



United States Department of Agriculture

Nontimber Forest Products in the United States:

An analysis for the 2015 National Sustainable Forest Report

James Chamberlain, Aaron Teets, and Steve Kruger



Forest Service
Southern Research Station
e-General Technical Report SRS-229, February 2018

Authors:

James Chamberlain is a research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060, phone (540) 231-3611; **Aaron Teets**, formerly a research assistant with Conservation Management Institute, Virginia Tech, Blacksburg, VA 24060, is currently with the University of Maine, School of Forest Resources, Orono, ME 04469; and **Steve Kruger** is a Ph.D. candidate at Virginia Tech, Forest Resources & Environmental Conservation Department, College of Natural Resources & Environment, Blacksburg, VA 24060.

February 2018

Southern Research Station
200 W.T. Weaver Blvd.
Asheville, NC 28804



www.srs.fs.usda.gov

Nontimber Forest Products in the United States:

**An analysis for the 2015 National
Sustainable Forest Report**

James Chamberlain, Aaron Teets, and Steve Kruger

CONTENTS

ABSTRACT	1
INTRODUCTION	1
Nontimber Forest Products	1
The Montreal Process	2
National Report on Sustainable Forests.....	3
GOAL & OBJECTIVES	6
METHODS	7
RESULTS	8
Annual Harvest of Nontimber Forest Products.....	9
Grass, Hay, Alfalfa, and Forage	9
Arts, Crafts, and Floral	10
Christmas Trees.....	10
Edible Forest Products.....	10
Nursery and Landscape Products	19
Herbs and Medicinal Plants	19
Value of Nontimber and Nonwood Forest Products from Federal Lands	24
Exports and Imports of Nontimber and Nonwood Forest Products	29
Total and Per Capita Consumption	31
LIMITATIONS OF NTFP ESTIMATES	34
CONCLUSIONS	35
LITERATURE CITED	36

Nontimber Forest Products in the United States: An analysis for the 2015 National Sustainable Forest Report

James Chamberlain, Aaron Teets, and Steve Kruger

Abstract

Worldwide, forest plants and fungi that are harvested for their nontimber products are critical for the health of the ecosystems and the well-being of people who benefit from the harvest. This document provides an analysis of the volumes and values of nontimber forest products in the United States. It presents estimates of the annual harvest for a number of product categories over five regions for the United States. Data for the analysis comes from records of harvest permits and contracts issued by the U.S. National Forests and Bureau of Land Management, other Federal agencies, as well as several industry sources. The data illustrate that nontimber forest products represent significant contributions to the country's economy. The total value of the receipts from the issuance of permits and contracts to harvest nontimber forest products from Federal lands was estimated at \$8.4 million in 2013. Estimated wholesale value of these products in that year was over \$950 million. Total wholesale value, adjusted for trade, including firewood, posts and poles, and Christmas trees, was estimated at over \$1 billion in 2013. There are challenges with reporting the full value of these products, but the framework to do so is improving.

Keywords: commerce, harvest values, harvest volumes, nontimber forest products, sustainability.

INTRODUCTION

Forest plants and fungi are harvested for products other than timber. Every 5 years, the Forest Service, U.S. Department of Agriculture, produces the National Report on Sustainable Forests, which includes analysis of nontimber forest products. This document provides supporting analysis that was used to generate the contribution to the national report for 2015. It summarizes the state of knowledge about the volumes of plants and fungi that were reported harvested, and estimates the value of these products to the U.S. economy.

Nontimber Forest Products

Products that are harvested from forests, other than timber, are referred to by many names. In 2000, the U.S. Congress directed the Secretary of Agriculture to implement a program to collect fees for the harvest and sale of “forest botanical products” (Public Law 2000, 2004, 2010). The U.S. Department of the Interior, Bureau of Land Management (BLM) uses the term “special forest products” and describes the products as “vegetative material found on public lands that can be harvested for recreation, personal use, or as a source of income” (USDI BLM 2014). The BLM includes in the term grasses, seeds, roots, bark, berries, mosses, greenery, edible mushrooms, tree seedlings, transplants, poles, posts, and firewood. The Forest Service (USFS) refers to these products as special forest products and defines them as:

...products collected from National Forest System land that include, but are not limited to, bark, berries, boughs, bryophytes, bulbs, burls, Christmas trees, cones, epiphytes, fence material, ferns, firewood, forbs, fungi (including mushrooms), grasses, mine props, mosses, nuts, pine straw, posts and poles, roots, sedge, seeds, shingles and shake bolts, transplants, tree sap, rails, and wildflowers. Special forest products do not include animals, animal parts, cull logs, derrick poles, house logs, insects, minerals, non-saw log material removed in log form, pulpwood, rocks, sawtimber, small roundwood, soil, telephone poles, water and worms. (USDA Forest Service 2001)

The international community defines these products as either nonwood forest products (NWFPs) or nontimber forest products (NTFPs). According to the United Nations Food and Agriculture Organization (1999), “Nonwood forest products consist of goods of biological origin other than wood, derived from forests, other wooded land and trees outside forests.” Timber, chips, charcoal, and fuelwood, as well as small woods such as tools, household equipment, and carvings, are excluded from the definition of NWFPs. In contrast, NTFPs generally include fuelwood and small woods; this is the main difference between NWFPs and NTFPs. “When wood products such as posts and poles are included in an analysis of forest products other than commercial saw timber and pulpwood, the collection of various products is referred to as nontimber forest products” (Alexander and others 2011, p. 1). In the analysis for the 2010 National Report on Sustainable Forests (USDA Forest Service 2011), NTFPs included medicinal plants, food and forage species, posts and poles, Christmas trees, and fuelwood. Consistent designations are used in this report to better standardize reporting of NTFP harvest volumes and values.

People harvest nontimber forest products for many reasons, including personal, recreational, and spiritual uses, as well as commercial gain. Alexander and others (2011, p. 2) assert that “most people who gather NTFPs do so for personal and subsistence use.” The analysis presented in this report, and previous analyses, is based on permits and contracts issued by the USFS and BLM for the harvest of NTFPs. These sales are “assumed to be for commercial use” (Alexander and others 2011, p. 2), though as Alexander and co-authors assert, “they are likely to be a combination of personal and commercial uses.” Data on medicinal plant harvest are for commercial use as that information is provided by the American Herbal Products Association. Determining how much

is harvested for personal use versus commercial gain is speculative at best.

The Montreal Process

As 1 of 12 countries that are members of the Montreal Process Working Group on the Conservation and Sustainable Management of Temperate and Boreal Forests, the United States has agreed to report on conditions and trends of the Nation’s forests. Two previous reports have been published. The 2003 report (USDA Forest Service 2004) conveyed the state of the forests using a set of 7 criteria and 67 indicators. The Working Group reviewed and modified the criteria and indicators after the first report was published. The 2010 report (USDA Forest Service 2011) used 7 criteria and 64 indicators to describe the conditions and trends of the Nation’s forests. Two criteria (2 and 6) and four indicators (2-14, 6-26, 6-29, and 6-31) focus on nontimber forest products.

Criterion 2 focuses on “Maintenance of Productive Capacity of Forest Ecosystems,” which is considered “one of the most straightforward” criteria (USDA Forest Service 2004, p. 11). As stated in the 2003 report (USDA Forest Service 2004, p. 11), “productive capacity is maintained as long as the harvesting of forest products does not exceed growth rates.” Indicator 14 presents data on the annual removal of nontimber forest products compared to the level determined to be sustainable. The criterion and indicator are important because “if harvesting exceeds growth rates, then the natural capital stocks become depleted and the amount of products flowing from the [forests] must decline” (USDA Forest Service 2004, p. 11).

Criterion 6 presents data on significance of forests to the “long-term multiple socio-economic benefits to meet the needs of societies” (USDA Forest Service 2004, p. 12). Three indicators address the economic value of

production and consumption of nonwood forest products. Criterion 6, indicator 26 presents the value of nonwood forest products, while criterion 6, indicator 29 focuses on total and per capita consumption of the products. Criterion 6, indicator 31 examines the value of exports and imports of the products.

National Report on Sustainable Forests

The 2003 National Report on Sustainable Forests reported no data on NTFPs and the sustainability of the harvest of these products (USDA Forest Service 2004). At the time, few sources of documentation had been identified. The agencies responsible for management of forest resources were trying to figure out how to deal with the increasing demand for the products and concern for their sustainability. Congress had recently passed legislation (Public Law 2000) requiring the Forest Service to implement a program to improve management of nontimber forest products. The report identified that annual or periodic harvest of the products is undocumented, particularly from private forest lands. The report recognized that “despite the lack of national quantified information across many NTFP categories, the removal of NTFPs from forest ecosystems is significant and very important for recreational, commercial, subsistence, and cultural uses” (USDA Forest Service 2004, p. 28).

Reporting of NTFPs improved in the 2010 National Report on Sustainable Forests (USDA Forest Service 2011), supported by an analysis of NTFP harvest from Forest Service and Bureau of Land Management lands and industry data (Alexander and others 2011). The authors created a framework to analyze the volume of NTFPs harvested from U.S. forests, which allowed for estimation of the overall value of these products to the Nation’s economy. The report provided quantitative evidence of the volumes and values of NTFPs harvested from Federal lands, and estimated

national value of NTFP consumption in the United States. It summarized, for the first time, estimates of harvest volumes for several medicinal forest products, foods and forage plants, and Christmas trees. The supporting documentation may be the first effort, ever, to analyze and assess the volumes and values of nontimber forest products in the United States.

Data for this report comes from a number of Federal agencies and two industry associations. For this report, the term “Federal lands” refers to forest lands managed by the U.S. Forest Service and Bureau of Land Management, from which data were obtained. Records of permits and contracts issued by the USFS (national forests) and BLM for the harvest of nontimber forest products provided data for harvest amounts. Other Federal sources of data include the National Agricultural Statistics Service and the U.S. International Trade Commission. The National Agricultural Statistics Service tracks several products (e.g., blueberries and maple syrup) classified as NTFPs. The Harmonized Tariff Schedule (USITC 2014) was used to report import and export data of NTFPs. The American Herbal Products Association (AHPA) regularly surveys its members to assess the volumes of select harvested medicinal forest products. Likewise, the National Christmas Tree Association (2012) surveys annually its members to estimate total consumption of this nontimber forest product. The two Federal forest land management agencies and industry associations report products harvested primarily for commercial gain.

Data from the BLM¹ for this report was provided directly by the agency, while data from the USFS was obtained from the *Cut and Sold Reports* (USDA Forest Service 2014a). The reporting of nontimber forest

¹ Unpublished data provided by the U.S. Bureau of Land Management. On file with: James Chamberlain, research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060.

products harvest by the USFS changed in 2008. From fiscal year (FY) 1996 through FY 2007, summaries of quarterly reports, by the USFS, were produced and reported on the forest management Web site (<http://www.fs.fed.us/forestmanagement/products/sold-harvest/cut-sold.shtml>). Through FY 2007, the Forest Service *Cut and Sold Reports* were produced from data extracted directly from the Automated Timber Sale Accounting system (ATSA). In FY 2008, the data started to be sent from the Forest Service's corporate data warehouse. Prior to 2009, the Forest Service *Cut and Sold Reports* conveyed only the value of nonconvertible products.

Nonconvertible products are products whose units of measure cannot be converted to units consistent with timber products. Nonconvertible products include Christmas trees, mushrooms, and boughs. To be consistent with categories reported for the 2010 National Report on Sustainable Forests (USDA Forest Service 2011), nonconvertible forest products are categorized as nursery and landscape uses; arts, crafts, and floral uses; regeneration and silviculture; edible fruits, nuts, berries, fungi, and sap; grass, hay, alfalfa, and forage; herbs and medicinal products; and products that include posts, poles, Christmas trees, fuelwood, and other nonconvertibles.

The USFS and BLM classify nonconvertible products in more than 10 categories and reported in different units of measure. "Nursery and landscape" products reported by USFS and BLM include cacti, bulbs, and aquatic plants that are used as ornamentals and transplants to support the nursery and landscape industry. Permitted harvest volumes are reported in pounds and/or tons. Products classified as "arts, crafts, and floral" may be wood items such as burls, knots, and twisted wood that may be fashioned into carvings and walking sticks. Limbs and boughs used for garland and roping for the holiday seasons and needles woven into

fine crafts are integral to the craft fair regional economy. In some cases, specific products, such as "hobby wood and "alder sticks" are listed in product reports produced by the agencies to describe particular products. The leaves of galax (*Galax urceolata* (Poir.) Brummitt), which may have been reported as "foliage," are collected from national forests in western North Carolina for the international floral trade (see fig. 1). Leaves harvested in western North Carolina are shipped worldwide to support the global floral industry.

The BLM and USFS report permitted harvest volumes for nontimber forest products used for "forest regeneration and silvicultural treatments." This includes cones, seeds, nuts, and other items that are used to produce seedlings for tree production, or to direct seed forest lands. Some local BLM or USFS units report the collection of these products in bushels, while other units report harvest in pounds.

Grasses and forage, another nonconvertible category, may not be considered a nontimber forest product, but they are included because some grasses, particularly beargrass, have been reported under this category. A large portion of the products reported in pounds is beargrass (*Xerophyllum tenax* (Pursh) Nutt.), which is harvested for the floral and craft industry (see fig. 2). The Forest Service reports beargrass under product code 48, which is labeled as "grass." Within this category, the species code used is BG (beargrass), which allows for easy identification as beargrass. Though beargrass harvest is reported under product code 'grass,' and because the species code allows for identification of the species, it is possible to extract the volumes harvested from this category and account for it under the more appropriate category "arts, crafts, and floral." Prior to 2009, extracting data for beargrass was not possible, but modifications in reporting



Figure 1—Galax leaves are harvested for the floral industry. (photo by Gary Kauffman, USDA Forest Service)

have improved knowledge about NTFP harvests.

Federal public lands are important sources of food and medicine. Permitted harvest volumes of “herbs and medicinal forest products” differ between the major Federal land management agencies. BLM lists some specific plants [e.g., cascara bark (*Frangula purshiana* (DC.) A. Gray) and St. John’s wort (*Hypericum* spp. L.)] under a general category of “edibles and medicinals” and reports volumes permitted for harvest in pounds. The USFS, on the other hand, reports these products under three possible sub-categories, and reports the volumes in pounds. These and other differences make combining harvest reports challenging. Permitted harvest volumes are reported for “edible fruits, nuts, berries, fungi, and sap” by the USFS and BLM and include fungi and

mushrooms, reported in pounds and gallons, and represent a large percentage of the wild-harvested edibles. The harvest of tree sap, more than likely maple sap, is reported by the number of taps, by the Forest Service.

Some nonconvertible products are wood, are considered nontimber, and do not readily fit in other categories. The USFS lists posts and poles under the general category of “posts and poles” and reports them in units of measure of 100 cubic feet (CCM). The BLM, on the other hand, lists them as a wood product under a broad category of “posts and poles” yet reports the volumes as board feet, cubic feet, cords, linear feet, and individual pieces. As important, both agencies report Christmas trees under a category of the same name, and report volumes harvested as either individual pieces or in linear feet.



Figure 2—Beargrass leaves are harvested by Native Americans for traditional baskets as well as for the floral industry. (photo by Frank Lake, USDA Forest Service)

These eight broad market segments (nursery and landscape uses; arts, crafts, and floral uses; foliage; regeneration and silviculture; grass, hay, alfalfa, and forage; herbs and medicinal products; edible fruits, nuts, berries, fungi, and sap; and products that include posts, poles, Christmas trees, fuelwood, and other nonconvertibles) define the industry for nontimber forest products relative to Federal public lands. They represent the spectrum of the NTFP industry and include a diverse and broad array of market players with often conflicting interests. Their scales, diversity, and demographics present challenges in efforts to address the multitude of issues affecting sustainable management of the resource. In particular, the diversity of units of measure is a significant obstacle in estimating a singular value for the industry. Data on these products

can be aggregated by national forest, BLM segment, State, and region, as well as for the Nation.

GOAL & OBJECTIVES

The ultimate goal of this study is to present the volume and value of nontimber forest products in the United States. The overall intention is to improve reporting of this information to better reflect the comprehensive nature of forest ecosystems. To realize these, several objectives were defined: (1) compile and describe private and public sources of data on NTFP harvest and trade; (2) identify and summarize the main NTFP sectors; (3) provide standardized estimates of harvest volumes; (4) provide estimates of the monetary value of nontimber forest products and product

sectors; and (5) present data in a format that allows for comparisons over time and between U.S. regions.

METHODS

To report the value and volume of nontimber forest products requires collecting data from various sources. Data from the USFS and BLM were combined to estimate the first point of sales for nontimber forest product permit data on Federal land. Data from each agency were collected independently and combined to estimate total amounts and values for the categories of NTFPs for this report. Values are presented in real terms adjusted to 2013.

USFS data were entered from individual *Cut and Sold Reports* (USDA Forest Service 2014a), which are accessible to the public. These standardized reports were created to present data on timber volumes that were sold (contracted volumes) and those actually cut (actual amounts reported). They were adapted for reporting of nontimber forest products, and sold volumes indicate the amounts reported on issuance of harvest permits, while cut volumes are the amounts actually reported, if this occurs. In many cases for nontimber forest products, these two values are the same.

Data for Federal lands were gleaned from the two types of reports: service-wide and individual regions. Regional reports have information separated by national forests, while service-wide reports sum all national forest information into one annual report. Both types of reports are based on fiscal year. Data from individual regional reports are summarized in the Results section, providing estimates of harvest volumes by product category and region. These same reports were used to summarize harvest volumes of nursery, landscape, and regeneration forest products and mushrooms and fungi by States. Service-wide data were used to present annual totals

of national forest harvests. The service-wide reports were used dating back to 2004 (10 years). Double-counting of information is avoided as these reports are used for different purposes and the data are not combined.

Prior to 2009, there were no “cut values” available for nonconvertible products, which encompass the majority of NTFPs. For this reason, the “sold values” have been used to remain consistent with the earlier reporting. Also, the units are not available for all “nonconvertible” products in reports predating 2009, which makes reporting amounts prior to 2009 impossible.

The BLM does not allow public access to the Timber Sale Information System (TSIS) and Special Forest Products (SFP) databases due to Privacy Act regulations. All BLM data were obtained through direct contact with the Stewardship/Biomass Forester. Previously, all nontimber sale information came from TSIS, but the SFP database was created in FY 2006 to collect information on the sale of nontimber forest products.

Import and export data were obtained through the U.S. International Tariff Commission Web site (<http://dataweb.usitc.gov>) using the Harmonized Tariff Schedules (HTS). The lists of import and export products were based on products reported by Alexander and others (2011). Individual HTS codes were identified and used to generate automated reports for information dating back to 1999. Products listed as imported and exported were based on HTS codes that were combined to produce reported values.

The USDA National Agricultural Statistics Service (NASS) conducts annual surveys of agricultural production in the United States. The agency reports on production and supply of food and fiber, prices, labor and wages, as well as farmer demographics. Two products

tracked by the NASS—blueberries and maple syrup—are nontimber forests products, though the agency does not classify them as such. Data for maple syrup was gleaned from annual production reports by NASS (USDA NASS 2014).

To be consistent with previous reports, we separated the United States into five regions—North, South, Rocky Mountain, West, and Alaska—to compare importance of NTFP product categories in different geographical locations. Figure 3 illustrates the distribution of States comprising the regions discussed. USFS and BLM data were separated by the State they are reported in; however, several national forests cross State lines. Because information is summed and reported by region, these cross-overs are inconsequential. The national forests

crossing regional lines were included in regions where the majority of the land area is located.

RESULTS

Results of this analysis are presented in two vectors. The first vector provides estimates of annual harvest volumes of nontimber forest products, as reported by the USFS and BLM. These data are based on volumes of harvest permits. The second vector provides estimates of the values of the products, and this follows the approach used in previous reporting (Alexander and others 2011). Together, these data present the most comprehensive assessment of the value and volumes of nontimber forest products harvested in the United States.

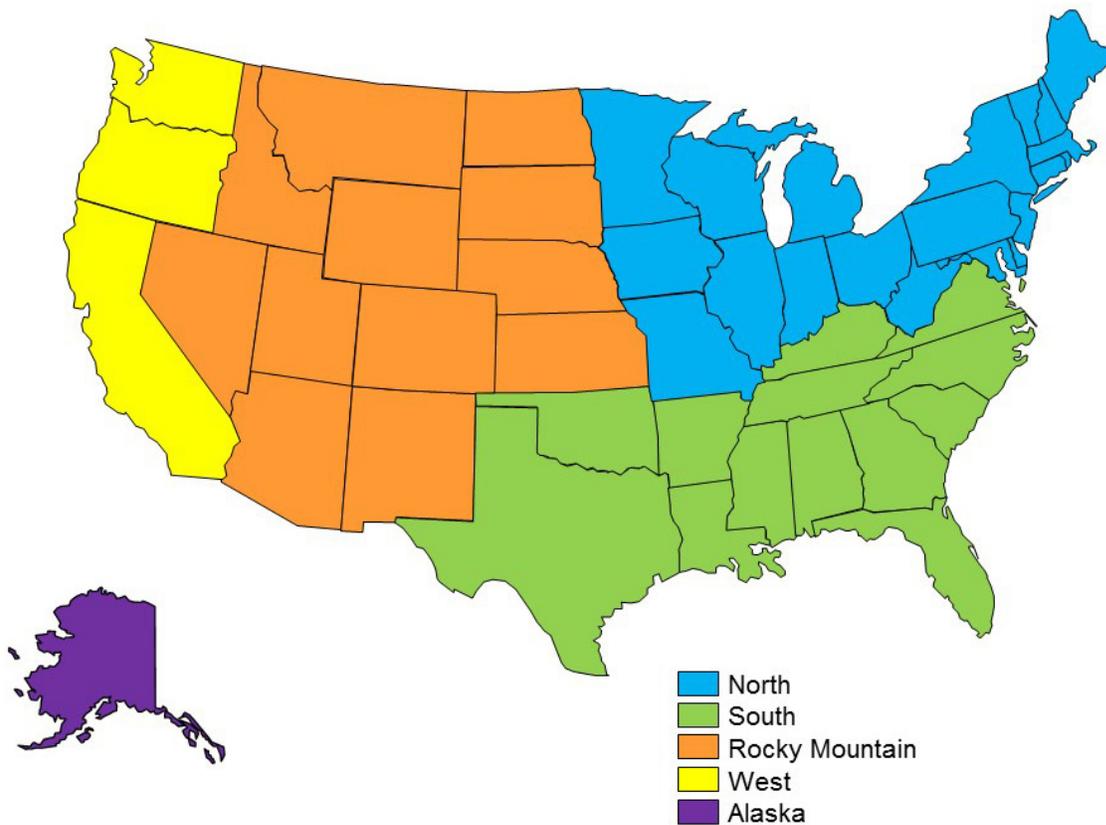


Figure 3—States that make up the regions discussed in this analysis: North, South, Rocky Mountain, West, and Alaska.

Annual Harvest of Nontimber Forest Products

Data from the USFS and BLM presented are ‘permitted harvest’ amounts. Actual harvest amounts may differ from permitted quantities as people may harvest more or less than the amount on a permit. Regular monitoring of actual harvest volumes is challenging and lacking in many locations. Throughout the system, the differences in units of measure, as well as the scope of permitting programs, even in adjacent forests with overlapping habitats, make generalizing the data challenging. There are no systematically aggregated records of harvest volumes from private lands. The higher proportion of public land in the Western States means that the Eastern States may be underrepresented in this data. The permitted harvest volumes, however, are the best available data for the amount of NTFPs being removed from our forests.

Table 1 presents the total quantities of all nontimber forest products that are permitted for harvest by the USFS and BLM, and the rate of harvest per 100,000 acres of USFS and BLM land. Some products fit easily into broad categories (e.g., arts, crafts and florals; and medicinals), while others are reported separately (e.g., fuelwood and Christmas trees). All regions report permitted harvest of fuelwood, though the majority comes from public lands in the Rocky Mountain and West regions. Together, these regions account for >90 percent of the reported firewood harvest.

Products that are not assigned into one of the main categories are reported in a general ‘nonconvertibles’ category, and reported in six units of measure. The West region reported the most volume of nonconvertibles harvested, with approximately 89 percent of the total pounds harvested, and about 50 percent of the individual pieces of plant materials reported under this category. The North region reported approximately 28 percent, while the South

reported about 20 percent, of the individual pieces of nonconvertible products. Alaska reported 5 percent of the total pounds of nonconvertibles harvested in 2013.

Posts and poles are used for fencing, as well as house construction. In the Southwestern United States, round roof poles, locally known as vigas, are used in adobe homes. Poles are harvested for fencing material, as well as landscaping ties. The USFS and BLM use three units of measure to report post and pole harvests. The West region reported the largest harvest, recording >46 percent of the total national harvest in cubic feet (CCF). This was followed by the Rocky Mountain region with approximately 32 percent of total CCF. The Rocky Mountain and West regions reported the largest volumes of individual pieces, 77 percent and 23 percent, respectively, of the total national harvest of 28,900 posts and poles. The West was the only region to permit posts by linear feet.

Forest products collected for regeneration and silviculture include cones, nuts, and seeds. Cones may be reported green, and seeds may be reported as ‘native seeds’ or as ‘nuts and seeds.’ The Rocky Mountain region reported the largest volume (95 percent of total) in pounds of regeneration and silviculture products, and approximately 40 percent of the total in bushels. The West region reported approximately 62 percent of the total harvest in bushels and about 5 percent of the national harvest in pounds.

Grass, Hay, Alfalfa, and Forage

Grass and forage production, particularly in the West, is an important nontimber forest product. The USFS and BLM report harvests in pounds and tons. These could have been converted to a common unit of measure, but it would be misleading. Some of the poundage reported may be beargrass, a grass-like plant harvested

Table 1—Quantities of permitted harvests of nonconvertible products classified as nontimber forest products from U.S. Forest Service (USFS) and Bureau of Land Management (BLM) lands, in 2013 by product category, units of measure, and region

Product category	Unit of measure	North		South		Rocky Mountain	
		12,290,729 acres of USFS and BLM Land		13,420,461 acres of USFS and BLM Land		242,269,511 acres of USFS and BLM Land	
		Quantity	Quantity/ 100,000 acres	Quantity	Quantity/ 100,000 acres	Quantity	Quantity/ 100,000 acres
Arts, crafts, and floral	Bunches	0	0	0	0	100	<1
	Bushel	180	<1	100	1	450	<1
	Cords	0	0	0	0	5	<1
	Cubic Feet	75	0	348	3	220	<1
	Number	0	0	0	0	1,000	<1
	Pounds	5,630	46	201,506	1,502	116,743	48
	Ton	663	5	65	<1	281	<1
Christmas trees	Each/Number	2678	22	249	2	128,974	55
	Linear Feet	0	0	0	0	1,566	1
Edible fruits, nuts, berries, and sap	Gallon	0	0	0	0	890	<1
	Pounds	400	3	30	<1	226,868	94
	Taps	18,430	150	0	0	0	0
Grass and forage	Pounds	104	1	0	0	10	<1
	Ton	295	2	8	<1	3	<1
Fuelwood	CCF	23,659	174	18,397	137	349,436	145
Medicinal	Pounds	856	7	14,936	111	12,148	5
Nonconvertibles not reported in a product category	Acre	0	0	28	<1	0	0
	Bushel	0	0	100	1	6	<1
	Cubic Feet	0	0	750	6	500	<1
	Each/piece	3,604	29	2,469	18	250	<1
	Pounds	0	0	4,320	32	0	0
	Ton	0	0	0	0	43	<1
Nursery and landscape	Each/Number	852	2	24,942	186	9,179	4
	Ton	0	0	0	0	1	0
Posts and poles	CCF	12,367	61	97	1	6,319	5
	Linear Feet	0	0	0	0	0	0
	Number	100	1	0	0	22,253	9
Regeneration/ silviculture	Bushel	10	0.6	0	0	2,183	1
	Pounds	0	0	0	0	316,744	131

(Table 1 continued on next page)

(Table 1 continued from previous page)

Product Category	Unit of Measure	West		Alaska		Nation	
		77,661,633 acres of USFS and BLM Land		94,571,133 acres of USFS and BLM Land		440,213,467 acres of USFS and BLM Land	
		Quantity	Quantity/ 100,000 Acres	Quantity	Quantity/ 100,000 Acres	Quantity	Quantity/ 100,000 Acres
Arts, crafts, and floral	Bunches	0	0	0	0	100	<1
	Bushel	71,093	92	0	0	71,823	16
	Cords	93	<1	0	0	98	<1
	Cubic Feet	22	<1	0	0	665	<1
	Number	0	0	0	0	1,000	<1
	Pounds	5,321,503	6852	150	<1	5,645,532	1283
	Ton	6,716	9	0	0	7,725	2
Christmas trees	Each/Number	76,240	98	0	0	212,744	48
	Linear Feet	175	<1	0	0	1,741	<1
Edible fruits, nuts, berries, and sap	Gallon	302,858	390	0	0	303,748	69
	Pounds	443,228	571	200	<1	670,726	152
	Taps	0	0	0	0	18,430	4
Grass and forage	Pounds	4,120,869	5306	0	0	4,120,983	936
	Ton	830	1	0	0	1,136	<1
Fuelwood	CCF	219,759	283	244	<1	611,496	139
Medicinal	Pounds	14,710	19	0	0	42,650	10
Nonconvertibles not reported in a product category	Acre	0	0	0	0	28	<1
	Bushel	0	0	0	0	106	<1
	Cubic Feet	450	<1	0	0	1,700	<1
	Each/piece	6,129	8	0	0	12,452	3
	Pounds	56,776	73	3,000	3	64,096	14
	Ton	1	<1	0	0	44	<1
Nursery and landscape	Each/Number	10,926	14	600	<1	46,499	10
	Ton	0	0	0	0	1	<1
Posts and poles	CCF	16,369	21	0	0	35,403	8
	Linear Feet	2,140	3	0	0	2,140	<1
	Number	6,547	8	0	0	28,900	7
Regeneration/ silviculture	Bushel	3,513	5	0	0	5,706	1
	Pounds	17,037	22	0	0	333,781	76

Sources: USDA Forest Service (2014a); unpublished data from the U.S. Bureau of Land Management (on file with: James Chamberlain, research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060).

for the floral industry and used as a complement in floral arrangements, and in the craft industry for baskets. Most of the beargrass harvest, reported by the USFS, was removed from this category, as the agency has a species code that allows for identification of this forest product.

Arts, Crafts, and Floral

The number of forest plants that can be used for art, craft, and floral products is limited only by the creativity of artisans who create the product. People have collected forest plants for creating arts and crafts for generations. The products cover the spectrum from carvings, walking sticks, jewelry, to baskets and bowls. Plant material that can be used for these products include burl and stem wood, roots, leaves, as well as vines, fungi, and bark. The USFS and BLM report volumes of permitted harvest of products under this category in seven different units of measure. In 2013, the two agencies reported that >5.64 million pounds (table 1) of plant material were harvested for art, craft, and floral products from Federal public lands. An additional 7,725 tons of plant material for art, craft, and floral products were reported by these agencies. The majority of this was harvested from the West region. The South region reported approximately 3.5 percent of the total pounds of harvested material under this category. Almost 99 percent of the 71,823 bushels of plant material harvested for arts, crafts, and florals came from the West region, as well. The Rocky Mountain region reported the next largest amount (i.e., 450 bushels) harvested for art, craft, and floral products. That region also reported all individual pieces (referred to as “number” in table 1) and all bunches of plant material harvested to make art, craft, and floral products.

Christmas Trees

Most regions reported the harvest of Christmas trees (table 1) by individual pieces (i.e., number), although some units, in the West and

Rocky Mountain regions, also report by linear feet. Of the Christmas tree harvest reported by linear feet, almost 90 percent came from the Rocky Mountain region. More than 212,700 individual Christmas trees were harvested from Federal lands in 2013. Of those, approximately 61 percent were reported harvested from the Rocky Mountain region.

The United States consumes more than 30 million Christmas trees (table 2) each year (NCTA 2012). During the period 2009–2012, artificial trees amounted to about 29 percent of the annual total. Farm-harvested (cultivated) Christmas trees accounted for about 71 percent of the average annual Christmas tree consumption. Wild-harvested Christmas trees from Federal lands account for <1 percent of the total trees used nationally for that purpose. Reported Christmas tree harvest from Federal lands (USFS and BLM) was lower in 2009, an unexplained anomaly.

Edible Forest Products

Products harvested as edible fruits, nuts, fungi, and sap are reported in gallons, pounds, and number of taps (table 1). The material collected includes pinyon nuts (*Pinus* spp. L.), huckleberries (*Vaccinium* spp. L.), blueberries (*Vaccinium* spp. L.), and nuts. The number of taps, an indication of maple syrup production, is exclusively from the North region. All regions report the harvest of culinary products in pounds, yet some also report edible forest products in gallons. More than 99 percent comes from the Rocky Mountain and West regions, which is greatly influenced by mushroom and fungi collection. The West also reports culinary products in gallons and claims >99 percent of the national harvest.

Edible forest products are harvested from USFS and BLM lands and reported as edible fruit, nuts, berries, mushrooms, and fungi. The BLM reports volumes of pinyon nuts,

huckleberries, and elderberries (*Sambucus* spp. L.). Both agencies report edible forest product harvests in pounds and gallons, and without some sort of conversion factor, combining the harvest volumes into one unit of measure is not possible. Table 3 presents the permitted harvest of edible forest products from Federal lands from 2009 through 2013. No units of measure were provided for 2008, which made reporting of this data impossible. Overall, the reported harvest of edible forest products has increased since 2009. More than 2.8 million pounds and 920 thousand gallons of edible forest products were reported harvested on Federal lands over the 5 years ending in 2013. On average,

568,550 pounds and 184,000 gallons of edible forest products were harvested each year. From 2009 through 2013, the reported volumes increased 24 percent for products reported in pounds, and almost 200 percent for those reported in gallons. The reported harvest in gallons for 2013 skews the annual average for edible forest products.

Wild blueberries (see fig. 4) are one of the few nontimber forest products that are tracked by the National Agricultural Statistics Service. As noted by Alexander and others (2011), harvest of wild blueberries increased approximately 23 percent from 1998 through

Table 2—Christmas tree consumption in the United States, reported by year and number sold

Year	Artificial	Farm harvested	Wild harvested	Total sold (real + artificial)
2009	11,700,000	25,944,000	66,509	37,710,509
2010	8,200,000	23,760,000	265,624	32,225,624
2011	9,500,000	27,412,000	216,436	37,128,436
2012	10,900,000	21,805,000	220,465	32,925,465

Note: wild-harvested trees are from U.S. Forest Service and Bureau of Land Management permits. Source: NCTA (2012).

Table 3—Quantity of edible fruits, nuts, berries, mushrooms, and fungi permitted for harvest on U.S. Forest Service and Bureau of Land Management land combined, by year

Year	Quantity permitted for harvest	
	<i>pounds</i>	<i>gallons</i>
2009	539,297	104,606
2010	558,613	177,057
2011	458,735	160,435
2012	615,400	174,976
2013	670,725	303,748

Sources: USDA Forest Service (2014a); unpublished data from the U.S. Bureau of Land Management (on file with: James Chamberlain, research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060).



Figure 4—Wild blueberries are not cultivated but come from natural populations that are managed for fruit production. (photo by David Yarborough, University of Maine)

2007. The volume of wild blueberries reached a 14-year low in 2004, with approximately 46 million pounds harvested that year. Since then, the annual reported harvest has increased approximately 10 percent, on average, though there have been a few years of decline. From 2008 through 2010, the annual harvest declined approximately 11 percent. In 2012, approximately 91 million pounds of wild blueberries were harvested, representing a 98-percent increase from 2004. The volume harvested in 2012 was approximately 45-percent more than in 1998 (fig. 5).

The sap of sugar maple (*Acer saccharum* Marshall) is harvested each spring and boiled down to make maple syrup (see fig. 6). Ten Northern States produce the majority of the maple syrup, although it is produced in a few Southern States, particularly Virginia and West Virginia. Vermont is the largest producer of maple syrup (fig. 7), followed by New York and Maine. From 2000 to 2007, annual harvest

increased only 2 percent. Since 2007 annual harvest of maple syrup increased 159 percent, from 1,258 thousand gallons to 3,253 thousand gallons. Although Vermont produces the most maple syrup, the State has not realized the greatest change in volume over the last 13 years. From 2000 to 2008, production of Vermont maple syrup increased approximately 9 percent, while maple syrup production in Ohio increased approximately 247 percent, and Michigan maple syrup harvest increased 127 percent. From 2000 through 2013, Vermont maple syrup production increased 187 percent, while Ohio maple syrup production increased over 350 percent. During that same time frame, Wisconsin production increased about 300 percent and Michigan realized a 236 percent increase in production. Since publication of the 2010 National Report on Sustainable Forests (USDA Forest Service 2011) and supporting technical report (Alexander and others 2011), all States have reported more than 100-percent increase in maple syrup production. On

average, production increased across all States approximately 149 percent from 2007 through 2013. Ohio realized the largest increase during that period of approximately 253 percent.

According to the NASS (2014), maple syrup production in 2013 totaled approximately 3.25 million gallons (table 4). This represented a 70-percent increase from 2012. Overall, for the 5-year period ending in 2013, the United States produced more than 14 million gallons of maple syrup. Over this period, production increased approximately 18 percent, per annum. NASS also reported an estimated number of taps of 10.6 million, while the USFS reported approximately 18,430 taps on national forests (table 1).

Mushrooms and fungi, for personal consumption and for sale, are the major culinary forest product harvested from Federal lands (see fig. 8). In 2013, virtually all of the mushrooms and fungi harvested and reported by the gallon came from the West and Rocky Mountain regions; in fact, only 430 pounds (<0.07 percent) were harvested in other regions (table 5). More than 99.6 percent of the total national harvest, recorded in gallons, came from three States (California, Oregon, and Washington). Oregon ranked at the top reporting more than 60 percent of the total national harvest. Idaho ranked next with approximately 35 percent of the total harvest by pounds.

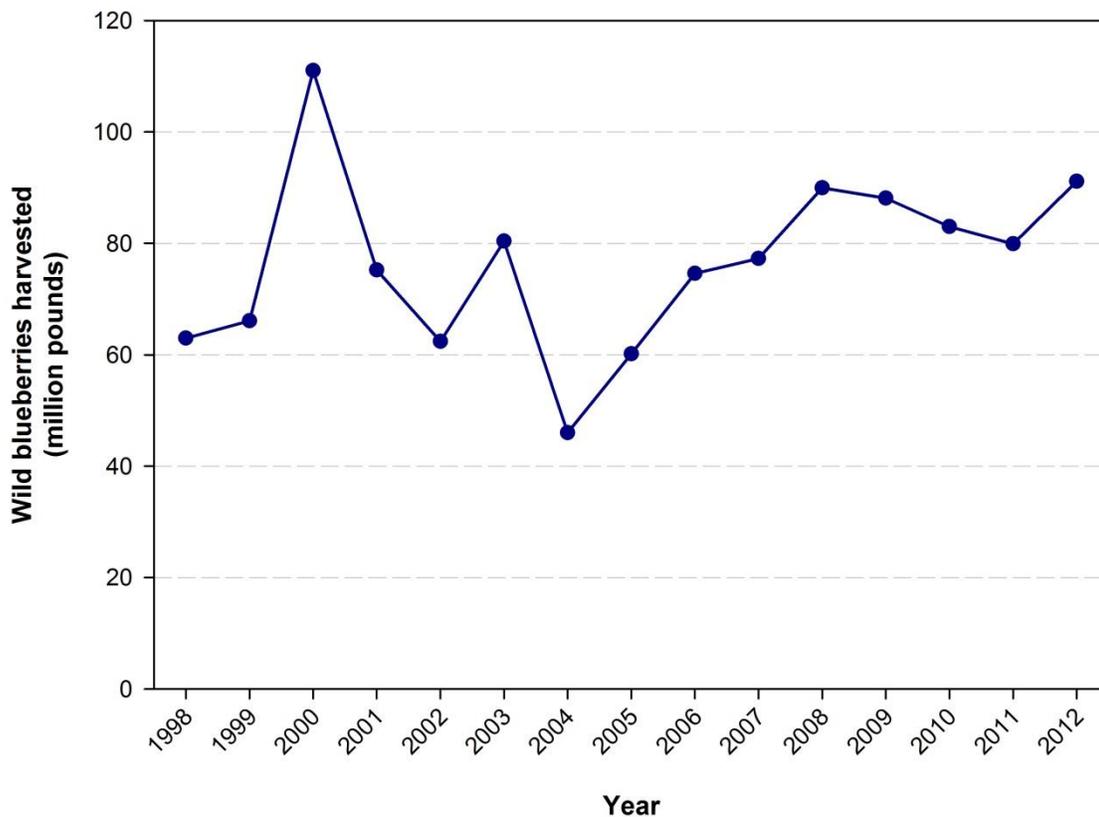


Figure 5—Quantity of wild-harvested blueberries in the United States, by year. (Source: USDA Economic Research Service 2014)



Figure 6—Maple sugar is the major nontimber forest product from Northeastern United States. (photo courtesy of Cornell University Uihlein Maple Research Forest)

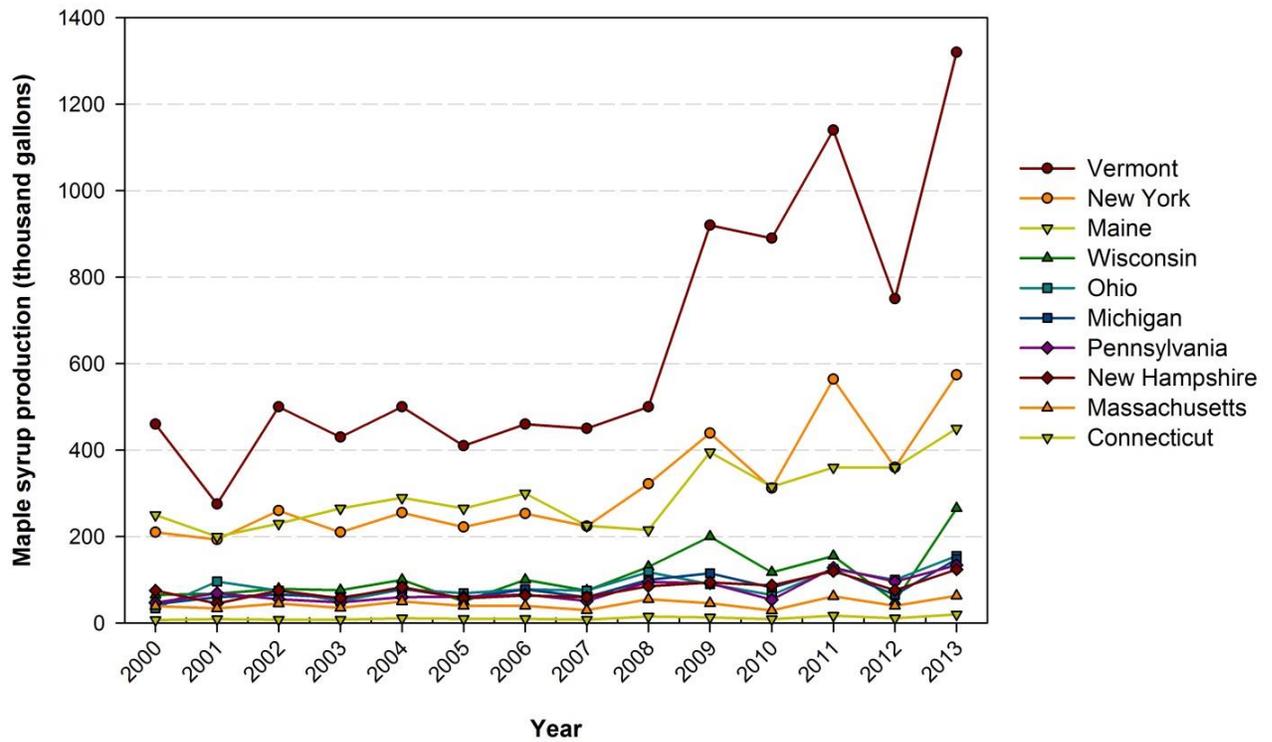


Figure 7—Maple syrup production by State and year. (Source: USDA NASS 2014)

Table 4—Maple syrup production from 2008 through 2013

Year	Production	Annual change
<i>thousand gallons</i>		
2008	1,912	—
2009	2,404	26%
2010	1,960	-18%
2011	2,794	43%
2012	1,908	-32%
2013	3,253	70%
Total	14,231	—
Average annual	2,372	—

Source: USDA NASS (2014).

— = not applicable.



Figure 8—Native American, LaVerne Glaze, harvesting matsutake mushrooms for personal use. (photo by Frank Lake, USDA Forest Service)

Table 5—Quantity of permitted mushroom and fungi harvests on U.S. Forest Service (USFS) and Bureau of Land Management (BLM) land by State in 2013

State	USFS & BLM acreage	Pounds	Pounds per 10,000 acres of USFS & BLM land	Gallons	Gallons per 10,000 acres of USFS & BLM land
California	36,079,642	18,352	5	7,794	2
Colorado	22,818,430	707	<1	0	–
Idaho	32,056,898	222,901	70	650	<1
Kentucky	819,439	30	<1	0	–
Montana	25,135,961	350	<1	240	<1
Oregon	31,816,221	391,724	123	96,254	30
Vermont	407,895	400	10	0	–
Washington	9,745,083	1,430	2	128,154	132
Total	158,879,569	635,894	4	233,092	15

Sources: USDA Forest Service (2014a); unpublished data from the U.S. Bureau of Land Management (on file with: James Chamberlain, research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060).

– = not applicable.

Nursery and Landscape Products

Nursery and landscape forest products are live plants (e.g., transplants) that are harvested from natural forests and sold for landscaping. In the South, this may include seedlings of rhododendron (*Rhododendron* spp. L.), azaleas (*Rhododendron* spp. L.), and Fraser fir [*Abies fraseri* (Pursh) Poir.]. Table 1 illustrates that more than 46,000 pieces and one ton of plant material were harvested from Federal lands for nursery and landscape uses in 2013. The South reported the largest harvest of nursery and landscape forest products; more than 50 percent of the total number of pieces reported harvested from Federal lands came from this region. The West region reported approximately 24 percent, while the Rocky Mountain region reported about 21 percent of the total harvest for the United States, in 2013. Only one region (Rocky Mountain) reported nursery and landscape products in tons.

Table 6 presents the permitted total harvest of nontimber forest products categorized as “nursery and landscape, and regeneration forest products” by State, and the harvest rate per 100,000 acres of USFS and BLM land. The table includes the number of transplants, ornamentals, cacti and nuts, seeds, and cones in bushels and pounds. In 2013, the largest volume of forest products harvested as transplants came from North Carolina, with almost 43 percent of the total national recorded harvest. The agencies managing Federal lands in Oregon reported the second largest volume of transplant materials, with about 21 percent of the total national harvest. Four States (Idaho, North Carolina, Oregon, and Tennessee) reported approximately 80 percent of the total national harvest of transplant materials. For nuts, seed, and seed cones for regeneration purposes, the top five States (California, Colorado, Idaho, Nevada, and Utah) reported more than 99 percent of the national harvest. The largest volume came from Utah, with almost 60 percent of the total weight of regeneration

products. The harvest of regeneration products was reported by the bushel in only six States, and Arizona had the most with approximately 35 percent of the total national harvest. Washington State was a close second, reporting 31 percent of the total harvest in bushels.

Herbs and Medicinal Plants

The USFS and BLM report the harvest of medicinal plants from all regions, except Alaska (table 1). The South reports the largest volume (i.e., 14,936 pounds), followed closely by the West (i.e., 14,710 pounds). In total, more than 42,500 pounds of medicinal forest products were reported harvested from Federal lands in 2013.

Table 7 presents the average annual harvest (pounds dry weight) of medicinal forest products, as reported by the American Herbal Products Association (2007, 2012). The association surveys its members regularly to monitor harvest of priority medicinal plants. The table presents the average annual harvest for two 5-year periods, which allows for a broad assessment of harvest trends. Eleven of the 21 medicinal forest products have experienced an average annual increase in harvest from 2001 through 2010. Likewise, there was a decrease in average annual harvest in 10 of the products. The greatest increase in average annual harvest was arnica (*Arnica* spp. L.), which comes from the Rocky Mountain region of the United States. The average annual harvest of osha (*Ligusticum* spp. L.), from the Rocky Mountain region, experienced a >150-percent increase over that same period. The average annual harvest of cascara bark which is harvested from Washington State increased 120 percent over the period. The average annual harvest of slippery elm (*Ulmus rubra* Muhl.) bark increased >66 percent over the period, as well. Some species, however, showed noteworthy decreases in average annual harvest. For example, the average annual

Table 6—Quantity of permitted nursery, landscape, and regeneration harvests on U.S. Forest Service (USFS) and Bureau of Land Management (BLM) land by State in 2013

State	Transplants, ornamentals, and cacti	Nuts, seed, and seed cones	Seed cones	Total national forests, national grasslands and BLM lands	Per 100,000 acres of USFS/BLM land		
					Transplants, ornamentals and cacti	Nuts, seed and seed cones	Seed cones
	<i>pieces</i>	<i>pounds</i>	<i>bushels</i>	<i>acres</i>	<i>each</i>	<i>pounds</i>	<i>bushels</i>
Alaska	600	0	0	94,571,133	1	0	0
Arizona	229	10	2,013	23,408,797	1	<1	9
Arkansas	0	350	0	2,586,406	0	14	0
California	285	16,466	650	36,079,642	1	46	2
Colorado	1,533	3,426	170	22,818,430	7	15	1
Georgia	1,400	0	0	867,141	162	0	0
Idaho	3,498	39,649	0	32,056,898	11	124	0
Montana	1,811	0	0	25,135,961	7	0	0
Nevada	98	74,428	0	53,541,624	<1	139	0
New Hampshire	4	0	0	718,822	1	0	0
New Mexico	1,465	40	0	22,573,223	7	<1	0
North Carolina	19,847	0	0	1,253,802	1583	0	0
Oregon	10,072	431	1,103	31,816,221	32	1	3
South Dakota	648	0	10	2,280,841	28	0	<1
Tennessee	3,695	0	0	654,564	565	0	0
Utah	303	193,040	0	30,985,902	1	623	0
Washington	213	40	1,760	9,745,083	2	<1	18
Wisconsin	200	0	0	1,525,771	13	0	0
Wyoming	598	1,600	0	27,590,442	2	6	0
Total	46,499	329,480	5,706	420,210,703			

Sources: USDA Forest Service (2014a); unpublished data from the U.S. Bureau of Land Management (on file with: James Chamberlain, Research Forest Products Technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060).

harvest of Virginia snakeroot (*Aristolochia serpentaria* L.) decreased approximately 64 percent over the years 2001 through 2010. The average annual harvests of bloodroot (*Sanguinaria canadensis* L.), pale purple coneflower [*Echinacea pallida* (Nutt.) Nutt.], eastern purple coneflower [*E. purpurea* (L.) Moench], and all other species of purple coneflower declined as well.

Table 8 presents the average annual harvest of American ginseng (*Panax quinquefolius* L.) from natural populations covering the years 2003–2012, in dry weight pounds (see fig. 9). Average annual harvests are presented as 5-year averages covering two time periods. Overall, the average annual harvest has increased approximately 12 percent from the 5-year period that ended in 2007 compared

Table 7—Average annual harvest for two 5-year periods, of plant species wild-harvested for herbal or medicinal purposes by plant part used

Scientific name	Common name	Plant part	Average annual harvest, 2001–2005	Average annual harvest, 2006–2010	Change from period 1 to period 2
----- pounds dry weight -----					
<i>Actaea racemosa</i>	Black cohosh	Root	224,072	284,162	26.8%
<i>Aletris farinosa</i>	White colicroot	Root	1,012	690	-31.9%
<i>Aristolochia serpentaria</i>	Virginia snakeroot	Root	121	43	-64.2%
<i>Arnica</i> spp.	Arnica	Whole plant	63	715	1044.0%
<i>Caulophyllum thalictroides</i>	Blue cohosh	Root	6,651	5,169	-22.3%
<i>Chamaelirium luteum</i>	Fairywand	Root	4,688	4,541	-3.1%
<i>Cypripedium</i> spp.	Lady's slipper	Whole plant	51	48	-4.3%
<i>Dioscorea villosa</i>	Wild yam	Tuber	33,422	37,692	12.8%
<i>Echinacea angustifolia</i>	Blacksamson echinacea	Root & Herb	35,446	36,394	2.7%
<i>Echinacea pallida</i>	Pale purple coneflower	Root & Herb	12,916	812	-93.7%
<i>Echinacea purpurea</i>	Eastern purple coneflower	Root & Herb	22,411	3,994	-82.2%
<i>Echinacea</i> spp.	Purple coneflower	Root & Herb	70,772	41,200	-41.8%
<i>Frangula purshiana</i>	Cascara buckthorn	Bark	166,034	366,272	120.6%
<i>Hydrastis canadensis</i>	Goldenseal	Root & Leaf	73,619	74,708	1.5%
<i>Ligusticum porteri</i>	Osha	Root	828	2,095	153.1%
<i>Lomatium dissectum</i>	Fernleaf biscuitroot	Root	584	809	38.4%
<i>Sanguinaria canadensis</i>	Bloodroot	Root	24,823	5,056	-79.6%
<i>Serenoa repens</i>	Saw palmetto	Fruit	3,293,377	2,432,841	-26.1%
<i>Trillium erectum</i>	Red trillium	Whole plant	1,099	1,445	31.5%
<i>Ulmus rubra</i>	Slippery elm	Bark	182,435	304,207	66.7%
<i>Usnea</i> spp.	Beard lichen	Whole plant	1,165	1,300	11.6%

Source: American Herbal Products Association (2007, 2012).

Table 8—Average annual dry weight in pounds of wild-harvested American ginseng in the United States, for two 5-year periods (2003-2007 and 2008-2012), and the potential ginseng habitat by land ownership

State	Dry weight of ginseng			Acres of potential ginseng habitat ^a	Potential ginseng habitat by ownership class			
	2003–2007	2008–2012	Change		National forests	Other Federal	State and local	Private
Alabama	614.8	693.2	12.7%	7,082,722	2.9%	1.2%	2.9%	92.9%
Arkansas	1,325.6	891.2	-32.8%	7,805,889	13.2%	2.4%	1.6%	79.4%
Georgia	289.7	265.7	-8.3%	6,454,236	5.4%	1.7%	3.9%	85.9%
Illinois	2,501.1	2,574.2	2.9%	3,472,063	5.5%	0.0%	0.2%	84.0%
Indiana	5,123.1	4,224.6	-17.5%	3,826,987	3.8%	3.3%	7.8%	84.7%
Iowa	621.4	758.7	22.1%	2,077,680	0.0%	3.3%	10.6%	86.0%
Kentucky	14,673.7	14,905.5	1.6%	10,588,720	6.8%	2.7%	2.0%	87.8%
Maryland	115.1	141.7	23.2%	1,640,783	0.0%	2.9%	25.5%	71.9%
Minnesota	1,108.2	665.0	-40.0%	3,439,900	12.1%	1.2%	21.6%	71.6%
Missouri	1,429.2	1,325.0	-7.3%	12,531,879	9.5%	2.1%	5.8%	82.8%
New York	168.7	325.5	92.9%	13,643,992	0.1%	0.4%	25.0%	74.5%
North Carolina	6,559.3 ^b	11,567.5	76.4%	7,278,582	8.9%	3.7%	3.8%	80.4%
Ohio	3,320.2	3,471.9	4.6%	6,743,017	3.4%	0.6%	9.7%	86.3%
Pennsylvania	1,164.3	876.0	-24.8%	14,498,135	3.0%	0.9%	26.7%	69.4%
Tennessee	8,070.2	10,619.9	31.6%	10,388,954	5.1%	4.7%	6.5%	83.3%
Vermont	93.7	148.9	58.8%	3,330,283	10.6%	1.2%	10.0%	77.5%
Virginia	3,261.8	3,885.0	19.1%	10,056,761	12.7%	3.2%	3.9%	78.8%
West Virginia	5,279.8	5,383.8	2.0%	11,111,982	8.4%	1.5%	3.1%	87.1%
Wisconsin	1,895.9	1,995.9	5.3%	8,211,963	7.7%	0.8%	15.4%	76.1%
Total	57,615.8	64,719.2	12.3%	144,184,528	7.0%	1.9%	10.0%	80.9%

^a Potential ginseng habitat broadly defined as forests in the oak-hickory and maple-beech-birch groups [based on analysis of Forest Inventory and Analysis data from USDA Forest Service (2014b)].

^b Includes wild-simulated produced ginseng in 2006.

Source: U.S. Fish and Wildlife Service data. On file with: James Chamberlain, research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060.

to the 5-year period that ended in 2012. Kentucky reported the largest harvest for both periods, representing about 24 percent of the total national harvest. During the first period (2003–2007), seven States reported 80 percent of the total national harvest of wild ginseng. Over the second period (2008–2012), those same seven States reported 84 percent of the total national harvest. Of the 19 States that report harvest volumes, 13 reported an increase

in harvest during these periods. New York reported the largest increase in harvest volume, recording almost a 93-percent increase. Of the six States that reported a decline in harvest, Minnesota reported the largest decrease of 40 percent. The table also shows the percentage of potential ginseng habitat by ownership class, demonstrating that most habitat occurs on private land.



Figure 9—The roots of American ginseng have been harvested from hardwood forests of the Eastern United States for over 250 years. (photo by Gary Kauffman, USDA Forest Service)

Annual dry weights of wild and cultivated ginseng are presented in table 9. Since 2002, more than 673 thousand pounds of wild ginseng have been harvested from hardwood forests. The average annual harvest of wild ginseng from 2002 to 2012 is approximately 61,200 pounds (stdev = 11,000 pounds); however, harvests in 2003 (77,012 pounds) and 2009 (81,767 pounds) were substantially greater than the average for the 11 years. In 2006 wild-harvested ginseng volumes in North Carolina included wild-simulated produced ginseng. From 2008 to 2012, the average annual harvest of wild ginseng was approximately 64,700 pounds (stdev = 9,800 pounds), which is not considerably different than the 11-year average (2002–2012). For cultivated ginseng, more than 4 million pounds had been harvested from 2002 to 2012, with an average annual cultivation of 371,731 pounds (stdev = 99,857 pounds). Wisconsin is a major producer of cultivated ginseng and skews the production volumes. The average of cultivated ginseng for the

period 2008–2012 was 352,500 pounds (stdev = 52,000 pounds), which was not substantially different than the 11-year average.

Figure 10 illustrates trends in harvests of the top six medicinal forest products (excluding saw palmetto), from 1999 through 2010, as estimated by the American Herbal Products Association (AHPA 2007, 2012). Most of the products have realized volatility in harvest volumes. This is particularly evident in slippery elm and black cohosh (*Actaea racemosa* L.), both of which are harvested from forests in the Eastern United States. The harvest of slippery elm and black cohosh declined drastically in 2009 and rebounded to about 2008 levels the following year. The estimated harvest of black cohosh (see fig. 11) was particularly volatile over the period illustrated. Harvest increased drastically from 2002 to 2003, and then declined to below 2001 level in 2005. It then increased sharply through 2007, after which it declined to below 100 tons in 2009. Black

Table 9—Dry weight in pounds of wild-harvested and cultivated American ginseng in the United States, 2002–2012

Year	Wild ginseng harvested	Cultivated ginseng harvested	Total (wild + cultivated)	Percentage wild
	<i>pounds</i>	<i>pounds</i>	<i>pounds</i>	
2002	61,315.5	542,761.8	604,077.3	10.2%
2003	77,012.7	366,931.8	443,944.5	17.3%
2004	59,351.3	240,112.9	299,464.2	19.8%
2005	40,738.9	340,820.5	381,559.4	10.7%
2006	52,949.8 ^a	285,334.9	338,284.7	15.7%
2007	58,026.2	550,623.6	608,649.8	9.5%
2008	57,581.5	350,253.3	407,834.8	14.1%
2009	81,767.9	373,842.6	455,610.5	17.9%
2010	64,016.3	349,684.3	413,700.6	15.5%
2011	60,283.9	272,778.2	333,062.0	18.1%
2012	59,987.6	415,900.5	475,888.2	12.6%

^a Includes wild-simulated produced ginseng from North Carolina.

Note: cultivated numbers are high because of Wisconsin farm grown ginseng.

Source: U.S. Fish and Wildlife Service data. On file with: James Chamberlain, research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060.

cohosh harvests increased again in 2010. The harvest of cascara bark increased sharply from 2004 through 2008. It stayed about the same in 2009, yet decreased sharply in 2010. Relative to other products, the harvests of Echinacea, goldenseal (*Hydrastis canadensis* L.), and wild yam (*Dioscorea villosa* L.) were fairly steady from 1999 to 2010, except for 2004 and 2005 when harvest of Echinacea dropped and then rebounded.

Value of Nontimber and Nonwood Forest Products from Federal Lands

The value of nontimber and nonwood forest products from Federal lands can be estimated by examining the permit and contract sales. The BLM and USFS track the value of these products through the issuance of harvest permits and contracts for the sale of large quantities. Estimates of the values from Federal lands do not represent the total value of these

products because harvest is not limited to Federal lands and harvesting on private lands is not monitored, nor included in value estimates. For example, Chamberlain and others (2013) estimated that the annual value of wild-harvested American ginseng, in 2007, at the first point of sale ranged from \$18 million to \$36 million, depending on price. Conversely, the estimated value of all herbs and medicinal plants as reported by the USFS and BLM at the first point of sale ranged from \$0.8 million in 2005 to \$2.4 million in 2008. Clearly, the entire value of wild-harvested ginseng is not included in these estimates, and under-representation may occur in other products, as well.

Convertible products, particularly timber, by far generate the largest revenues for national forests. Table 10 illustrates the proportion of income that is generated by nonconvertible products relative to convertible products.

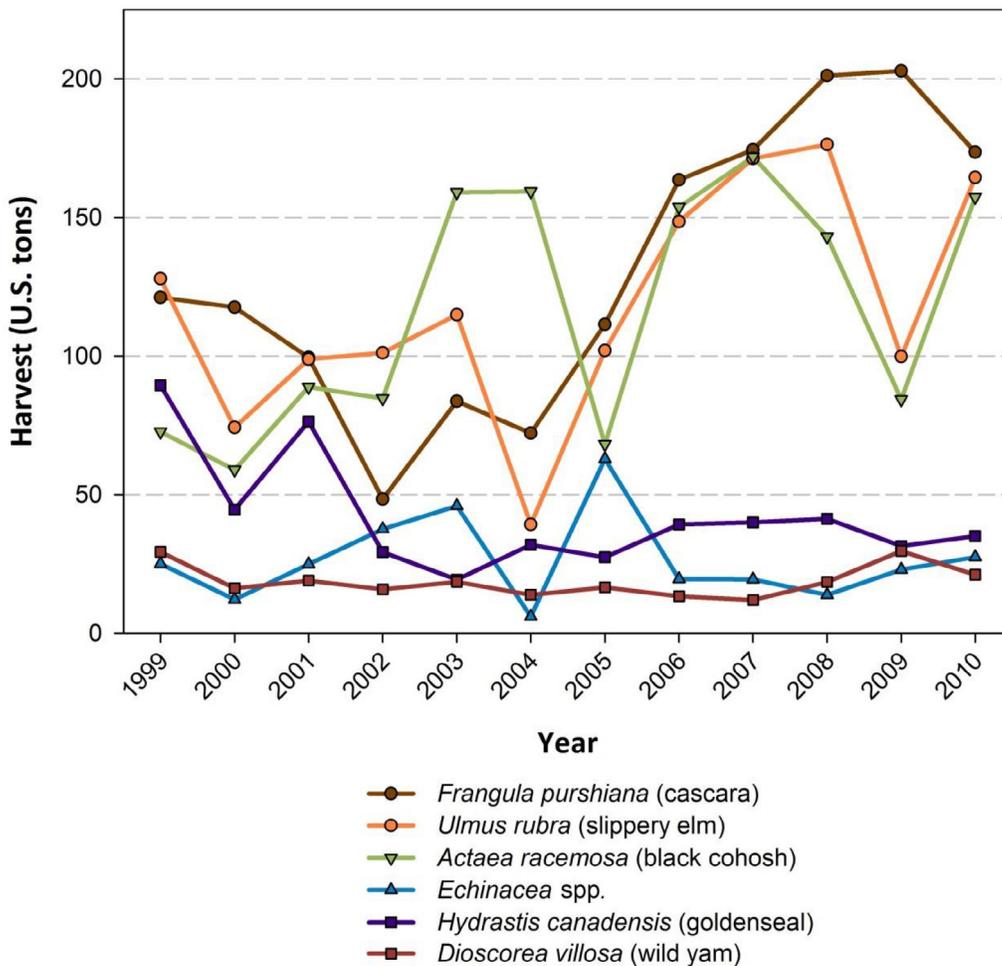


Figure 10—Harvest trends for the top six medicinal forest products as reported by the American Herbal Products Association (2007, 2012).

Across all regions, nonconvertible products account for, on average, about 5.6 percent of receipts. In contrast, nonconvertible products account for, on average, more than 22 percent of receipts for national forests in Region 3 (Arizona, New Mexico). Likewise, they accounted for about 10 percent of the receipts for national forests in Region 5 (California). Clearly for some regions, these products are higher value than traditional timber products.

Table 11 summarizes receipts (adjusted to 2013 U.S. dollars) for permits and contracts for the harvest of nontimber and nonwood forest products from USFS and BLM lands. Nonwood forest products is a subset of nontimber forest products. The top portion

of table 11 summarizes receipts for nonwood forest products, while the portion below the ‘subtotal’ includes those considered nontimber. The total of both represents nontimber forest products. Over the period 2004 through 2013, the two agencies generated close to \$22 million from nonwood forest products and \$79 million from nontimber forest products. There have been fluctuations, as expected with all commodities, and overall receipts have increased, on average, about 2 percent each year. Total annual fluctuations in receipts varied from the mean (\$7.79 million; stdev = \$630 thousand) over 3 years. The year 2009 (\$6.98 million) was more than one standard deviation less than the overall mean, while 2007 (\$8.68 million) and 2010 (\$8.95 million) were greater



Figure 11—Black cohosh roots are harvested from natural populations and used for herbal remedies for menopausal symptoms. (photo by James Chamberlain, USDA Forest Service)

Table 10—Proportion of receipts generated from permits and contracts for the harvest of nonconvertible products classified as nontimber forest products (NTFPs) from national forests

National forest region	Proportion of income from NTFPs				
	2009	2010	2011	2012	Average
1	1.96%	1.96%	1.40%	1.30%	1.66%
2	3.95%	3.93%	3.59%	5.23%	4.18%
3	25.58%	22.78%	23.74%	18.21%	22.58%
4	7.49%	8.46%	12.85%	9.42%	9.56%
5	21.54%	10.92%	4.23%	3.93%	10.16%
6	12.05%	8.72%	4.81%	3.88%	7.37%
8	0.32%	0.31%	0.21%	0.24%	0.27%
9	0.20%	0.17%	0.17%	0.17%	0.18%
10	0.02%	0.01%	0.01%	0.04%	0.02%

Source: USDA Forest Service (2014a).

Table 11—Receipts for nontimber forest (bottom half) and nonwood (top half) products estimated from U.S. Forest Service and Bureau of Land Management permits and contracts, 2004–2013

Product category	Receipts									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	<i>thousand 2013 U.S. dollars</i>									
Landscaping	257	226	225	220	177	41	84	72	59	61
Arts, crafts, and floral	1,091 ^b	907 ^b	1,759 ^b	2,059 ^b	817 ^b	852	1,368	1,323	1,326	1,518
Regeneration and seed	26	48	37	25	80	96	40	82	52	108
Edible fruits, nuts, and sap	629	327	415	428	733	397	626	489	546	676
Grass and forage	257 ^b	330 ^b	288 ^b	270 ^b	217 ^b	0.2	18	3	5	237
Herbs and medicinals	22	17	16	27	53	27	38	44	46	37
Subtotal^a	2,281	1,856	2,741	3,029	2,078	1,414	2,174	2,012	2,034	2,636
Posts and poles	435	301	331	268	212	203	186	184	252	206
Christmas trees	1,655	1,727	321	1,344	1,175	376	1,519	1,113	1,090	1,049
Fuelwood	3,449	3,263	3,681	3,879	4,388	4,964	5,030	4,924	4,553	4,579
Nonconvertible	105	214	272	159	64	23	41	70	7	7
Total^a	7,926	7,362	7,346	8,679	7,918	6,979	8,951	8,303	7,935	8,477

^a Totals may be off due to rounding.

^b For years 2004–2008, beargrass was included in the grass and forage category instead of arts, crafts, and floral.

Sources: USDA Forest Service (2014a); unpublished data from the U.S. Bureau of Land Management (on file with: James Chamberlain, research forest products technologist, U.S. Department of Agriculture, Forest Service, Southern Research Station, Forest Inventory & Analysis, 1710 Research Center Drive, Blacksburg, VA 24060).

than one standard deviation than the mean for the 10-year period. This suggests that there is a statistically significant difference between these years and the mean, though more rigorous analysis is warranted.

Although the overall total receipts did not change much during the 10 years (see table 11), receipts for individual product categories did. From 2008 to 2009, receipts for nursery and landscaping products decreased from \$177,000 to \$41,000. Receipts for this product line remained low for the rest of the period. Figure 12 illustrates the change in transplants, a major component of nursery and landscape products, from 2004 through 2013. Receipts for transplants dropped from more than \$150,000 in 2008 to less than \$45,000 in 2009. Though there was a slight increase

the following year, receipts from transplants never reached previous levels through 2013. Likewise, receipts for art, craft, and floral products decreased more than \$1,242,000 from 2007 to 2008. Receipts for the harvest of these products rebounded in 2010, but not back to the 2007 level.

Estimates of the first point-of-sale values (table 12), in 2013 U.S. dollars, are based on assumptions that receipts are 10 percent of first point-of-sale values, and that USFS sales represent 20-30 percent of total supply, while BLM receipts are 2-15 percent of total supply. These assumptions are in-line with those used in previous reporting (Alexander and others 2011). For the 10-year period ending in 2013, the total overall first point-of-sale value for nontimber forest products from Federal lands

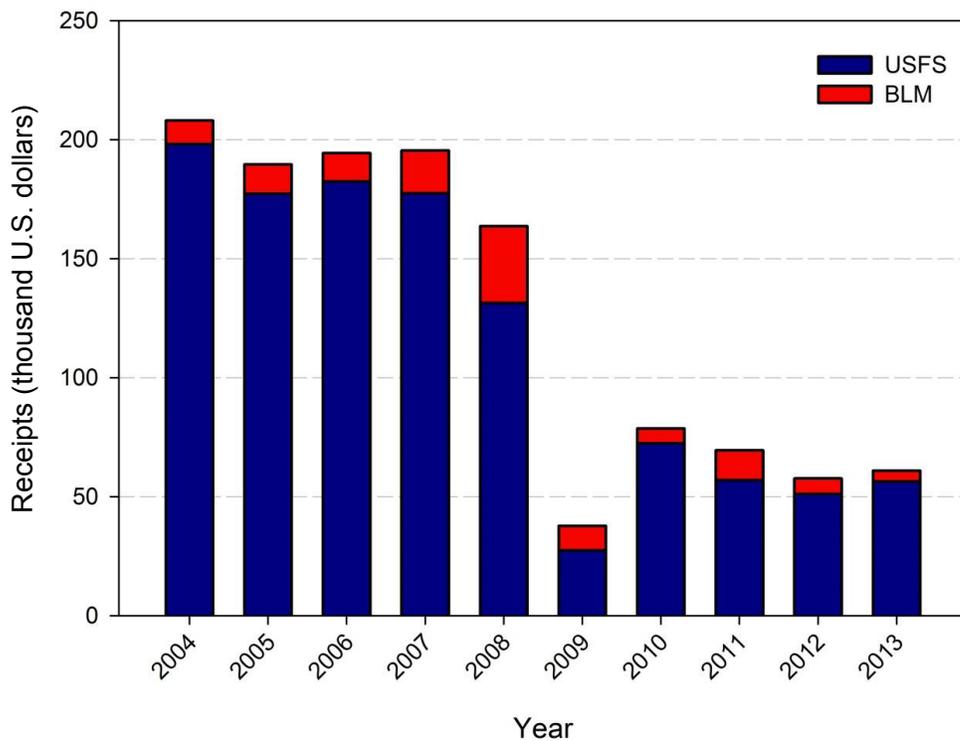


Figure 12—Receipts from the sale of transplants and ornamentals as reported by the U.S. Forest Service (USFS) and Bureau of Land Management (BLM) for the period 2004–2013.

is estimated at \$3.63 billion, while nonwood forest products constituted about \$1 billion. On average, the value of fuelwood comprised more than 50 percent of the total, while art, craft, and floral products were about 16 percent of the total value. Christmas trees represented about 14 percent of the total first point-of-sale value, on average. The total for the years (2008–2013) since the 2010 National Report on Sustainable Forests (USDA Forest Service 2011) is approximately \$2.2 billion, with an annual average value of \$367,900 thousand. Beargrass is reported in two different categories among agencies; the BLM reports it as “arts, crafts, and floral” while the USFS reports beargrass in “grass and forage.” This product was removed from the USFS “grass and forages” category from 2009 to 2013 and placed under “arts, crafts, and floral.”

The estimated wholesale value, in 2013 U.S. dollars, of nontimber forest products is based on

several assumptions, as presented by Alexander and others (2011). The estimations assume that USFS and BLM receipts are 10 percent of first point-of-sale value, and that the first point-of-sale value is 40 percent of wholesale price. The assumptions also imply that USFS harvest volumes are 20–30 percent of the total, while BLM harvest volumes at 2–15 percent of the total supply. The total estimated wholesale value of nontimber forest products (table 13) from Federal lands over the 10-year period (2004–2013) is \$9.08 billion, while nonwood forest products was about \$2.53 billion. For the period (2008–2013) since the 2010 National Report on Sustainable Forests (USDA Forest Service 2011), the total estimated wholesale value of NTFPs from Federal lands is \$5.52 billion. The estimated wholesale value for all herbs and medicinal plants harvested in the United States for the period 2008–2013 is \$27.8 million, which is about the same for the annual wholesale value of wild-harvested American

Table 12—First point-of-sale value of wild-harvested nontimber forest products in the United States

Product category	First point-of-sale value ^a									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	<i>million 2013 U.S. dollars</i>									
Landscaping	11.7	10.3	10.2	10.0	8.1	1.9	3.8	3.3	2.7	2.8
Arts, crafts, and floral	49.6 ^c	41.2 ^c	80.0 ^c	93.6 ^c	37.1 ^c	38.7	62.2	60.1	60.3	69.0
Regeneration and seed	1.2	2.2	1.7	1.1	3.6	4.4	1.8	3.7	2.4	4.9
Edible fruits, nuts, and sap	28.6	14.9	18.9	19.5	33.3	18.0	28.5	22.2	24.8	30.7
Grass and forage	11.7 ^c	15.0 ^c	13.1 ^c	12.3 ^c	9.9 ^c	0.01	0.8	0.1	0.2	10.8
Herbs and medicinals	1.0	0.8	0.7	1.2	2.4	1.2	1.7	2.0	2.1	1.7
Subtotal^b	103.7	84.4	124.6	137.7	94.5	64.3	98.8	91.5	92.4	119.8
Posts and poles	19.8	13.7	15.1	12.2	9.7	9.2	8.5	8.4	11.4	9.3
Christmas trees	75.2	78.5	14.6	61.1	53.4	17.1	69.0	50.6	49.5	47.7
Fuelwood	156.8	148.3	167.3	176.3	199.5	225.6	228.6	223.8	206.9	208.1
Nonconvertible	4.8	9.7	12.4	7.2	2.9	1.1	1.9	3.2	0.3	0.3
Total^b	360.3	334.6	333.9	394.5	359.9	317.2	406.8	377.4	360.7	385.3

^a First point-of-sale values assume U.S. Forest Service (USFS) and Bureau of Land Management (BLM) sales receipts are 10 percent of first point-of-sales value, and that USFS sales represent approximately 20–30 percent and BLM sales represent approximately 2–15 percent of total supply.

^b Totals may be off due to rounding.

^c For years 2004–2008, beargrass was included in the grass and forage category instead of arts, crafts, and floral.

ginseng as estimated by Chamberlain and others (2013). This indicates that these values are underestimated and the overall value may be significantly greater.

Exports and Imports of Nontimber and Nonwood Forest Products

Global trade is important because it allows countries to substitute and/or supplement domestic consumption with products that are unavailable or, are available but not in quantities needed to meet domestic demand. Exports of nontimber forest products contribute to regional and national economies. They provide increased revenue streams for U.S.-based enterprises. Imports of NWFPs are critical for meeting demand for products that cannot be attained through domestic

production. The difference between imports and exports is an indicator of trade in these products and of opportunities to increase domestic production.

The U.S. International Trade Commission tracks the import and export of 13 commodities that can be classified as nonwood forest products. Many of these have long histories in global trade; others have more recently reached a level of trade that draws attention to their production. Presenting these values for individual years may not clearly reflect the trade environment; therefore, average annual exports and imports are presented (adjusted to 2013 dollars) for three 5-year periods, which allows for better assessments of trends.

Table 13—Estimated wholesale value of wild-harvested nontimber forest products in the United States

Product category	Estimated wholesale value ^a									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	<i>million 2013 U.S. dollars</i>									
Landscaping	29.2	25.7	25.6	25.0	20.1	4.7	9.6	8.2	6.7	6.9
Arts, crafts, and floral	124.0 ^c	103.1 ^c	199.9 ^c	234.0 ^c	92.8 ^c	96.8	155.5	150.3	150.6	172.5
Regeneration and seed	3.0	5.4	4.2	2.8	9.1	11.0	4.5	9.3	5.9	12.3
Edible fruits, nuts, and sap	71.4	37.2	47.2	48.7	83.3	45.1	71.1	55.5	62.1	76.8
Grass and forage	29.2 ^c	37.5 ^c	32.8 ^c	30.7 ^c	24.7 ^c	0.02	2.1	0.3	0.5	26.9
Herbs and medicinals	2.5	1.9	1.9	3.0	6.0	3.0	4.3	5.0	5.2	4.2
Subtotal^b	259.3	210.9	311.5	344.2	236.1	160.6	247.1	228.7	231.1	299.6
Posts and poles	49.5	34.3	37.6	30.5	24.1	23.1	21.2	20.9	28.6	23.4
Christmas trees	188.1	196.3	36.5	152.8	133.5	42.7	172.6	126.5	123.9	119.2
Fuelwood	391.9	370.8	418.3	440.7	498.7	564.1	571.6	559.5	517.4	520.3
Nonconvertible	11.9	24.4	30.9	18.1	7.3	2.7	4.7	8.0	0.8	0.8
Total^b	900.6	836.6	834.8	986.2	899.7	793.1	1,017.1	943.5	901.7	963.3

^a First point-of-sale values assume (1) U.S. Forest Service (USFS) and Bureau of Land Management (BLM) sales receipts are 10 percent of first point-of-sales value, (2) that USFS sales represent approximately 20–30 percent and BLM sales represent approximately 2–15 percent of total supply, and (3) that first point-of-sales value is 40 percent of wholesale price.

^b Totals may be off due to rounding.

^c For years 2004–2008, beargrass was included in the grass and forage category instead of arts, crafts, and floral.

Exports—Since 1999, the United States has exported in excess of \$7.75 billion (in real dollars) in nonwood forest products (table 14). The average annual export value of nonwood forest products from the United States has increased over the last 15 years. The average annual value of NWFP exports from 1999 through 2003 was approximately \$361 million. Over the next 5 years (2004–2008), average annual exports were valued at \$482.7 million, a 34-percent increase over the previous period. The average annual exports over the last 5-year period (2009–2013) increased more than 45 percent over the previous period, and approximately 95 percent over the first period.

Several nonwood forest products have experienced significant changes in export value since 1999. The average annual export value of mosses and lichens decreased from

\$11.8 million during the period 1999–2003 to approximately \$1.63 million for the period ending in 2013. The average annual export value of fresh or dried pecans increased from \$81 million to \$346 million over the three periods. Wild-harvested ginseng increased in export value, as well. Over the 15 years, average annual export value for wild-harvested ginseng increased more than 56 percent. Over the same period, maple syrup export values increased more than 160 percent, while the average annual export value of essential oils (cedarwood, clove, and nutmeg) increased almost 200 percent. Some of these exports may be products (e.g., clove and nutmeg) that are imported, processed, and then exported.

Imports—The average annual value (in real dollars) of nonwood forest products imported into the United States has increased

Table 14—Average annual value of nonwood forest products (NWFPs) in the Harmonized Tariff Schedule exported from the United States

Nonwood forest product	Value of exported NWFPs		
	Average 1999–2003	Average 2004–2008	Average 2009–2013
	<i>thousand 2013 U.S. dollars</i>		
Mosses and lichens	11,801	1,402	1,630
Fresh, dried, dyed, bleached, impregnated, or otherwise prepared foliage branches	101,439	129,665	116,962
Mushrooms and truffles, fresh, preserved, dried, sliced, etc.	20,657	11,373	12,957
Pecans, fresh or dried, in shell and shelled	81,073	182,787	346,099
Cranberries and other fruits, fresh, of the genus <i>Vaccinium</i> except blueberries	14,396	27,015	22,602
Wild blueberries, fresh, frozen, preserved, dried, canned	44,851	53,474	64,402
Vanilla beans	8,924	5,957	2,846
Ginseng roots, cultivated, fresh, or dried	19,580	12,396	19,074
Ginseng roots, wild, fresh, or dried	27,065	24,275	42,567
Maple sugar and maple syrup	7,690	12,154	20,459
Pignolia (pine nuts), prepared or preserved	15	24	922
Gum, wood, or sulfate turpentine oils	7,560	5,392	19,220
Essential oils of cedarwood, clove, and nutmeg	6,804	8,810	20,355
Pine oil	9,491	7,968	16,245
Total	361,346	482,692	706,340

Source: U.S. International Trade Commission (2014).

approximately 33 percent over the last 15 years (table 15). From the first reporting period (1999–2003) to the second (2004–2008), import values increase approximately 30 percent. From the second period to the third period (2009–2013), average annual import values increased less than 2 percent. Over the entire period, the United States imported more than \$2.27 billion of nonwood forest products.

Over the last 15 years, the average annual import values of several prominent NWFPs increased considerably. The average annual import of truffles, as example, increased from \$2.77 million (1999–2003) to \$10.69

million (2009–2013). Over the same period, the average annual value of imported pecans increased approximately 185 percent, from \$87.17 million to \$248.03 million. The average annual import value of fruits of the genus *Vaccinium* (e.g., blueberries, huckleberries) increased from \$88,000 (1999–2003) to \$7.63 million (2009–2013). The import value of gum and oils increased almost 3-fold over the 15-year period.

Total and Per Capita Consumption

Estimating the total and per capita consumption is critical to demonstrate the importance of

Table 15—Average annual value of nonwood forest products (NWFPs) in the Harmonized Tariff Schedule imported into the United States

Nonwood forest product	Value of imported NWFPs		
	Average 1999-2003	Average 2004-2008	Average 2009-2013
	<i>thousand 2013 U.S. dollars</i>		
Moss and lichens	4,316	4,693	4,293
Christmas trees	33,620	31,408	25,109
Foliage, branches, and grasses for ornamental purposes, fresh, dried, dyed, or otherwise prepared	77,253	100,399	87,988
Truffles, fresh or dried	2,770	6,662	10,692
Mushrooms, fresh or dried	35,894	24,268	24,945
Pecans, fresh or dried, in shell and shelled	87,165	174,280	248,033
Pignolia (pine nuts), prepared or preserved	32,989	59,467	24,819
Wild blueberries, fresh, frozen, preserved, dried, canned	43,479	100,012	76,863
Cranberries, fresh or frozen	27,653	54,527	77,758
Fruits of the genus <i>Vaccinium</i> , fresh	88	467	7,625
Vanilla beans, whole, crushed, or ground	167,972	89,993	43,384
Ginseng roots, cultivated, fresh or dried, whole, cut, crushed or powdered	13,889	18,371	23,569
Ginseng roots, wild, fresh or dried, whole, cut, crushed, or powdered	1,064	8,108	1,029
Maple syrup, blended or not	89,128	135,776	158,330
Maple sugar	259	675	721
Essential oils of cedarwood	841	1,008	1,410
Gum, wood, or sulfate turpentine oils	4,679	5,266	12,559
Pine oil	1,111	989	1,570
Total	624,170	816,369	830,697

Source: U.S. International Trade Commission (2014).

nonwood and nontimber forest products. Total consumption is estimated as the difference between the sum of domestic production and imports, and exports. Per capita consumption is simply the ratio of total consumption and national population. Following the procedures presented by Alexander and others (2011), we assumed that table 14 represents all NWFP exports, while table 15 includes all NWFP imports. This may not be accurate as there is no

way to know if all products are included in the data used to generate these tables.

Table 16 illustrates, in real dollars, that the United States is a net importer of nonwood forest products. In every year since 2004, imports have exceeded exports on average by \$200 million, adjusted dollars. The difference declined drastically in 2010 because exports increased (~ \$55 million) while imports

declined (~ \$65 million). Though imports increased the following years, exports continued to increase, as well. The total wholesale value of permitted harvest from Federal lands, as presented in table 16, is estimated in table 13. Total wholesale value adjusted for trade is the difference between imports and exports plus the wholesale value of NWFPs from Federal lands. Overall, this value has declined about 40 percent over the 10 years. The total wholesale value adjusted for trade of NWFPs for the 10 years exceeds \$4.5 billion.

By including the value of firewood, posts and poles, Christmas trees, and other nonconvertibles, the adjusted wholesale value of NTFPs can be estimated. The average annual wholesale value of NTFPs to the United States was about \$1.10 billion over the 10 years from 2004 through 2013. The total wholesale value, adjusted for trade, of NTFPs to the United

States for 10 ten years was approximately \$11.32 billion.

The per capita consumption, in real dollars, of NWFPs and NTFPs in the United States is estimated in table 17. This figure is the ratio of the respective values to population estimates (U.S. Census Bureau 2013). Over the 10 years, annual per capita consumption of NWFPs averaged approximately \$1.50, while annual per capita consumption of NTFPs averaged about \$3.73. The major reason for the difference between these two figures is the value of firewood and Christmas trees. Per capita consumption of NWFPs dropped below \$1.00 in 2011 and 2012 because total wholesale value of NWFPs adjusted for trade declined in those 2 years and the estimated U.S. population in those years increased (U.S. Census Bureau 2013). Total adjusted wholesale value of NTFPs declined below \$1.00 billion in 2012, which

Table 16—Adjusted wholesale value of nonwood forest products trade in the United States

Value description	Adjusted wholesale value									
	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
	<i>million 2013 U.S. dollars</i>									
U.S. NWFP imports	853.1	684.0	782.7	801.3	803.7	765.2	700.1	829.4	881.2	852.1
U.S. NWFP exports	411.2	380.6	463.5	557.2	601.0	561.9	616.9	757.0	868.8	727.1
U.S. NWFP imports minus exports	442.0	303.4	319.1	244.1	202.7	203.2	83.2	72.4	12.5	125.0
Total wholesale value of USFS and BLM NWFP permitted harvest	259.3	210.9	311.5	344.2	236.1	160.6	247.1	228.7	231.1	299.6
Total wholesale value adjusted for trade (Row 3 + Row 4) ^a	701.2	514.3	630.6	588.3	438.8	363.9	330.3	301.0	243.6	424.5
Total wholesale valued adjusted for trade, plus firewood, posts and poles, Christmas trees, and nonconvertibles	1,376.8	1,172.4	1,186.0	1,261.4	1,129.8	1,022.2	1,127.0	1,041.3	938.2	1,111.9

BLM = Bureau of Land Management; NWFP = nonwood forest product; USFS = U.S. Forest Service.

^a Totals may be off due to rounding.

Table 17—United States population and per capita consumption of nonwood and nontimber forest products, adjusted for trade in wholesale 2013 U.S. dollars

Population and consumption	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013
U.S. population (millions) as of July 1	293.0	295.8	298.6	301.6	304.4	307.0	309.3	311.6	313.9	316.1
Annual U.S. per capita consumption of nonwood forest products	\$2.39	\$1.74	\$2.11	\$1.95	\$1.44	\$1.19	\$1.07	\$0.97	\$0.78	\$1.34
Annual U.S. per capita consumption of nontimber forest products	\$4.70	\$3.96	\$3.97	\$4.18	\$3.71	\$3.33	\$3.64	\$3.34	\$2.99	\$3.52

Source: U.S. Census Bureau (2013).

explains the dip in per capita consumption of these products.

LIMITATIONS OF NTFP ESTIMATES

There are two important limitations to presenting a comprehensive assessment of the volume of nontimber forest product harvests relative to the sustainability of the resource. First, there is a significant lack of data. Reports of the permitted harvest by U.S. Forest Service and Bureau of Land Management provide the most comprehensive data available for Federal lands. However, there are no mechanisms to account for unpermitted or otherwise undocumented harvests on public lands, which could be substantial. In addition, products collected from private forest lands are completely unaccounted for which is particularly germane in the Eastern United States, where a majority of forest lands are privately owned.

Industry data are helpful in addressing this limitation, but these are incomplete, as well. In general, industry data is national in scale and do not allow for a finer assessment. Rarely does industry data include the origin of products which restricts interpretation of the data. Further, these data sources are limited to a few of the most commonly traded products.

Data for other market segments (e.g., edible forest products, decorative forest products) are unavailable. Products that enter the supply chain more informally, or are sold directly to consumers, are generally missing from industry data. Because of these shortcomings, estimates are conservative, meaning that estimates of the volumes and values of NTFP harvests are likely lower than actual volumes and values.

The focus on commercial harvests in the available private and public data excludes the impact and intangible values of NTFPs harvested for subsistence and personal use. The breadth of harvest has been documented in indigenous groups and in some rural communities, but NTFPs are harvested by a wide swath of the American public, including recent immigrants and a new generation of recreational foragers. Similarly, they are harvested across rural, urban, and suburban landscapes.

The second major limitation is the inability to interpret the impact that harvest has on the resource. Without reliable inventories of NTFP species, there are few, if any, ways to determine the sustainability of harvests. Some of the trees included in USFS Forest Inventory and Analysis protocols produce nontimber products, and rudimentary assessments of

these are possible. For example, firewood, and posts and poles can be monitored. Available volumes of some nontimber products derived from trees, such as slippery elm and birch bark, can be estimated from tree data, as well. Most NTFP species, however, are not inventoried or monitored, so the impacts of harvesting cannot be assessed. Studies that take stock of populations in forests are limited to one particular species, and are carried out in a limited area or span of time. To meet the goals of the Montreal Process and assess the sustainability as well as the economic value of NTFP production, harvest data must be integrated with inventory data.

CONCLUSIONS

Large volumes of diverse nontimber products are harvested from forests of the United States. Providing a single estimate of the volume harvested that encompasses all NTFPs is not possible as there are too many products and too many units of measure. The latter is true even for one product category. For example, seven units of measure are used to report the harvests of products classified as ‘arts, crafts, and florals’ by the USFS and BLM. Across the United States, in 2013, more than 70,000 bushels and 7,500 tons of these products were reported harvested from public forests. That same year, public forests were the sources of over 40,000 pounds and 670,000 pounds of medicinal and edible forests products, respectively. But the total volume of all products harvested across the country far exceeds that which is reported by Federal agencies.

Each region of the country has products that are of particular value and may be unique to that area. For example, the West region is the source of the majority of plant material classified as ‘art, craft, and floral’ products. That region is the major supplier of beargrass, which has been erroneously reported as a forage even though it is used in crafts and the floral industry.

The West region also is the major supplier of fungi, harvested for the culinary market. The Rocky Mountain region is the source of most ‘fuelwood’ harvested from Federal lands, while the South region is the source of much of the ‘nursery and landscape products.’ The South also is the major supplier of medicinal forest products. The North region is the sole source for ‘taps’ of edible products. Region 3, which includes Arizona and Nevada, has the greatest proportion of revenues (22.6 percent) from the harvest of NTFPs. These distinctions are important as they allow for more refined assessments and targeting of efforts to better understand the dynamics of NTFP harvests.

The harvest of nontimber forest products contributes to the economy of the United States. The total receipt value of NTFPs harvested from Federal lands for 2013 was estimated at \$8.48 million. Estimated wholesale value of nontimber forest products in the United States for 2013 was approximately \$963 million. The United States exported, on average, more than \$700 million annually from 2009 through 2013. The data clearly illustrates that nontimber forest products are significant to the country’s economy, yet the estimates are more than likely below actual values as the data is incomplete.

Clearly, nontimber forest products, and the plants and fungi whence they originate, are important to our economy and the sustainability of our forests. The data illustrate that large volumes with great economic value are harvested from public forests. But, there is insufficient data to determine a comprehensive value as well as assessing if the harvest of these resources is sustainable. Reporting on these products has improved over the last 15 years, though the institutional structure for gathering data of harvests from all lands is still lacking. More institutional support is needed to present a comprehensive assessment of the volume, values, and ecological impacts of nontimber forest products across all lands.

LITERATURE CITED

- Alexander, S.J.; Oswalt, S.N.; Emery, M.R. 2011 Nontimber forest products in the United States: Montréal Process indicators as measures of current conditions and sustainability. Gen. Tech. Rep. PNW-GTR-851. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 36 p.
- American Herbal Products Association (AHPA). 2007. Tonnage survey of select North American wild-harvested plants, 2004–2005. Silver Spring, MD: American Herbal Products Association. 25 p.
- American Herbal Products Association (AHPA). 2012. Tonnage survey of select North American wild-harvested plants, 2006–2010. Silver Spring, MD: American Herbal Products Association. 24 p.
- Chamberlain, J.L.; Prisley, S.; McGuffin, M. 2013. Understanding the relationships between American ginseng harvest and timber harvest to improve co-management of the forests of Eastern United States. *Journal of Sustainable Forestry*. 32(6): 605-624.
- National Christmas Tree Association (NCTA). 2012. Consumer survey results. <http://www.realchristmastrees.org/dnn/NewsMedia/IndustryStatistics/ConsumerSurvey.aspx>. [Date accessed: April 15, 2014].
- Public Law. 2000. The Department of the Interior and Related Agencies Appropriations Act of 2000. Section 339. Pilot Program of Charges and Fees for Harvest of Forest Botanical Products. Public Law 106-113. 113 Stat. 135. Superintendent of Documents, United States Government Printing Office. <http://www.gpo.gov/fdsys/pkg/PLAW-106publ113/pdf/PLAW-106publ113.pdf>. [Date accessed: December 19, 2017].
- Public Law. 2004. The Department of the Interior and Related Agencies Appropriations Act of 2004. Section 335 Public Law 108-108, 117 Stat. 1312. Superintendent of Documents, United States Government Printing Office. <http://www.gpo.gov/fdsys/pkg/PLAW-108publ108/pdf/PLAW-108publ108.pdf>. [Date accessed: December 19, 2017].
- Public Law. 2010. The Department of the Interior and Related Agencies Appropriations Act of 2010. Section 420. Extension of Forest Botanical Product Authorities. Public Law 111-88. 123 Stat. 2960. Superintendent of Documents, United States Government Printing Office. <http://www.gpo.gov/fdsys/pkg/PLAW-111publ88/pdf/PLAW-111publ88.pdf>. [Date accessed: December 19, 2017].
- United Nations Food and Agriculture Organization. 1999. FAO forestry: nonwood forest products and income generation. Corporate document repository. <http://www.fao.org/docrep/x2450e/x2450e0d.htm>. [Date accessed: April 17, 2014].
- U.S. Census Bureau. 2013. Population estimates; historical data. <http://www.census.gov/popest/data/historical/index.html>. [Date accessed: March 27, 2014].
- U.S. Department of Agriculture (USDA) Forest Service. 2001. National strategy for special forest products. FS-713. Washington, DC: U.S. Department of Agriculture, Forest Service. 15 p.
- U.S. Department of Agriculture (USDA) Forest Service. 2004. National report on sustainable forests—2003. FS-766. Washington, DC: U.S. Department of Agriculture, Forest Service. 139 p. <https://www.fs.fed.us/research/sustain/docs/national-reports/2003/2003-sustainability-report.pdf>. [Date last accessed: November 2017].
- U.S. Department of Agriculture (USDA) Forest Service. 2011. National report on sustainable forests—2010. FS-979. Washington, DC: U.S. Department of Agriculture, Forest Service. 203 p. <https://www.fs.fed.us/research/sustain/docs/national-reports/2010/2010-sustainability-report.pdf>. [Date last accessed: November 2017].
- U.S. Department of Agriculture (USDA) Forest Service. 2014a. Cut and sold reports. <http://www.fs.fed.us/forestmanagement/products/sold-harvest/cut-sold.shtml>. [Date accessed: February 18, 2014].
- U.S. Department of Agriculture (USDA) Forest Service. 2014b. Forest Inventory and Analysis. National core field guide, Version 6.1. <http://www.fia.fs.fed.us/library/field-guides-methods-proc/>. [Date accessed: January 15, 2015].
- U.S. Department of Agriculture (USDA) National Agricultural Statistics Service (NASS). 2014. Maple syrup production (annual reports 2001–2013). <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1046>. [Date last accessed: December 20, 2017].
- U.S. Department of Agriculture (USDA) Economic Research Service. 2014. Wild blueberries: commercial acreage, yield per acre, production, and season-average grower price in Maine, 1980-2012. <http://usda.mannlib.cornell.edu/MannUsda/viewDocumentInfo.do?documentID=1765>. [Date last accessed: December 20, 2017].
- U.S. Department of the Interior (USDI) Bureau of Land Management (BLM). 2014. Special forest products Oregon/Washington BLM. <http://www.blm.gov/ordistricts/salem/sfp/index.php>. [Date accessed: March 31, 2014].
- U.S. International Trade Commission (USITC). 2014. Harmonized tariff schedule of the United States, version 3.1.0. <http://dataweb.usitc.gov/>. [Date accessed: February 27, 2014].

Chamberlain, James; Teets, Aaron; Kruger, Steve. 2018. Nontimber forest products in the United States: an analysis for the 2015 National Sustainable Forest Report. e-Gen. Tech. Rep. SRS-229, Asheville, NC: U.S. Department of Agriculture, Forest Service, Southern Research Station. 36 p.

Worldwide, forest plants and fungi that are harvested for their nontimber products are critical for the health of the ecosystems and the well-being of people who benefit from the harvest. This document provides an analysis of the volumes and values of nontimber forest products in the United States. It presents estimates of the annual harvest for a number of product categories over five regions for the United States. Data for the analysis comes from records of harvest permits and contracts issued by the U.S. National Forests and Bureau of Land Management, other Federal agencies, as well as several industry sources. The data illustrate that nontimber forest products represent significant contributions to the country's economy. The total value of the receipts from the issuance of permits and contracts to harvest nontimber forest products from Federal lands is estimated at \$8.4 million in 2013. Estimated wholesale value of these products in that year was over \$950 million. Total wholesale value, adjusted for trade, including firewood, posts and poles, and Christmas trees, is estimated at over \$1 billion in 2013. There are challenges with reporting the full value of these products, but the framework to do so is improving.

Keywords: commerce, harvest values, harvest volumes, nontimber forest products, sustainability.

This report is available for download at
www.srs.fs.usda.gov/pubs/.

How do you rate this publication?

Scan this code to submit your feedback or go to
www.srs.usda.gov/pubeval





In accordance with Federal civil rights law and U.S. Department of Agriculture (USDA) civil rights regulations and policies, the USDA, its Agencies, offices, and employees, and institutions participating in or administering USDA programs are prohibited from discriminating based on race, color, national origin, religion, sex, gender identity (including gender expression), sexual orientation, disability, age, marital status, family/parental status, income derived from a public assistance program, political beliefs, or reprisal or retaliation for prior civil rights activity, in any program or activity conducted or funded by USDA (not all bases apply to all programs). Remedies and complaint filing deadlines vary by program or incident.

Persons with disabilities who require alternative means of communication for program information (e.g., Braille, large print, audiotape, American Sign Language, etc.) should contact the responsible Agency or USDA's TARGET Center at (202) 720-2600 (voice and TTY) or contact USDA through the Federal Relay Service at (800) 877-8339. Additionally, program information may be made available in languages other than English.

To file a program discrimination complaint, complete the USDA Program Discrimination Complaint Form, AD-3027, found online at http://www.ascr.usda.gov/complaint_filing_cust.html and at any USDA office or write a letter addressed to USDA and provide in the letter all of the information requested in the form. To request a copy of the complaint form, call (866) 632-9992. Submit your completed form or letter to USDA by: (1) mail: U.S. Department of Agriculture, Office of the Assistant Secretary for Civil Rights, 1400 Independence Avenue, SW, Washington, D.C. 20250-9410; (2) fax: (202) 690-7442; or (3) email: program.intake@usda.gov.

USDA is an equal opportunity provider, employer, and lender.