 13 | 10 | 10 | 15 | 13 | 3 |
| Maine | 5 | 11 | | 10 | 11 | 17 | 11 | 13 |
| Maryland | 3 | 6 | 5 | 6 | 9 | 11 | 10 | 12 |
| Massachusetts | 2 | 2 | 2 | 10 | 12 | 11 | 10 | 12 |
| Michigan | 20 | 22 | 22 | 36 | 30 | 43 | 39 | 50 |
| Minnesota | 19 | 28 | 29 | 39 | 51 | 68 | 69 | 79 |
| Mississippi | 13 | 21 | 17 | 18 | 24 | 36 | 33 | 26 |
| Missouri | 6 | 3 | 2 | 7 | 12 | 12 | 16 | 20 |
| Montana | 5 | 10 | 8 | 25 | 27 | 39 | 77 | 42 |
| Nebraska | 2 | 2 | 3 | 2 | 5 | 5 | 4 | 6 |
| Nevada | 2 | | 4 | 13 | 20 | 23 | 28 | 26 |
| New Hampshire | | 5 | 18 | 4 | 5 | 6 | 5 | 7 |
| New Jersey | 3 | | | 10 | 10 | 13 | 9 | 13 |
| New Mexico | 2 | 18 | 20 | 14 | 11 | 16 | 12 | 22 |
| New York | 8 | 9 | 12 | 14 | 18 | 22 | 20 | 26 |
| North Carolina | 22 | 26 | 37 | 34 | 46 | 57 | 47 | 60 |
| North Dakota | 1 | 2 | 3 | 4 | 5 | 6 | 5 | 6 |
| Ohio | 5 | 7 | | 9 | 10 | 16 | 10 | 16 |
| Oklahoma | 5 | 9 | 8 | 10 | 14 | 15 | 11 | 16 |
| Oregon | 84 | 66 | 73 | 143 | 275 | 262 | 146 | 207 |
| Pennsylvania | 18 | | | 47 | 62 | 87 | 89 | 84 |
| Rhode Island | 1 | 2 | 2 | 1 | 1 | 2 | 1 | 2 |
| South Carolina | 10 | 13 | 12 | 13 | 23 | 28 | 22 | 35 |
| South Dakota | 1 | 1 | 3 | 5 | 4 | 3 | 1 | 2 |
| Tennessee | 8 | 14 | 15 | 15 | 21 | 25 | 20 | 29 |
| Texas | 5 | 4 | 25 | 102 | 51 | 79 | 93 | 111 |
| Utah | 16 | 8 | 9 | 21 | 23 | 25 | 26 | 37 |
| Vermont | 2 | 3 | 3 | 3 | 5 | 6 | 6 | 12 |
| Virginia | 10 | 12 | 15 | 17 | 22 | 29 | 23 | 35 |
| Washington | 35 | 37 | 57 | 157 | 288 | 214 | 59 | 291 |
| West Virginia | 2 | 4 | | 2 | 5 | 3 | 2 | 3 |
| Wisconsin | 12 | 16 | 25 | 32 | 47 | 49 | 36 | 58 |
| Wyoming | 5 | 2 | 8 | 35 | 10 | 15 | 12 | 16 |

*Source: Years 1998, 2002, 2004 from Skog et al. (2010) (Skog et al. (2010) values were divided by 1000 due an apparent mistake in reporting). Years 2012, 2014, 2016, 2018, 2020 are obtained*

*from Association of State Foresters 2023. Empty cells indicate a lack of data for a particular category or time period.*

## APPENDIX B: NAICS CODES UNDER 321 – WOOD PRODUCT MANUFACTURING AND 322 – PAPER MANUFACTURING

| Codes | Titles | US Business Entities |
|---|---|---|
| 321 | Wood Product Manufacturing | 31,379 |
| 3211 | Sawmills and Wood Preservation | 3,102 |
| 321113 | Sawmills | 2,472 |
| 321114 | Wood Preservation | 630 |
| 3212 | Veneer, Plywood, and Engineered Wood Product Manufacturing | 1,629 |
| 321211 | Hardwood Veneer and Plywood Manufacturing | 298 |
| 321212 | Softwood Veneer and Plywood Manufacturing | 82 |
| 321213 | Engineered Wood Member (except Truss) Manufacturing | 62 |
| 321214 | Truss Manufacturing | 871 |
| 321219 | Reconstituted Wood Product Manufacturing | 316 |
| 3219 | Other Wood Product Manufacturing | 26,648 |
| 321911 | Wood Window and Door Manufacturing | 1,243 |
| 321912 | Cut Stock, Resawing Lumber, and Planning | 1,242 |
| 321918 | Other Millwork (including Flooring) | 14,547 |
| 321920 | Wood Container and Pallet Manufacturing | 3,439 |
| 321991 | Manufactured Home (Mobile Home) Manufacturing | 515 |
| 321992 | Prefabricated Wood Building Manufacturing | 1,116 |
| 321999 | All Other Miscellaneous Wood Product Manufacturing | 4,546 |
| | | |
| 322 | Paper Manufacturing | 9,149 |
| 3221 | Pulp, Paper, and Paperboard Mills | 3,069 |
| 322110 | Pulp Mills | 352 |
| 322121 | Paper (except Newsprint) Mills | 2,019 |
| 322122 | Newsprint Mills | 31 |
| 322130 | Paperboard Mills | 667 |
| 3222 | Converted Paper Product Manufacturing | 6,080 |
| 322211 | Corrugated and Solid Fiber Box Manufacturing | 1,829 |
| 322212 | Folding Paperboard Box Manufacturing | 154 |
| 322219 | Other Paperboard Container Manufacturing | 652 |
| 322220 | Paper Bag and Coated and Treated Paper Manufacturing | 1,463 |
| 322230 | Stationery Product Manufacturing | 429 |
| 322291 | Sanitary Paper Product Manufacturing | 423 |
| 322299 | All Other Converted Paper Product Manufacturing | 1,130 |

*Source: NAICS Association webpage, 2023*

## APPENDIX C— CAPITAL INVESTMENT IN PRIVATE SECTOR

*Wood product industry (NAICS 321) by region 1997–2020 (million 2020$).*

| | North | South | Pacific Coast | Rocky Mountain | Not specified | Total |
|---|---|---|---|---|---|---|
| 1997 | 392 | 670 | 271 | 61 | 1 | 1,395 |
| 1998 | | | | | | 1,422 |
| 1999 | | | | | | 1,655 |
| 2000 | | | | | | 1,709 |
| 2001 | | | | | | 1,516 |
| 2002 | 526 | 302 | 173 | 369 | | 1,363 |
| 2003 | 434 | 525 | 207 | 61 | 3 | 1,230 |
| 2004 | 554 | 712 | 267 | 94 | 6 | 1,633 |
| 2005 | 622 | 832 | 326 | 105 | 9 | 1,893 |
| 2006 | 707 | 978 | 464 | 159 | 7 | 2,314 |
| 2007 | | | | | | 2,964 |
| 2008 | | | | | | 1,788 |
| 2009 | | | | | | 1,114 |
| 2010 | | | | | | 1,699 |
| 2011 | | | | | | 1,630 |
| 2012 | 568 | 808 | 228 | 89 | -60 | 1,633 |
| 2013 | 724 | 996 | 380 | 116 | 309 | 2,526 |
| 2014 | 725 | 1,232 | 449 | 182 | 441 | 3,029 |
| 2015 | 657 | 1,341 | 467 | 125 | 489 | 3,080 |
| 2016 | 877 | 1,392 | 470 | 378 | 148 | 3,266 |
| 2017 | 917 | 1,614 | 488 | 69 | 237 | 3,325 |
| 2018 | 1,240 | 1,913 | 557 | 123 | 143 | 3,975 |
| 2019 | 1,299 | 1,675 | 438 | 141 | 97 | 3,651 |
| 2020 | 1,204 | 1,581 | 543 | 132 | 72 | 3,532 |

Paper product industry (NAICS 322) by region 1997–2020 (million 2020$).

| | North | South | Pacific coast | Rocky mountain | Not specified | Total |
|---|---|---|---|---|---|---|
| 1997 | 1,702 | 2,042 | 338 | 89 | 7 | 4,179 |
| 1998 | | | | | | 4,342 |
| 1999 | | | | | | 3,769 |
| 2000 | | | | | | 4,491 |
| 2001 | | | | | | 3,799 |
| 2002 | 1,609 | 1,422 | 432 | 83 | 27 | 3,573 |
| 2003 | 1,256 | 1,665 | 386 | 42 | 83 | 3,432 |
| 2004 | 1,337 | 1,292 | 344 | 68 | 71 | 3,113 |
| 2005 | 1,636 | 1,337 | 303 | 144 | 26 | 3,446 |

*Table continues*

| | | | | | | |
|---|---|---|---|---|---|---|
| 2006 | 1,861 | 2,052 | 628 | 288 | 39 | 4,867 |
| 2007 | | | | | | 4,170 |
| 2008 | | | | | | 4,222 |
| 2009 | | | | | | 3,214 |
| 2010 | | | | | | 3,649 |
| 2011 | | | | | | 4,082 |
| 2012 | 1,982 | 3,596 | 491 | 132 | 24 | 6,225 |
| 2013 | 1,960 | 2,858 | 460 | 95 | 426 | 5,799 |
| 2014 | 2,433 | 4,119 | 605 | 128 | 382 | 7,667 |
| 2015 | 2,786 | 3,379 | 547 | 128 | 598 | 7,439 |
| 2016 | 2,382 | 3,571 | 562 | 153 | 534 | 7,201 |
| 2017 | 2,584 | 3,225 | 375 | | 697 | 6,881 |
| 2018 | 2,351 | 2,529 | 459 | 167 | 138 | 5,644 |
| 2019 | 2,969 | 4,155 | 611 | 225 | 1,009 | 8,969 |
| 2020 | 2,822 | 5,146 | 568 | 141 | 56 | 8,733 |

*Wood furniture 2012–2021 (million 2020$).*

| | Wood office furniture manufacturing (NAICS 337211) | Custom architectural woodwork and millwork manufacturing (337212) | Wood kitchen cabinet and countertop manufacturing (NAICS 337110) | Nonupholstered wood household furniture manufacturing (NAICS 337122) | Total (NAICS 337211, 337212, 337110, 337122) |
|---|---|---|---|---|---|
| 2012 | 40 | 105 | 160 | 66 | 371 |
| 2013 | 46 | 118 | 179 | 48 | 391 |
| 2014 | 41 | 117 | 201 | 77 | 436 |
| 2015 | 59 | 117 | 233 | 116 | 525 |
| 2016 | 58 | 259 | 217 | 77 | 611 |
| 2017 | 43 | 210 | 384 | 77 | 714 |
| 2018 | 45 | 247 | 428 | 76 | 796 |
| 2019 | 55 | 254 | 527 | 89 | 925 |
| 2020 | 86 | 315 | 557 | 105 | 1,063 |
| 2021 | 98 | 312 | 627 | 119 | 1,156 |

*Source: Years 1997 – 2006 Skog et al (2010). United States Census Bureau Annual Survey of Manufactures: Summary Statistics for Industry Groups and Industries (2013–2016, 2018–2020), Years 2012 and 2017 from Economic Census statistics. Annual Survey of Manufactures: annual Survey of Manufactures: Geographic Area Statistics: Statistics for All Manufacturing by State 2013-2016. Empty cells indicate a lack of data for a particular category or time period.*

## APPENDIX D— PRIVATE SECTOR ANNUAL EXPENDITURE: PAYROLL AND MATERIALS EXPENDITURE

*Wood product industry (NAICS 321) by region 2002–2020 (million 2020$).*

| | North | South | Pacific Coast | Rocky Mountains | Not specified | Total |
|---|---|---|---|---|---|---|
| 2002 | 15,436 | 8,388 | 4,551 | 11,380 | -235 | 39,520 |
| 2003 | 13,052 | 15,841 | 7,664 | 2,354 | 185 | 39,095 |
| 2004 | 13,560 | 16,530 | 8,556 | 2,748 | 189 | 41,582 |
| 2005 | 14,364 | 18,136 | 8,905 | 3,196 | 197 | 44,798 |
| 2006 | 13,869 | 17,810 | 8,617 | 3,249 | 177 | 43,722 |
| 2007 | | | | | | |
| 2008 | | | | | | |
| 2009 | | | | | | |
| 2010 | | | | | | |
| 2011 | | | | | | |
| 2012 | 15,927 | 19,112 | 8,241 | 2,232 | 443 | 45,955 |
| 2013 | 15,802 | 21,046 | 9,731 | 3,678 | 2,602 | 52,860 |
| 2014 | 16,908 | 23,383 | 10,744 | 3,740 | 3,507 | 58,282 |
| 2015 | 18,523 | 25,539 | 11,071 | 4,361 | 3,245 | 62,740 |
| 2016 | 19,937 | 27,154 | 11,437 | 4,602 | 3,192 | 66,322 |
| 2017 | 24,366 | 30,801 | 12,929 | 3,722 | 438 | 72,256 |
| 2018 | 28,423 | 32,111 | 15,018 | 4,322 | 682 | 80,556 |
| 2019 | 28,303 | 31,973 | 14,469 | 4,245 | 1,044 | 80,035 |
| 2020 | 28,029 | 33,297 | 14,367 | 4,472 | 902 | 81,067 |

*Paper product industry (NAICS 322) by region 2002–2020 (million 2020$).*

| | North | South | Pacific Coast | Rocky Mountains | Not specified | Total |
|---|---|---|---|---|---|---|
| 2002 | 26,627 | 21,520 | 6,364 | 1,861 | -260 | 56,111 |
| 2003 | 26,465 | 22,107 | 6,188 | 1,583 | 482 | 56,825 |
| 2004 | 27,797 | 24,241 | 6,573 | 1,672 | 535 | 60,818 |
| 2005 | 30,653 | 23,732 | 7,541 | 4,128 | 946 | 66,999 |
| 2006 | 32,213 | 25,250 | 8,033 | 4,295 | 1,167 | 70,958 |
| 2007 | | | | | | |
| 2008 | | | | | | |
| 2009 | | | | | | |
| 2010 | | | | | | |
| 2011 | | | | | | |
| 2012 | 42,930 | 36,528 | 9,324 | 2,177 | -19 | 90,940 |
| 2013 | 41,534 | 37,047 | 9,858 | 3,263 | 5,632 | 97,335 |
| 2014 | 43,193 | 39,804 | 10,407 | 3,582 | 5,661 | 102,647 |
| 2015 | 44,899 | 39,713 | 10,804 | 3,666 | 5,739 | 104,822 |
| 2016 | 45,003 | 40,178 | 11,095 | 3,629 | 5,655 | 105,559 |
| 2017 | 51,155 | 46,826 | 11,770 | 4,229 | 950 | 114,931 |
| 2018 | 57,440 | 47,849 | 12,749 | 3,315 | 2,709 | 124,062 |
| 2019 | 51,165 | 49,512 | 12,708 | 3,719 | 12,165 | 129,270 |
| 2020 | 47,649 | 46,302 | 11,754 | 3,507 | 10,915 | 120,127 |

*Table continues*

| | Wood office furniture manufacturing (NAICS 337211) | Custom architectural woodwork and millwork manufacturing (337212) | Wood kitchen cabinet and countertop manufacturing (NAICS 337110) | Nonupholstered wood household furniture manufacturing (337122) | Total |
|---|---|---|---|---|---|
| 2012 | 1,181 | 3,248 | 5,519 | 2,338 | 12,286 |
| 2013 | 1,226 | 3,576 | 6,578 | 2,430 | 13,810 |
| 2014 | 1,239 | 3,835 | 7,155 | 2,449 | 14,678 |
| 2015 | 1,376 | 4,245 | 8,086 | 2,546 | 16,253 |
| 2016 | 1,375 | 4,443 | 8,388 | 2,532 | 16,738 |
| 2017 | 1,350 | 5,222 | 8,795 | 2,497 | 17,864 |
| 2018 | 1,577 | 5,945 | 9,588 | 2,560 | 19,670 |
| 2019 | 1,677 | 6,126 | 9,695 | 2,470 | 19,968 |
| 2020 | 2,058 | 5,601 | 9,776 | 2,121 | 19,556 |
| 2021 | 2,036 | 6,482 | 11,865 | 2,526 | 22,909 |

*Source: Years 2002–2006 Skog et al. (2010), United States Census Bureau. Annual Survey of Manufactures: Summary Statistics for Industry Groups and Industries in the U.S.: 2018 – 2020, Annual Survey of Manufactures: annual Survey of Manufactures: Geographic Area Statistics: Statistics for All Manufacturing by State 2013–2016. 2012 and 2017 from Economic Census statistics. Empty cells indicate a lack of data for a particular category or time period.*

**APPENDIX E. PRIVATE SECTOR TOTAL ANNUAL EXPENITURE: PAYROLL AND MATERIALS EXPENDITURE IN WOOD PRODUCT (NAICS 321), PAPER PRODUCT (NAICS 322), AND WOOD FURNITURE (NAICS 337211, 337110, 337122) INDUSTRIES (MILLION 2020$).**

| Year | Wood products (NAICS 321) | Paper products (NAICS 322) | Wood furniture (NAICS 337211, 337110, 337122) | Total |
|---|---|---|---|---|
| 2002 | 39,520 | 56,111 | | 95,631 |
| 2003 | 39,095 | 56,825 | | 95,920 |
| 2004 | 41,582 | 60,818 | | 102,400 |
| 2005 | 44,798 | 66,999 | | 111,797 |
| 2006 | 43,722 | 70,958 | | 114,680 |
| …. | | | | |
| 2012 | 45,955 | 90,940 | 12,285 | 149,180 |
| 2013 | 52,860 | 97,335 | 13,809 | 164,004 |
| 2014 | 58,282 | 102,647 | 14,677 | 175,606 |
| 2015 | 62,740 | 104,822 | 16,253 | 183,815 |
| 2016 | 66,322 | 105,559 | 16,738 | 188,618 |
| 2017 | 72,256 | 114,931 | 17,864 | 205,051 |
| 2018 | 80,556 | 124,062 | 19,670 | 224,289 |
| 2019 | 80,035 | 129,270 | 19,967 | 229,272 |
| 2020 | 81,067 | 120,127 | 19,556 | 220,749 |

**APPENDIX F— PRIVATE SECTOR TOTAL CAPITAL INVESTMENT: WOOD PRODUCT (NAICS 321) AND PAPER PRODUCT INDUSTRIES (NAICS 322) BY REGION 1997–2020 (MILLION 2020$).**

| Year | North | South | Pacific Coast | Rocky Mountain | Not specified | Total NAICS 321 and 322 |
|---|---|---|---|---|---|---|
| 1997 | 2,094 | 2,713 | 609 | 149 | 8 | 5,574 |
| 1998 | | | | | | 5,765 |
| 1999 | | | | | | 5,424 |
| 2000 | | | | | | 6,200 |
| 2001 | | | | | | 5,315 |
| 2002 | 2,135 | 1,725 | 604 | 452 | 27 | 4,935 |
| 2003 | 1,690 | 2,190 | 593 | 103 | 86 | 4,663 |
| 2004 | 1,892 | 2,003 | 611 | 162 | 77 | 4,746 |
| 2005 | 2,258 | 2,169 | 629 | 249 | 35 | 5,339 |
| 2006 | 2,568 | 3,030 | 1,091 | 446 | 46 | 7,180 |
| 2007 | | | | | | 7,135 |
| 2008 | | | | | | 6,010 |
| 2009 | | | | | | 4,328 |
| 2010 | | | | | | 5,348 |
| 2011 | | | | | | 5,712 |
| 2012 | 2,550 | 4,404 | 719 | 221 | -36 | 7,858 |
| 2013 | 2,684 | 3,854 | 840 | 211 | 735 | 8,325 |
| 2014 | 3,158 | 5,352 | 1,054 | 310 | 823 | 10,697 |
| 2015 | 3,443 | 4,721 | 1,014 | 254 | 1,088 | 10,518 |
| 2016 | 3,259 | 4,963 | 1,032 | 532 | 681 | 10,467 |
| 2017 | 3,501 | 4,839 | 863 | | 934 | 10,206 |
| 2018 | 3,820 | 4,442 | 1,015 | 293 | 78 | 9,619 |
| 2019 | 4,382 | 5,830 | 1,049 | 363 | 960 | 12,619 |
| 2020 | 4,134 | 6,727 | 1,111 | 273 | 20 | 12,266 |

*Source: Skog et al. 2010, United States Census Bureau. Annual Survey of Manufactures: Summary Statistics for Industry Groups and Industries in the U.S.: 2018 – 2020, Annual Survey of Manufactures: annual Survey of Manufactures: Geographic Area Statistics: Statistics for All Manufacturing by State 2013–2016. 2012 and 2017 from Economic Census statistics. Empty cells indicate a lack of data for a particular category or time period.*

**APPENDIX G—PRIVATE SECTOR TOTAL ANNUAL EXPENDITURE: PAYROLL AND MATERIALS EXPENDITURE IN WOOD PRODUCT (NAISCS 321) AND PAPER PRODUCT INDUSTRIES (NAICS 322) BY REGION 2020–2021 (MILLION 2020$) IN TOTAL.**

| Year | North | South | Pacific Coast | Rocky Mountain | Not specified | Total |
|---|---|---|---|---|---|---|
| 2002 | 42,063 | 29,907 | 10,915 | 13,241 | -495 | 95,631 |
| 2003 | 39,517 | 37,949 | 13,851 | 3,937 | 667 | 95,920 |
| 2004 | 41,358 | 40,770 | 15,128 | 4,419 | 724 | 102,400 |
| 2005 | 45,017 | 41,868 | 16,446 | 7,324 | 1,143 | 111,797 |
| 2006 | 46,082 | 43,060 | 16,649 | 7,544 | 1,344 | 114,680 |
| 2007 | | | | | | |
| 2008 | | | | | | |
| 2009 | | | | | | |
| 2010 | | | | | | |
| 2011 | | | | | | |
| 2012 | 58,857 | 55,640 | 17,565 | 4,409 | 424 | 136,895 |
| 2013 | 57,336 | 58,093 | 19,589 | 6,942 | 8,234 | 150,195 |
| 2014 | 60,101 | 63,187 | 21,150 | 7,322 | 9,168 | 160,929 |
| 2015 | 63,423 | 65,252 | 21,876 | 8,027 | 8,984 | 167,562 |
| 2016 | 64,939 | 67,332 | 22,532 | 8,230 | 8,847 | 171,881 |
| 2017 | 75,521 | 77,627 | 24,699 | 7,951 | 1,388 | 187,187 |
| 2018 | 85,864 | 79,960 | 27,767 | 7,637 | 3,391 | 204,618 |
| 2019 | 79,468 | 81,485 | 27,178 | 7,964 | 13,210 | 209,305 |
| 2020 | 75,677 | 79,599 | 26,122 | 7,979 | 11,816 | 201,194 |

*Source: Years 2002–2006 Skog et al. 2010, United States Census Bureau. Annual Survey of Manufactures: Summary Statistics for Industry Groups and Industries in the U.S.: 2018–2020, Annual Survey of Manufactures: annual Survey of Manufactures: Geographic Area Statistics: Statistics for All Manufacturing by State 2013–2016. 2012 and 2017 from Economic Census statistics. Empty cells indicate a lack of data for a particular category or time period.*

**APPENDIX H—NEW CAPITAL INVESTMENT FOR WOOD PRODUCT AND PAPER PRODUCT INDUSTRIES (NAICS 321 and 322) 1997–2021 (MILLION $2020).**

| | Wood products NAICS 321 | Paper products NAICS 322 |
|---|---|---|
| 1997 | 1,395 | 4,179 |
| 1998 | 1,422 | 4,342 |
| 1999 | 1,655 | 3,769 |
| 2000 | 1,709 | 4,491 |
| 2001 | 1,516 | 3,799 |
| 2002 | 1,363 | 3,573 |
| 2003 | 1,230 | 3,432 |
| 2004 | 1,633 | 3,113 |
| 2005 | 1,893 | 3,446 |
| 2006 | 2,314 | 4,867 |
| 2007 | 2,707 | 4,072 |
| 2008 | 4,222 | 1,788 |
| 2009 | 996 | 3,032 |
| 2010 | 1,523 | 3,095 |
| 2011 | 1,515 | 3,953 |
| 2012 | 1,914 | 5,007 |
| 2013 | 2,700 | 4,814 |
| 2014 | 3,020 | 5,037 |
| 2015 | 3,943 | 5,992 |
| 2016 | 3,899 | 6,696 |
| 2017 | 4,125 | 7,426 |
| 2018 | 4,739 | 10,333 |
| 2019 | 5,178 | 11,392 |
| 2020 | 3,861 | 8,770 |
| 2021 | 5,988 | 10,216 |

*Source: United States Census Bureau. Annual Capital Expenditure Survey (ACES) (1996–2021). See Skog et al. 2010 for past data.*