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Criterion 6, Indicator 34: Value of Capital Investment and Annual Expenditure in Forest Management, Wood and Non-Wood Product Industries, Forest-Based Environmental Services, Recreation, and Tourism

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Abstract

USDA Forest Service capital investment in management infrastructure was \$501 and \$390 million (2005\$) for 2005 and 2007, respectively. National forest programs expenditures decreased from \$3.0 to \$2.7 billion between 2004 and 2007 and wildfire management expenditures increased from \$1.7 to \$2.1 billion (2005\$). State forestry program expenditures for 1998, 2002, and 2004 were \$2.0 to \$2.2 billion (2005\$). Forest recreation capital investment by the Forest Service was \$461 and \$405 million for 2008 and 2009, respectively, and by the National Park Service was \$386 and \$474 million for 2006 and 2008, respectively. NPS concessions provided \$21.6 million for facility improvements in 2006. Private capital investment in forest recreation infrastructure and by businesses providing recreation equipment was \$1.03 billion for structures and \$442 million for equipment in 2006. Wood products industries capital investments decreased from \$3.4 to \$2.2 billion between 1997 and 2003 but increased to \$3.5 billion in 2006 (2005\$). Paper products industries investments declined from \$10.2 to \$5.3 billion between 1997 and 2004 but increased to \$7.4 billion in 2006 (2005\$). Wood furniture industry investments were \$837 and \$873 million for 1997 and 2002, respectively. Logging industry investments were \$0.9 billion in 1997 (2005\$).

Keywords: forests, sustainability, criteria and indicators, Montreal process, forest management, forest products industry, recreation, capital investment

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Criterion 6, Indicator 34: Value of Capital Investment and Annual Expenditure in Forest Management, Wood and Non-Wood Product Industries, Forest-Based Environmental Services, Recreation, and Tourism

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Indicator Background

The purpose of this report is to provide information on the rationale and data provided for Indicator 34 for the U.S. National Report on Sustainable Forests—2010. Information on the rationale for the Indicator and recommended data to be developed are taken from the report of the Technical Advisory Committee (TAC) of the Montreal Process (MP).

Verbatim Montreal Process Technical Advisory Committee Notes

Rationale – This indicator measures investments made to maintain and/or enhance the ability of forests to produce goods and services for the ultimate benefit of a nation's economy and its people. Sustainable forest management is not possible in the long run without regular investments in forest protection and management operations, forest industries and enterprises, and forest-based environmental services. When capacities to protect, manage, and use forests erode through lack of funding, the benefits that forests provide also decline.

Measurement – The measure desired is the total annual expenditure by both public and private entities in protecting and managing forests, extracting and manufacturing wood and non-wood products, and using the many services of forests.

These expenditures should include both

- the annual operating expenses of agencies, firms, and organizations and
- the average annual value of capital investments.

A simple way to estimate the average value of capital investments, which countries may choose to adopt, is to sum

up the capital costs of investments in assets for the preceding 3 to 5 years and divide by the time period selected. This simple approach has two advantages. It recognizes that although capital investments do not occur every year, the level of recent capital investments is important, and it avoids a major accounting exercise involving detailed capital asset depreciation computations.

Examples of capital assets for which investments might be tabulated are the following:

1. the costs of new plants and equipment rebuilds by industrial firms,
2. new forest infrastructure (e.g., roads, bridges, buildings for forest managers, new recreation areas),
3. new investments by concessionaires (e.g., new hotels at recreation areas, constructed by concessionaires),
4. acquisition of additional forest land (e.g., purchase of land to add to protected areas, parks, or buffers),
5. purchase of conservation easements designed to keep forests in the forest, and
6. major investments by public agencies in management and protection (e.g., new fire-fighting bulldozers, aircraft, or information technology to support forest managers).

Annual expenditures and capital investments in research, development, education, and extension activities should not be included here because they are covered in indicator 6.35 (Annual investment and expenditure in forest-related research, extension and development, and education).

Public entities include Federal and provincial/state agencies and local governments. Private entities include industrial firms, concessionaires, other forest enterprises including forest-based recreation and tourism firms, and other non-governmental organizations with interests in protecting,

managing, and using forests for the many goods and services they provide.

Information on annual expenditures and investments in forests and processing industries (for wood and non-wood products) and infrastructure for forest-based services should be consistent with the categories of information reported on these goods and services in indicator 6.25 (Value and volume of wood and wood products productions, including primary and secondary processing). Ideally, information on categories (for example, wood-based, non-wood services) should be reported separately and then aggregated.

Sources of data could be drawn from official government reports (for example, from national income and product accounts) and private sector reports, including reports by industry associations and financial reports of major public companies. Universities and non-governmental organizations may also be a source of information. Consider using standard governmental/commercial accounting methods (distinguishing annual expenditures from investment, for example). Countries may wish to report domestic and foreign sources of investment separately.

Comments and Clarifications

Additions and Clarifications to Rationale (Opportunity to Provide Comment on Relevance and Nature of Indicator)

This indicator has changed from the investment indicator (Indicator 38) in the 2003 National Report, which included “investment in forest growing.” This indicator now focuses on capital investment in the form of buildings and other infrastructure and not investment in capital in the form of new trees. It is now more focused on the health of the businesses related to forestry and not investments in forest capital itself (trees).

It is not clear from the guidance what is to be included in the category of entities providing “forest-based environmental services.” We will not define these services or entities here because that will be done under Indicator 27, revenue from forest-based environmental services.

Additions and Clarifications to Measurement (Opportunity to Provide Comment on Feasibility and Applicability of TAC Recommendations)

Estimates for the cost of “...purchase of conservation easements designed to keep forest in forest” will be made under Indicator 27, revenue from forest-based environmental services. We assume that “annual expenditures” refers to costs of operation. For wood and paper products firms, we show payroll costs and materials costs.

Indicator Development

Data Used to Address Indicator

General description – Annual entity operating expenses and capital costs have been sought for entities involved in forest protection/management, manufacturing, and forest services.

Data have been found for a subset of all entities involved in these activities. Data on protection/management are presented for Federal and state agencies but have not been obtained for many private entities (corporations/NGOs, Timber Investment Management Organizations (TIMOs), Real Estate Investment Trusts (REITs), conservation organizations). Data on manufacturing is presented for primary and secondary forest products firms but have not been obtained for non-wood products firms. Data on “utilizing the many services of forests” are presented to a limited degree for forest-based recreation but not for environmental services generally. Those services are just now being identified for the 2010 National Report under Indicator 27.

Trend information has been sought covering at least the last 10 years, and data are presented by the Resource Planning Act (RPA) Region where available.

Specific Data Sources

See Table 1 for sources for annual capital and operating expenses.

Analysis Techniques

General Description

Most data on capital costs and annual expenses are obtained directly from Federal government survey databases, publications, or the Association of State Foresters. Estimates of capital cost for forest-based recreation businesses are estimated indirectly using data from Federal government survey databases. Capital investments are termed capital expenditures in some data sources as noted below.

Specific Steps Taken to Make Estimates

Estimating capital investment in buildings and equipment by private forest-based recreation businesses

The estimates for private capital investment in forest-based recreation businesses were made for 2006 in several steps. First, data on building and equipment expenses were obtained from the 2006 U.S. Bureau of the Census, Annual Capital Expenditures Survey for North American Industry Classification System (NAICS) codes 071 (arts, entertainment, and recreation industry) and 487 (scenic and sightseeing transportation). We then estimated total capital expenditures in the U.S. recreation and leisure industry in 2006 by summing the building and equipment expenditures for these two industries (NAICS 071 and 487), which came to \$17.196 billion (US DOC BOC 2008). Because NAICS codes 071 and 487 include many industries unrelated to outdoor recreation, we estimated the proportion of building and equipment expenditures that were made by outdoor recreation industries using the following procedures. First, we obtained a list of the number of business firms in Standard Industrial Classification (SIC) 79—the amusement and recreation services industry from Marigold Technologies Business Mailing Lists (2008). According to this source, currently approximately 64,284 business firms in the United States are in the amusement and recreation services

Table 1—Sources for annual capital and operating expenses

Type of activity/private or public entities	Annual expenses	Annual value of capital investments	Likelihood that the same data will be available for next national report
Protecting and managing forests			
USDA Forest Service	Annual operating expenses for the National Forest System	Total Forest Service investment in infrastructure	Medium to high
State forestry agencies	Annual program costs/expenditures	—	Medium to high
Wood products industries			
Wood, pulp and paper, and furniture firms	Annual costs for payroll and materials	Annual capital investments	High
Wood-based biofuels industry	—	Grants for capital investments by the U.S. Department of Energy	Low to medium
Using the many services of forests			
Recreation			
USDA Forest Service	Capital and maintenance expenses	—	Medium to high
National Park Service	Expenditures on facility maintenance	—	Medium
Private businesses, providing forest recreation services	—	Investment in buildings and equipment by firms providing forest recreation services and firms providing equipment people use for forest recreation	Medium, using the same estimation method
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	—	Medium
Forest-based environmental services	No data obtained—see Indicator 27	—	—
Non-wood product industries	No data obtained	—	—

industry. Next, using professional judgment, we determined which sub-industries identified by SIC Code on this list are predominately involved with outdoor recreation. The sum of the number of business firms in these sub-industries provided us with an estimate of 15,166 outdoor recreation firms currently in the United States. By dividing 15,166 outdoor recreation firms by 64,284 total firms, we estimated that approximately 24% of firms in the U.S. recreation and leisure industry are outdoor recreation firms.

The next major step in the process was to estimate the proportion of capital expenditures in 2006 made by outdoor recreation firms that are attributable to forest-based outdoor recreation. Because of the lack of more specific data linking outdoor recreation capital expenditures in general to forest-based recreation, we assumed that the percentage of all outdoor recreation firm capital expenditures attributable to forest-based recreation is similar to the percentage of all land cover in the United States that is forestland cover (approximately 41.86%). The percentage of forestland cover in the United States was estimated from U.S. Department of

Agriculture, National Agricultural Statistics Service (NASS) datasets, provided by the USDA Economic Research Service (USDA ERS 2002).

NAICS 071 is made up of three major sub-industries: NAICS 0711—Performing Arts, Spectator Sports, and Related Industries; NAICS 712—Museums, Historical Sites, and Similar Institutions; and NAICS 0713—Amusement, Gambling, and Recreation Industries. Using professional judgment, we assumed that firms in NAICS 0711 have little to do with forest-based recreation. Thus, since for this indicator we are only interested in forest-based outdoor recreation, we subtracted capital expenditures for NAICS 0711 reported in the 2006 Annual Capital Expenditure Survey (\$2,308 billion) (US DOC BOC 2008) from the \$17.196 billion estimate of total U.S. recreation and leisure capital expenditures cited above, which equals \$14.888 billion. Finally, to estimate capital investment in the U.S. outdoor recreation and leisure industry attributable to forest-based recreation, we multiplied \$14.888 billion by .24 and by .4186 to equal \$1.5 billion. Using 2006 Annual Capital Expenditure Survey

data, this \$1.5 billion total can be broken down into \$1.048 billion in structure expenditures and \$.452 billion in equipment expenditures.

Data Issues (Replicability, Availability, Precision, and Potential Bias)

Availability – Capital expenditure and annual expense data are not available for a number of entities that protect and manage forests, including county/local governments, conservation organizations, and certain corporate land owners (e.g., TIMOs, REITs). Capital and annual expense data are not available by region for forest-based recreation and tourism. Data specifically on capital and annual expenses for providing forest-based environmental services are not available. But the annual expenses cited for the USDA Forest Service National Forest System and for state forestry agencies include costs of providing many environmental services such as clean water, biodiversity, and carbon storage.

No specialized information on private investments into forest recreation infrastructure for the United States is available at this time. Therefore, only estimates can be made using data for the entire leisure industry as a whole, and detail on whether or not these investments were made into recreation infrastructure cannot be obtained. More refined data concerning retail sales may possibly be available from industry analyst companies, such as Hoover’s, Inc. or Standard and Poor’s, but these data are likely quite expensive to obtain. General data on recreation goods are provided in the U.S. Census Bureau’s Annual Capital Expenditure Survey (US DOC BOC 2008) but are of little use without knowing the proportion of sales within each industry.

Replicability – The likelihood that the measurements and data displayed in this report can be updated for the next national report is judged to be medium to high. Although the data for forest-based recreation could likely be replicated next time, better survey information or better estimation methods might be developed. See Table 1.

Indicator Interpretation and Discussion

Indicator Results (Reiteration of Indicator Briefs)

What Does the Indicator Show?

USDA Forest Service—Capital Expenses—Capital investment in protecting and managing forests by the USDA Forest Service was \$7.7 billion in 2005 and \$7.3 billion in 2007 (expressed in year 2005 dollars) (Table 2). This includes costs for land and land rights, construction, buildings and improvements, other structures, and improvements to land. A portion of these investments—for protecting and managing forests, including investment in facilities, road, and trails—was \$501 million in 2005 and \$390 million in 2007. Annual expenditures for Forest Service programs for

Table 2—U.S. Department of Agriculture, Forest Service general property, plant, and equipment costs, 2005–2007 (million 2005\$)

Type of cost	2005	2006	2007
Land and land rights	51	48	49
Construction in progress	311	219	174
Buildings, improvements, and renovations	803	777	825
Other structures and facilities	1,510	1,462	1,501
Improvements to land	4,979	4,800	4,741
Total	7,654	7,307	7,290

Source: USDA FS 2007 (and prior years).

Table 3—U.S. Department of Agriculture, Forest Service program costs by segment, 2004–2007 (million 2005\$)

Program costs	2004	2005	2006	2007
National forests and grasslands	3,000	2,817	2,722	2,688
Wildfire management	1,684	1,551	2,304	2,123
State and private forestry	423	377	383	341
Forest and rangeland research	323	297	313	247
Total	5,430	5,042	5,722	5,399

Source: USDA FS 2007 (and prior years).

national forests and grasslands decreased between 2004 and 2007, from \$3.0 to \$2.7 billion (2005\$), and expenditures for wildfire management increased from \$1.7 to \$2.1 billion (2005\$) (Table 3).

State Forestry Agencies—Program Expenditures and Costs

—Total annual expenditures for state forestry agency programs has been about the same for 1998, 2002, and 2004 at \$2.0 to \$2.2 billion (2005\$) (Tables 4 and 5, Figure 1). Over this time, state expenditures increased for Pacific Coast states by 27% after inflation, primarily in California, and decreased in the North. The decrease in the North is due primarily to an urban forestry expense in 1998 in New Hampshire not present in 2002 or 2004.

Forest Service recreation and National Park Service Recreation—Capital Improvements and Maintenance Costs

—Capital investment in forest recreation and tourism is made by a variety of entities on both public and private land, as well as for infrastructure for businesses that provide the goods and services that make forest recreation possible. On the national level, investments into public recreation facilities include those made by the U.S. Forest Service and the U.S. Department of the Interior National Park Service (NPS). For 2009, the Forest Service budgeted \$405 million in capital improvement and maintenance costs, which is an 8% decrease from 2008 (\$474 million) (USDA FS 2008). The NPS expenditures on facility maintenance increased from \$389 million in 2006 to \$393 million in 2007 and is budgeted for \$461 million in 2008 (US DOI NPS 2006, 2007a, 2007b).

Table 4—State/Island forestry program expenditures/costs by region, 1998, 2002, 2004 (million \$2005)

Year	North	South	Pacific Coast	Rocky Mountains	Total
1998	764,749	387,806	879,487	143,259	2,175,302
2002	331,129	455,747	945,558	217,170	1,949,605
2004	336,795	442,407	1,118,454	163,716	2,061,371

Source: Association of State Foresters 2008.

Notes: Current values were deflated by gross domestic product (GDP) deflator. Values are calculated for states with missing values using the average percentage change between those years that display values for states with data. See state details in Table 5.

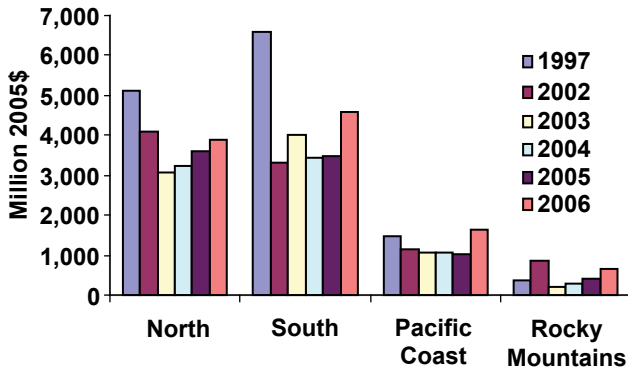


Figure 1. Annual state forestry program expenditures/costs by region, 1998, 2002, 2004 (million 2005\$).
Source: Table 4.

Private Forest-Based Recreation Businesses—Capital Investment in Buildings and Equipment—Private capital investment in forest recreation infrastructure was estimated for businesses that provide forest recreation services and those that provide the equipment that makes forest recreation possible. In 2006, total capital investment within the forest-based recreation and leisure sector were an estimated \$1.47 billion, with \$1.03 billion toward structures and \$442 million in equipment expenditures. This is approximately 8.5% of total expenditures in the leisure industry. The leisure industry is defined as all industries under NAICS code title 71, as well as the scenic and sightseeing transportation (2002 NAICS code 487, under Transportation and Warehousing). Total expenditures for all leisure industries in 2006 are estimated to be \$17 billion.

Concessionaires at National Parks—Revenue Received by Concessionaires and Fees Paid to the National Park Service Including Fee Amounts Used to Improve Facilities—Concessionaires are businesses that provide commercial forest recreation services to park visitors at the national, state, and local levels. Many forest-based parks have a two-way relationship with concessionaires; that is, parks want to maintain environmental compliance and management while maximizing revenue generation (US DOI NPS 2008; US DOI NPS 2006).

Table 5—State/Island forestry program expenditures/costs, 1998, 2002, 2004 (million\$)

State/island	1998	2002	2004
Alabama	25,523	31,699	23,755
Alaska	—	12,920	32,591
American Samoa	219	357	—
Arizona	2,864	3,995	—
Arkansas	14,070	20,531	—
California	448,004	641,892	815,849
Colorado	20,704	27,703	32,775
Connecticut	3,341	2,500	2,643
Delaware	1,438	1,716	2,015
District of Columbia	2,075	6,520	7,598
Florida	56,011	90,309	86,398
Georgia	42,001	47,462	33,996
Guam	1,193	1,430	—
Hawaii	2,948	17,510	—
Idaho	21,244	78,842	21,986
Illinois	6,185	6,809	—
Indiana	10,093	8,476	15,740
Iowa	2,967	4,447	5,419
Kansas	1,404	2,403.0	2,181
Kentucky	10,380	15,482	18,440
Louisiana	13,682	19,789	21,566
Maine	11,700	20,090	—
Maryland	6,681	11,981	9,190
Marshall Islands	161	0	—
Massachusetts	5,220	3,936	2,714
Michigan	47,247	42,772	37,345
Micronesia	173	—	—
Minnesota	44,035	53,659	49,358
Mississippi	29,900	39,876	28,716
Missouri	13,100	6,567	3,549
Montana	10,882	18,972	14,250
Nebraska	3,651	4,130	4,552
Nevada	4,913	—	6,157
New Hampshire	382,823	8,854	30,746
New Jersey	7,022	—	—
New Mexico	4,535	33,897	33,897
New York	17,410	18,131	19,720
North Carolina	50,049	50,488	63,621
North Dakota	1,985	4,062	5,700
Northern Marianas	290	—	—
Ohio	11,250	13,416	—
Oklahoma	11,235	16,560	13,999
Oregon	194,222	126,179	124,310
Palau	—	—	—
Pennsylvania	42,421	—	—
Puerto Rico	3,599	—	—
Rhode Island	1,819	2,940	2,712
South Carolina	23,385	25,484	21,198
South Dakota	2,355	1,877	4,814
Tennessee	18,387	27,657	25,090
Texas	10,567	8,145	43,277
Utah	36,050	15,311	14,948
Vermont	4,058	5,345	4,974
Virginia	22,295	23,221	25,710
Virgin Islands	—	—	—
Washington	81,611	70,918	96,882
West Virginia	5,007	7,574	7,131,77
Wisconsin	27,000	31,488	42,094
Wyoming	11,718	4,263	13,571

Source: Association of State Foresters 2008.

Concessionaires provide significant social and economic benefits. Socially, concessionaires help support recreational opportunities by providing many of the services and recreation opportunities that recreation is dependent upon. They also can provide services that otherwise may not be available, such as transportation, education, and safety services. They can also increase visitation, as they are able to subsidize visitation costs and make forest recreation more affordable to the general public. Economically, they can help support local communities and businesses, with the NPS employing more than 23,000 people through the Concession Program alone, doubling the size of the entire NPS Federal staff during peak seasons. Franchise fee revenue from allowing concessionaires to operate on park lands can also provide environmental benefits and support forest sustainability, as these fees are often reinvested into park operation and maintenance.

Concessionaires operate at the Federal, state, and local levels. The NPS is one of the largest concessionaire contractors in the United States. Contracts made by the NPS with concessionaires generated an estimated \$859 million in 2005, with 71% of NPS parks supporting concession operations. NPS concessionaires provide many services to National Park visitors including lodging, food and beverage, gift and souvenir, transportation, interpretation, education, and public health services (USDOI NPS 2006). Although there is no official division of how much of these revenues were for forest-based recreation, 10% is identified as being from marina contract revenue, which can be dismissed as possible revenue for forest-based recreation. Thus, potentially, \$773 million in revenue was received by concessionaires from recreation users.

In 2006, NPS concessions provided an estimated \$48.3 million in franchise fees and facility improvements paid to the National Park Service, with \$21.6 million of this solely dedicated to facility improvements (ARC 2007; US DOI NPS 2006). With two-thirds of NPS concessionaire business in lodging (approximately 3.3 million overnight stays in 2006), a sizable amount of this investment into facility improvements was likely for improving lodging facilities. However, NPS concessionaires also had nearly 1.2 million overnight campsite visits in 2006, implying that considerable investments were likely made into campsite facilities (USDOI NPS 2007a).

Wood and Paper Products Industries—Capital Investment—Capital investment in wood products industries decreased from \$3.4 billion in 1997 to \$2.2 billion in 2003 but increased to \$3.5 billion in 2006 (all in 2005\$) (Table 6). Capital investment in paper products industries declined more—from \$10.2 billion in 1997 to \$5.3 billion in 2004 but increased to \$7.4 billion in 2006 (all in 2005\$) (Table 7). Capital investment in the wood furniture industry was \$837 million in 1997 and \$873 million in 2002. Capital investment in the logging industry was \$0.9 billion in 1997

Table 6—Capital expenditure in wood products industries (NAICS 321) by region (million 2005\$)

Year	North	South	Pacific Coast	Rocky Mountains	Not specified	Total
1997	956	1,633	659	148	2	3,398
1998	—	—	—	—	—	3,279
1999	—	—	—	—	—	3,590
2000	—	—	—	—	—	3,484
2001	—	—	—	—	—	2,993
2002	1,006	578	330	706	-16	2,605
2003	791	957	378	111	6	2,244
2004	948	1,217	456	161	10	2,793
2005	997	1,333	522	169	14	3,034
2006	1,069	1,479	701	240	10	3,499

Source: USDOC BOC 2008 (American Fact Finder).

Table 7—Capital expenditure in paper products industries (NAICS 322) by region (million 2005\$)

Year	North	South	Pacific Coast	Rocky Mountains	Not specified	Total
1997	4,145	4,975	824	216	18	10,179
1998	—	—	—	—	—	10,011
1999	—	—	—	—	—	8,176
2000	—	—	—	—	—	9,153
2001	—	—	—	—	—	7,501
2002	3,076	2,719	825	158	52	6,830
2003	2,291	3,037	704	76	151	6,260
2004	2,287	2,209	589	116	122	5,324
2005	2,621	2,142	486	230	42	5,521
2006	2,815	3,103	949	435	59	7,360

Source: USDOC BOC 2008

(2005\$) (Table 8). More recent data from the U.S. Bureau of Census are not yet available.

Wood and Paper Products Industries—Annual Expenditures—Annual expenditures for payroll and materials by the wood products industries decreased between 1997 and 2003 about 9%, from \$82 to \$75 billion, then increased to \$84 billion in 2006 (2005\$) (Table 9). Annual expenditures for payroll and materials for paper product industries also declined 15%, from 1997 to 2003 at \$121 to \$104 billion, then increased to \$107 billion in 2006 (2005\$) (Table 10).

How Has It Changed Since 2003?

Wood and Paper Products Industries—Capital Investment and Annual Expenditures

Annual capital investment in wood and paper industries declined 40% between 1997 and 2004 and increased 34% between 2004 and 2006 (Table 11, Figs. 2 and 3). In contrast, annual expenditures for payroll and materials remained relatively stable between 1997 and 2006 (in 2005\$) (Table 12, Fig. 4). In recent developments, the U.S. Department of Energy has awarded grants to partially pay capital costs to build several cellulosic biofuels plants that will use woody biomass.

Table 8—New capital expenditures for selected forest products industries by SIC (1954–1996) and NAICS (1997–2006)

Year	New capital expenditure (million 2005\$)										Total logging, wood, paper, wood furniture NAICS 113, 321, 322	Total logging, wood, paper, wood furniture NAICS 113, 321, 322
	Lumber and wood products SIC 24	Paper and allied products SIC 26	Wood furniture parts SIC 25	Total SIC 24 + 26	Total SIC 25 + 26	Logging NAICS 113	Wood products NAICS 321	Paper products NAICS 322	Wood furniture parts NAICS 337	Total logging, wood, paper NAICS 113, 321, 322		
1954	1,016	—	—	—	—	—	—	—	—	—	—	—
1955	996	—	—	—	—	—	—	—	—	—	—	—
1956	1,347	—	—	—	—	—	—	—	—	—	—	—
1957	829	—	—	—	—	—	—	—	—	—	—	—
1958	1,142	2,299	—	3,440	—	—	—	—	—	—	—	—
1959	1,145	2,378	—	3,523	—	—	—	—	—	—	—	—
1960	1,303	2,333	—	3,636	—	—	—	—	—	—	—	—
1961	926	2,500	—	3,426	—	—	—	—	—	—	—	—
1962	1,034	2,358	—	3,392	—	—	—	—	—	—	—	—
1963	1,437	2,277	—	3,714	—	—	—	—	—	—	—	—
1964	1,231	3,006	—	4,237	—	—	—	—	—	—	—	—
1965	1,538	4,144	—	5,682	—	—	—	—	—	—	—	—
1966	1,462	4,686	—	6,148	—	—	—	—	—	—	—	—
1967	1,108	5,306	—	6,414	—	—	—	—	—	—	—	—
1968	1,275	3,474	—	4,749	—	—	—	—	—	—	—	—
1969	1,498	3,796	—	5,294	—	—	—	—	—	—	—	—
1970	1,150	3,619	—	4,768	—	—	—	—	—	—	—	—
1971	1,560	2,952	—	4,512	—	—	—	—	—	—	—	—
1972	1,823	3,150	433	4,973	5,407	—	—	—	—	—	—	—
1973	1,997	3,540	501	5,537	6,038	—	—	—	—	—	—	—
1974	2,798	5,070	568	7,867	8,435	—	—	—	—	—	—	—
1975	2,528	5,825	302	8,354	8,656	—	—	—	—	—	—	—
1976	2,243	6,394	335	8,637	8,972	—	—	—	—	—	—	—
1977	2,566	6,255	398	8,821	9,219	—	—	—	—	—	—	—
1978	2,797	6,466	521	9,263	9,784	—	—	—	—	—	—	—
1979	3,050	7,259	533	10,309	10,842	—	—	—	—	—	—	—
1980	2,606	7,706	474	10,313	10,787	—	—	—	—	—	—	—
1981	1,970	7,513	404	9,483	9,887	—	—	—	—	—	—	—
1982	1,233	6,848	402	8,081	8,484	—	—	—	—	—	—	—
1983	1,102	6,381	375	7,483	7,858	—	—	—	—	—	—	—
1984	1,546	6,168	441	7,714	8,155	—	—	—	—	—	—	—
1985	1,358	6,926	493	8,284	8,777	—	—	—	—	—	—	—
1986	1,326	6,387	467	7,713	8,181	—	—	—	—	—	—	—
1987	1,437	5,810	533	7,248	7,781	—	—	—	—	—	—	—
1988	1,280	7,653	589	8,932	9,521	—	—	—	—	—	—	—
1989	1,400	10,913	593	12,314	12,906	—	—	—	—	—	—	—
1990	1,409	11,506	459	12,915	13,375	—	—	—	—	—	—	—
1991	1,105	9,074	371	10,179	10,550	—	—	—	—	—	—	—
1992	1,158	7,488	421	8,646	9,067	—	—	—	—	—	—	—
1993	1,239	6,297	462	7,536	7,998	—	—	—	—	—	—	—
1994	1,540	6,045	483	7,585	8,068	—	—	—	—	—	—	—
1995	1,871	6,501	517	8,372	8,889	—	—	—	—	—	—	—
1996	1,938	7,465	541	9,404	9,944	—	—	—	—	—	—	—
1997	—	—	—	—	—	907	3,398	10,179	837	14,485	—	15,322
1998	—	—	—	—	—	NA	3,279	10,011	847	—	—	—
1999	—	—	—	—	—	NA	3,590	8,176	1,045	—	—	—
2000	—	—	—	—	—	NA	3,484	9,153	977	—	—	—
2001	—	—	—	—	—	NA	2,993	7,501	NA	—	—	—
2002	—	—	—	—	—	NA	2,605	6,830	873	—	—	—
2003	—	—	—	—	—	NA	2,244	6,260	NA	—	—	—
2004	—	—	—	—	—	NA	2,793	5,324	NA	—	—	—
2005	—	—	—	—	—	NA	3,034	5,521	NA	—	—	—
2006	—	—	—	—	—	NA	3,499	7,360	NA	—	—	—

Note: NA indicates not available. Sources: USDOC BOC 1981, 1985, 1990, 1995, 1999, 2001–2006, 2008 (American Fact Finder); deflated by the gross domestic product (GDP) price deflator. SIC 25 includes SIC 2541 and SIC 2542. NAICS 337 includes four categories: Wood Office furniture (337211), Custom Architectural Woodwork and Millwork (337212), Wood Kitchen Cabinet and Counter Top (337110), and Non-upholstered Wood Household Furniture (337122).

Table 9—Payroll and materials expenditure in wood products industries (NAICS 321) by region (million 2005\$)

Year	North	South	Pacific Coast	Rocky Mountains	Not specified	Total
1997	23,818	34,605	18,123	5,829	76	82,450
1998	—	—	—	—	—	84,024
1999	—	—	—	—	—	87,471
2000	—	—	—	—	—	83,615
2001	—	—	—	—	—	76,383
2002	29,510	16,035	8,700	21,756	-449	75,552
2003	24,952	30,285	14,651	4,500	353	74,740
2004	25,924	31,601	16,356	5,253	361	79,495
2005	27,460	34,672	17,024	6,110	377	85,642
2006	26,514	34,048	16,473	6,212	338	83,585

Source: USDOC BOC 2008 (American Fact Finder).

Table 10—Payroll and materials expenditure in paper products industries (NAICS 322) by region (million 2005\$)

Year	North	South	Pacific Coast	Rocky Mountains	Not specified	Total
1997	58,188	46,606	13,047	3,268	284	121,394
1998	—	—	—	—	—	122,362
1999	—	—	—	—	—	121,879
2000	—	—	—	—	—	124,330
2001	—	—	—	—	—	115,896
2002	50,904	41,140	12,167	3,557	-497	107,270
2003	48,265	40,318	11,285	2,887	879	103,634
2004	47,539	41,456	11,241	2,859	915	104,010
2005	49,118	38,027	12,083	6,614	1,516	107,358
2006	48,717	38,186	12,148	6,495	1,765	107,312

Source: USDOC BOC 2008 (American Fact Finder).

Table 11—Capital expenditure in wood products and paper products industries (NAICS 322) by region (million 2005\$)

Year	North	South	Pacific Coast	Rocky Mountains	Not specified	Total
1997	5,101	6,609	1,483	364	20	13,577
1998	—	—	—	—	—	13,290
1999	—	—	—	—	—	11,766
2000	—	—	—	—	—	12,637
2001	—	—	—	—	—	10,493
2002	4,082	3,297	1,155	864	37	9,435
2003	3,083	3,994	1,082	187	157	8,504
2004	3,236	3,427	1,045	277	132	8,116
2005	3,618	3,475	1,007	399	56	8,555
2006	3,885	4,582	1,650	675	68	10,859

Source: USDOC BOC 2008 (American Fact Finder).

Forest Service and National Park Service Recreation Services—Capital Improvements and Maintenance Costs—U.S. Forest Service expenditures on recreation infrastructure (capital improvements and maintenance) declined from \$537 million in 2001 to \$474 in 2008 and

Table 12—Payroll and materials expenditure in wood products and paper products industries (NAICS 322) by region (million 2005\$)

Year	North	South	Pacific Coast	Rocky Mountains	Not specified	Total
1997	82,006	81,211	31,170	9,098	360	203,844
1998	—	—	—	—	—	206,386
1999	—	—	—	—	—	209,351
2000	—	—	—	—	—	207,945
2001	—	—	—	—	—	192,279
2002	80,414	57,175	20,867	25,313	-946	182,822
2003	73,217	70,603	25,936	7,387	1,232	178,374
2004	73,463	73,056	27,597	8,112	1,276	183,505
2005	76,578	72,699	29,107	12,724	1,893	193,000
2006	75,231	72,234	28,622	12,707	2,103	190,897

Source: USDOC BOC 2008 (American Fact Finder).

a budget request of \$405 million for 2009. This decrease may, in part, reflect the fluctuation and relative decrease in the number of outdoor recreation facilities maintained by the Forest Service, which totaled 10,271 in 2005, 9,424 in 2006, and 10,231 in 2007 (US OMB 2008). After adjusting for inflation, the decrease in expenditures from 2001 to 2008 was about 26%.

In 2003, NPS total investment in recreation facilities totaled \$367 million for both forested and non-forested areas. This implies that unlike the Forest Service, the NPS had a slight decrease in funds for facility maintenance when accounting for inflation, with a 7% decrease in spending from 2002 to 2007. However, assuming the 2008 NPS budget is exhausted, the use of real values that adjust for inflation imply a potential 13% increase in funds from 2007 to 2008, with a 5.3% increase from 2003 to 2008 (using 2008 dollars). The overall budget for the NPS for 2008 was \$2.4 billion, which is the largest increase in funding ever granted to the NPS. This increase was to help the NPS meet their Centennial Initiative, which proposed investing \$3 billion into the parks over the next decade. One of the three goals of this initiative is to “build capacity for critical park operations and facilities, and sustain them through the next century,” so a significant increase in forest recreation infrastructure investment is needed (Barna and Olson 2007).

Wood-Based Liquid Biofuels Industry—Capital Investment—During 2007 and early 2008, the U.S. Department of Energy announced grants of up to \$585.3 million for capital costs to build 13 demonstration or commercial cellulosic biofuels plants. Six of the plants, with funding up to \$230.3 million, will use woody biomass or wood pulp extract as feedstock. Additional funds are to be invested by individual businesses. In addition to the DOE-funded biofuels plants, three other wood-based plants are being prepared. All together, these plants expect to use 2,300 tons per day of woody biomass or more (720,000 tons per year) (Table 13).

The U.S. wood-based biofuels industry is in its early, largely experimental, stages with its economic viability yet to be

Table 13—Commercial and demonstration scale cellulosic ethanol and other fuel producing plants scheduled for construction, July 2008

Company	Town/state	Feedstock tonnes of per day (tpd)	Process	Product	G/ton	Million gal/yr.	Start	All USDOE funding (million\$)	USDOE funding for plants using wood (million\$)
Abengoa*	Colwich, KS	Agricultural-400	Gasification/ferment	Ethanol/chemicals	79	11.4	2008	76	—
Alico*	Labelle, FL	Agricultural-770	Gasification/ferment	Ethanol	75	20.9	2010	33	—
Blue Fire*	Irvine, CA	Waste wood-700	Chemhydrol/ferment	Ethanol	75	19	Na	40	40
Broin Cos*	Emmetsburg, IA	Agricultural-1000	Enzymhydrol/ferment	Ethanol	85	30	2011	80	—
Colusa Dynamotive	Colusa, CA Willow Springs, MO	Agricultural-400 Wood-200	Proprietary-High temperature pyrolysis	Ethanol Heating oil	89 170	12.5 12.2	Na 2009	— —	— —
Ecofin*	Washington, KY	Agricultural-100	Enzymhydrol/ferment	Ethanol	Na	1	2010	30	—
ICM, Inc.*	St. Joseph, MO	Agricultural-70	Bio and thermomechan	Ethanol	Na	2.5	2009	30	—
Iogen*	Shelley, ID	Agricultural-700	Enzymhydrol/ferment	Ethanol	71	18	2010	80	—
Ligno*	Commerce City, CO	Waste wood-70	Biochemical	Ethanol	Na	2.5	2009	30	30
Mascoma*	Monroe, TN	Switchgrass-Na	Hydrolysis/ferment	Ethanol	Na	5	2009	26	—
Mascoma	Lebanon, NH	Wood-Na	Hydrolysis/ferment	Ethanol	Na	40	Na	—	—
Pacific Ethan*	Boardman, OR	Agriculture and wood-70	Biochemical	Ethanol	Na	2.5	2010	24.3	24.3
Range Fuels*	Soperton, GA	Wood-1200	Gasification/reformg	Ethanol/methanol	113	49	2011	76	76
RSE Pulp*	Old Town, ME	Pulp extract-Na	Hydrolysis/ferment	Ethanol	Na	2.2	2010	30	30
New Page*	Wisconsin Rapids, WI	Waste wood-70	Gasification/reformg	Diesel	Na	2.5	2009	30	30
SunOpta	Little Falls, MN	Wood chips-Na	Hydrolysis/biochem	Ethanol	Na	10	Na	—	—
Verenium	Jennings, LA	Agricultural-na	Enzymhydrol/ferment	Ethanol	71	1.4	2008	—	—
Total	—	—	—	—	—	—	—	585.3	230.3

Notes: “Enzymhydrol” refers to hydrolysis using enzymes; “Reformg” refers to reforming of synthetic gases to synthetic fuels; starred entries are those plants that have received a U.S. Department of Energy grant.

proven. To further the national goal of making cellulosic ethanol cost-competitive by 2012, the U.S. Department of Energy undertook a major grants program in 2007 as part of more than \$1 billion (0.6 billion Euro) in funding for multi-year biofuels research and development projects (US DOE 2008b).

The first funded projects consisted of six commercial-scale plants using various feedstocks and employing near-term commercial processes. Two of these were planned to be supplied with wood only (US DOE 2007) (Table 13). On average, these commercial-scale biorefineries will input 700 tons of non-food based feedstock per day, with an output of approximately 75–110 million litres a year.

The second round of funding involved seven small-scale, demonstration type facilities whose purpose is to verify the feasibility of integrated operations at a reduced size with diverse feedstocks using novel processing technologies. These biorefineries will operate at a level equivalent to about 10% of a full-scale commercial plant (US DOE 2008a, 2008b) (Table 13). When Federal funding is combined with the industry cost share, more than \$634 million will be invested in these projects over the next 4 years. Negotiations between the selected companies and the Department of Energy are under way to determine final project plans and funding levels.

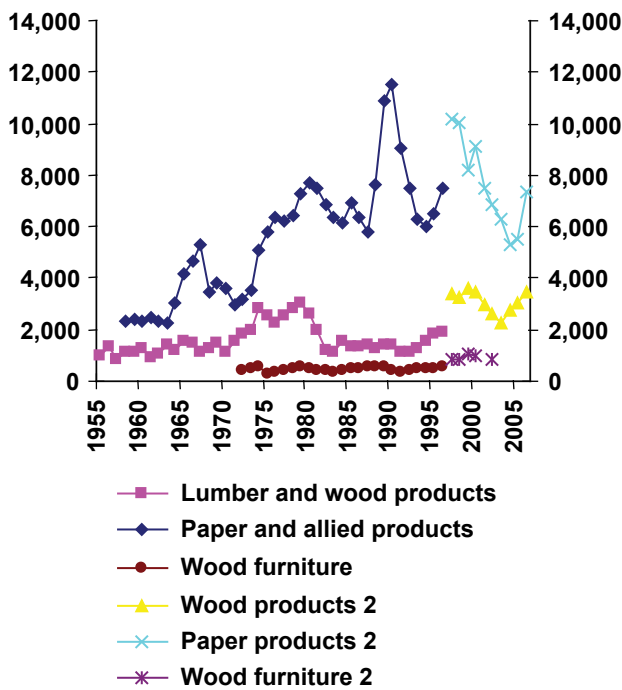


Figure 2. Capital expenditure in wood products and paper products industries by RPA Region, 1997 and 2002 to 2006 (million 2005\$). Source: Table 11.

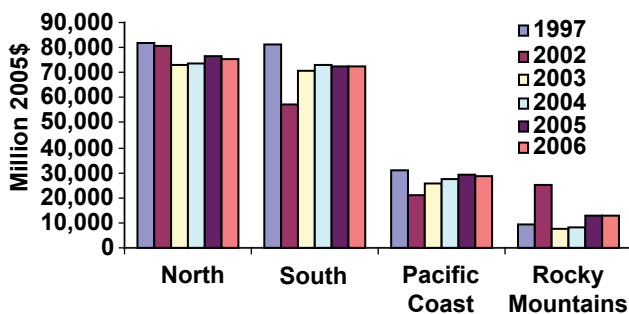


Figure 3. Expenditure in forest products industries, 1955–2006 (million 2005\$) (data after 1996 are for census NAICS industry groups.) Source: Table 12.

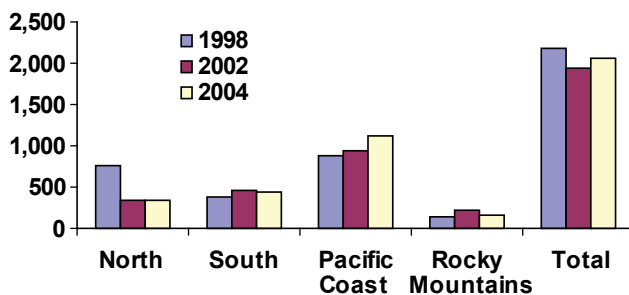


Figure 4. Payroll and material costs for wood and paper products industries, 1997, 2002–2006. Source: Table 12.

Regional Variation and Associated Issues

The regional share of U.S. expenditures for state forestry agency programs in 2004 is highest for the Pacific Coast (54%), followed by the South (21%), North (16%), and Rocky Mountains (8%) (Table 5, Fig. 4). Between 1997 and 2006, the share of total U.S. annual capital investment in wood and paper product industries ranged from 35% to 49% in the North, 36% to 43% in the South, 11% to 15% in the Pacific Coast, and 3% to 9% for the Rocky Mountains (Table 5, Fig. 1). The share increased from 11% to 15% for the Pacific Coast region and decreased for the North and South regions. The regional shares of annual payroll and material expenses have been a little more stable and are highest in the North and South at 39% and 38%, respectively, followed by the Pacific Coast (15%) and Rocky Mountains (7%) (Table 12, Fig. 3).

Regional differences in Federal, private business and concessionaire recreation infrastructure investments cannot be reported at this time because of data limitations.

Assessment of Ability to Measure Underlying Concern (How Successful Was the Indicator?)

General Assessment

It is possible to provide capital and annual expense estimates for certain major entities that protect and manage forests or extract and manufacture wood products. Data can be provided over time and by region. But we are missing data on some entities that protect and manage forests including local governments, NGOs, and certain corporate landowners (conservation organizations, TIMOs, REITs). Also, information is not available for non-wood products business, and separately for entities providing “services from forests.”

Congruence of U.S. Results with TAC Recommendations

Data requested by the TAC recommendations are available for a number of types of entities but missing for others.

Suggested Steps for Improvement

Use the findings from Indicator 27 to identify specific types of entities that provide environmental services and seek information about their capital costs and annual expenditures.

Additional recreation concessionaire data may become available. For example, in addition to the NPS, the U.S. Forest Service contracts with a considerable number of concessionaires. In all, Federal agencies had 11,263 concession contracts, with 90% of these being with agencies, such as the U.S. Forest Service and the National Park Service, whose goals were to protect land-based resources. In all, \$2.2 billion was collected by the Federal government in 2006 from concession agreements, implying that improvements can be made on the breadth and depth of data used in constructing this indicator. Furthermore, state and local

concessionaire information was not available. State and local concessionaires are likely to significantly contribute to capital investments and expenditures in forest recreation infrastructure and should be included in future assessments of this indicator.

Cross-Cutting Issues and Relation to Other Indicators

The levels and trends in capital investment and annual operating expenses are a key factor in sustaining benefits of all types from forests—from wood products (Indicators 25 and 28), from non-wood products (Indicators 26 and 29), from recreation (Indicators 41–43), and for environmental services (Indicator 27). Levels of capital investment and operation expenses also influence the competitiveness of U.S. wood and non-wood products firms in comparison to foreign firms, and this determines the share of consumption met by imports and share of production that are exported (Indicators 30–32). Levels of capital investment also influence level of employment (Indicator 36), wages (Indicator 37), and community resilience (Indicator 38).

Concluding Remarks

What does the information on capital investment and annual expenditures indicate about sustainable forestry and sustaining benefits of forests?

We know there are limited recent decreases in capital investment for some entities (paper industry, Forest Service National Forest Programs, and Forest Service Recreation building improvement and maintenance). Some entities have recently increased annual operating expenses (wood and paper products industries) that were formerly decreased, and some entities have stable to increasing expenditures (state programs).

We also know US DOE and firms are just beginning to provide major funding for commercial and demonstration wood-based biofuels plants.

But there is much we do not know, such as the 1) trends in capital and operating expenses for forest-based recreation business, or 2) the level and trend for capital and operating expenses for many entities protecting forests, producing non-wood forest products, or providing forest environmental services. These unknown trends could have a substantial effect on our judgment about the adequacy of capital investment and annual expenditures in sustaining forests and their benefits.

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