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Nontimber Forest Products Management on National Forests in the United States

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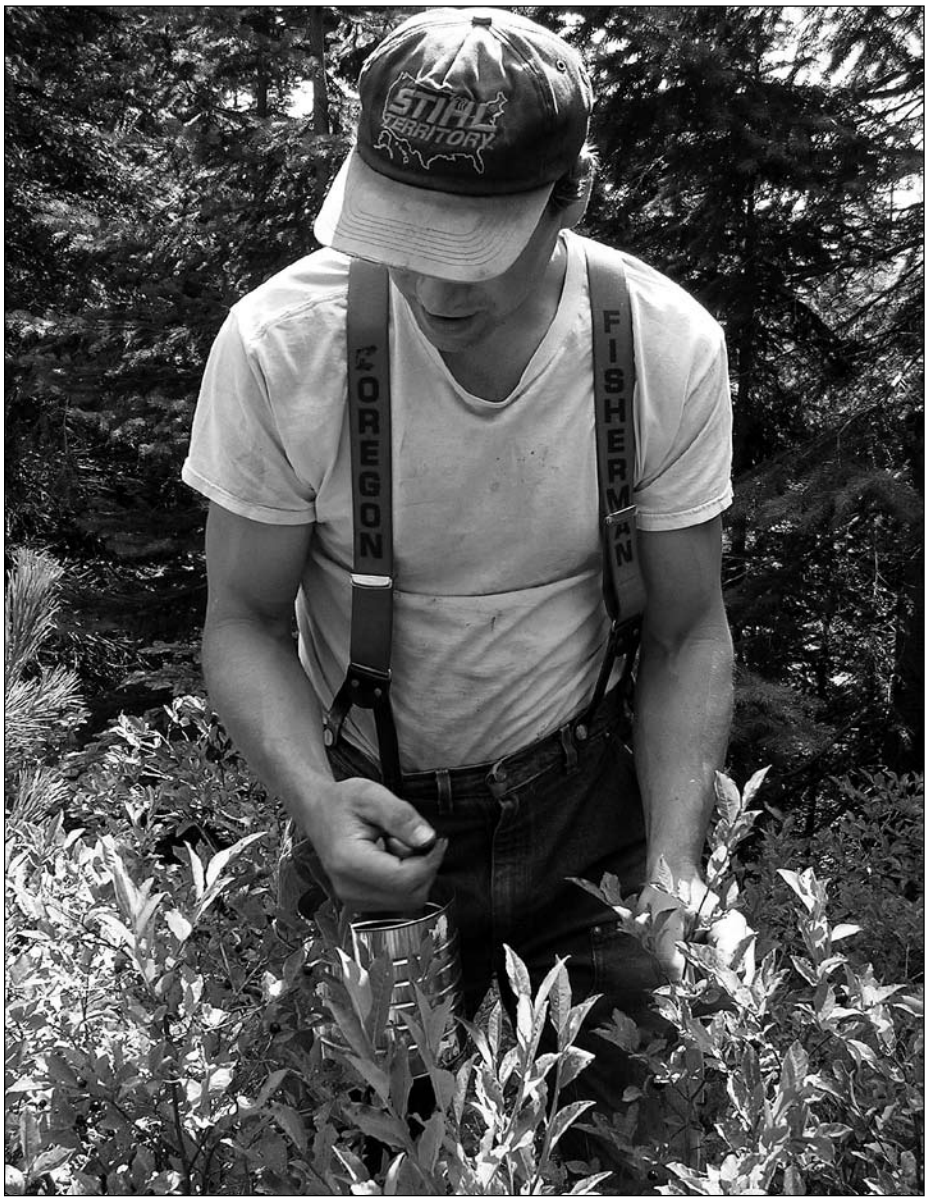

The **Forest Service** of the U.S. Department of Agriculture is dedicated to the principle of multiple use management of the Nation's forest resources for sustained yields of wood, water, forage, wildlife, and recreation. Through forestry research, cooperation with the states and private forest owners, and management of the national forests and national grasslands, it strives—as directed by Congress—to provide increasingly greater service to a growing Nation.

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Cover Photo: Justin Anderson harvests several species of huckleberries on the Mt. Hood National Forest in Oregon. Photo by Kathryn A. Lynch 2005

Abstract

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This study provides an overview of nontimber forest products (NTFP) programs on national forests in the United States. We conducted an email survey in 2003 to obtain data on NTFP management activities on national forests across the country. Program characteristics examined in the study included important NTFPs managed on national forests, presence of NTFP coordinators and law enforcement programs on ranger districts, incorporation of NTFPs into forest planning documents, presence of NTFP inventory and monitoring programs, managers' views on barriers to and opportunities for including NTFP harvesters in NTFP inventory and monitoring efforts, and managers' perceptions of barriers to expanding commercial NTFP harvesting. The data indicate that the agency is constructing a foundation for scientific NTFP management. The study identifies lack of funding and internal administrative capacity as key barriers to adequate incorporation of NTFPs in Forest Service planning, inventory, and monitoring.

Keywords: Nontimber forest products, forest planning, inventory and monitoring, biodiversity conservation, special forest products.

Preface

The term “nontimber forest products” is widely used internationally and within the United States to describe a multitude of forest products that are administratively distinguished from timber and wood fiber resources. Nontimber forest products have a variety of uses, including food, medicine, fuel, decorative uses, and ceremonial and spiritual uses. Types of products include fruiting bodies (e.g., mushrooms and berries); roots, leaves, cones, bark, and needles; woody parts of plants, such as boughs and logs; and resins and oils. The USDA Forest Service has historically used a variety of terms for such products, including “minor forest products,” “specialty forest products,” and “special forest products,” with the term “special forest products” used most widely during the past decade. We have opted to use the term “nontimber forest products” in this report so as to conform to prevailing international convention and the predominant trend in the United States.

Contents

Introduction

Since prehistory, humans around the world have relied on products derived from forest species for their survival and well-being (Huckell and Toll 2004, Matson and Coupland 1995, Moerman 1998, Scarry 2003, Turner and Cocksedge 2001). Nontimber forest products (NTFPs) include (1) foods, such as wild edible mushrooms, fruits, and nuts; (2) medicinal plants and fungi; (3) floral greenery and horticultural stock; (4) fiber and dye plants, lichens, and fungi; (5) oils, resins, and other chemical extracts from plants, lichens, and fungi; (6) fuelwood; and (7) small-diameter wood used for poles, posts, and carvings. Differentiating between form and function of individual NTFPs is complex given that many NTFPs serve multiple functions. For example, fungi serve as food for everyday meals and religious observances, are used as medicines and a means for achieving spiritual enlightenment, and as surfaces for paintings, drawings, and etchings.

Harvesting of NTFPs remains widespread throughout the United States (Emery and McLain 2001, Jones et al. 2004, McLain 2000). People from diverse income levels, age groups, and cultural backgrounds harvest NTFPs for household subsistence, maintaining cultural and family traditions, obtaining spiritual fulfillment, maintaining physical and emotional well-being, scientific learning, and earning income (Jones et al. 2004). Many NTFPs serve as raw materials for industries ranging from large-scale floral greens suppliers and pharmaceutical companies to microenterprises centered around basket-making, woodcarving, medicinal plant harvesting and processing, and a variety of other activities (Alexander et al. 2002, Chamberlain 2000, Emery 1998, Jones et al. 2004, Thomas and Schumann 1993).

The economic value of NTFPs harvested in the United States is likely in the billions of dollars each year.

Estimating the contribution of NTFPs to the national or regional economies is difficult owing to the lack of broad-based systems for tracking the combined value of the hundreds of products that make up the various NTFP industries. In 1998, Brevoort estimated the retail value of medicinal plant products sold in the United States, many of which were wild-crafted, at $4 billion. Chamberlain et al. (2002) placed the wholesale value of just one medicinal species–forest-harvested ginseng (*Panax quinquefolius* L.)–gathered from a four-state area at $18.5 million dollars in 2001. Schlosser and Blatner (1995) estimated that the wild mushroom industry in 1992 contributed $41.2 million and the floral greens industry in 1994 contributed $106.8 million to just the Pacific Northwest economy. Maple syrup (*Acer* spp.) production, which occurs primarily in 10 states in the Northeast and Great Lakes regions, had a wholesale value of $30 million dollars in 1997 (Chamberlain 2000). The aggregate economic value of NTFPs harvested in the United States is thus likely in the billions of dollars each year.

Aside from their economic value, many NTFPs have significant cultural values (Danielsen and Gilbert 2002, Emery 1998, Fisher 2002, Richards and Creasy 1996, Schroeder 2002). For example, the huckleberry (*Vaccinium* spp.) is a sacred food among many Native Americans in the Pacific Northwest, and huckleberry gathering has long served as a focal point for renewing kinship and cross-tribal social ties (Fisher 2002, Knudson 1980). Emery (1998) documented the cultural importance of NTFPs for Native Americans and descendants of European settlers in Michigan's Upper Peninsula, noting that nonmonetary exchanges of NTFPs serve to enhance social ties. Similarly, Lee (2002) described the importance of nonmonetary exchange networks centered on fish, game, and wild plants in maintaining links between rural and urban Native Alaskans. Thus, NTFP gathering and processing contribute toward the development and maintenance of the social ties needed for long-term cultural sustainability.

Through harvesting NTFPs, indigenous and nonindigenous cultural groups develop ecological knowledge of the areas in which they live and work. Anthropologists refer to such knowledge as traditional ecological knowledge (TEK). Berkes (1999) defined TEK as "a cumulative body of knowledge, practice, and belief, evolving by adaptive processes and handed down through generations by cultural transmission, about the living beings (including humans) with one another and their environment (cited in Danielson and Gilbert 2002: 289)." Danielson and Gilbert (2002: 290) noted that TEK and contemporary ecosystem management share principles including "adaptive management through observation and monitoring and an intergenerational sustainability, including the relationship and dependence of humans and all life on each other."

Harvesting of NTFPs in the United States takes place on lands held by a variety of public and private entities, including municipalities, state land management agencies, federal land management agencies, tribes, corporations, and private individuals (Emery 1998, Jones et al. 2004, Lynch and McLain 2003). Of the five major federal land management agencies, the USDA Forest Service has played the most prominent role in encouraging harvesting of nontimber forest products.

Historically, the Forest Service has viewed nontimber forest products harvesting as a locally important, albeit limited vehicle for rural economic development (Shaw 1949; Thomas and Schumann 1993; USDA FS 1965, 1970). The National Forest System's 192 million acres (78 million hectares) of land are particularly important sources of raw materials for NTFP harvesters in the Western United States where national forests constitute a large percentage of the forested land base (Nelson 1995). Although most forested land is held privately or by state agencies in the states east of the Rocky Mountains, national forests also serve as important

repositories of NTFPs in the southern Appalachians, the upper Great Lakes, and parts of New England and the Southeast (Chamberlain 2000, Emery 1998, Emery et al. 2002). The NTFPs in many areas, including some national forests, are extracted under commodity management strategies similar to those used for timber. Emery (1998) has identified the commodity management paradigm as it has been applied to timber management as problematic for some NTFP users. For example, her study of NTFP livelihood strategies on Michigan's Upper Peninsula notes that nonmarket uses for NTFPs, such as subsistence consumption and gifting to strengthen kinship and other social ties, are undermined under commodity management approaches.

This report describes USDA Forest Service NTFP programs on 84 national forests located in the continental United States and Alaska (fig. 1). The description is based on data gathered through email surveys distributed to ranger districts nationwide in 2003 (app. 1).[1] We relied on a literature review and our ethnographic research experience to develop the survey questionnaire.

[1] The Forest Service is part of the U.S. Department of Agriculture and is headed by the Chief of the Forest Service. The agency is composed of five branches: the National Forest System, Research and Development, International Forestry, Administration, and State and Private Forestry (USDA FS 2005a). Within the National Forest System, four administrative levels exist (Loomis 2002, USDA FS 2005a): Washington Office, regions, national forests and grasslands, ranger districts.

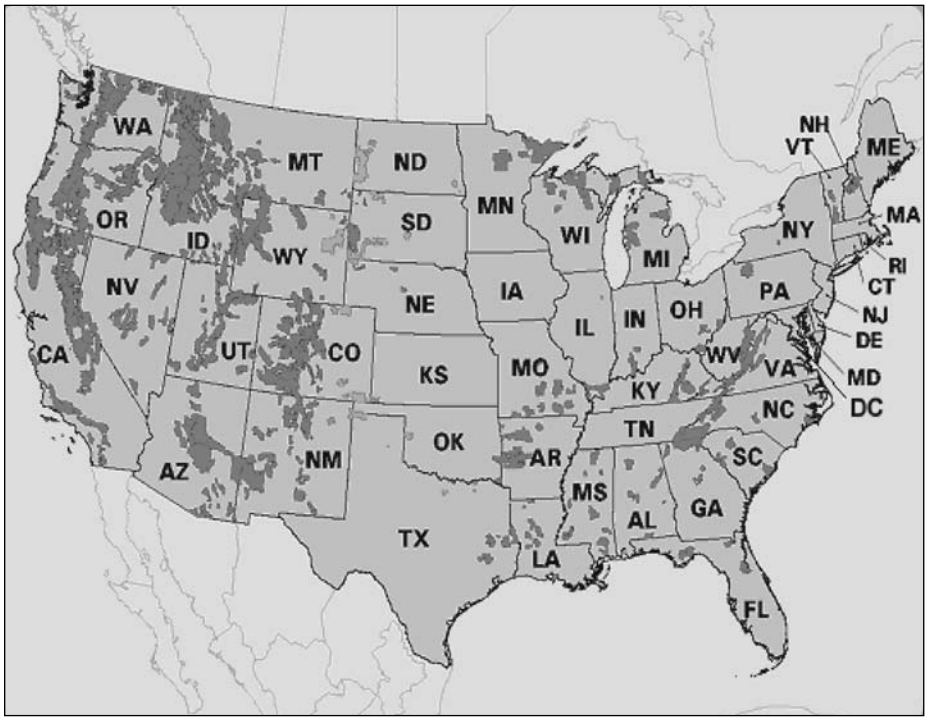

Figure 1—National forests in the continental United States.

Legislative and Administrative Context of NTFP Management

The Forest Service authority to develop and administer rules governing NTFP harvesting and related activities, such as buying and camping, on national forest lands stems directly from the "use and occupancy" and "protection" provisions of the 1897 Organic Act (table 1 provides a list of laws, regulations, and policies affecting NTFP management on national forests).[2,3] Congress initially granted this authority to the Secretary of the Interior (Steen 1991), the official responsible for managing the national forest reserves established under the 1891 Creative Act. In 1905, Congress shifted this authority to the Secretary of Agriculture when jurisdiction over the national forests was transferred from the General Land Office to the Department of Agriculture (Steen 1991).

Other major laws that mandate how the Forest Service manages the resources under its jurisdiction include the 1960 Multiple-Use Sustained Yield Act, the 1974 Forest and Rangeland Resources Planning Act (RPA), and the 1976 National Forest Management Act (NFMA) (Antypas et al. 2002). In addition, the Lacey Act as amended in 1981, the Endangered Species Act (ESA), and the National Environmental Policy Act (NEPA) shape how the Forest Service manages natural resources, including NTFPs (Antypas et al. 2002). Additionally, the Final Rule for the National Forest Land Management Planning (36 Code of Federal Regulations [CFR] Part 219) published on January 5, 2005, establishes "requirements for sustainability of social, economic, and ecological systems" in the forest planning process (Federal Register 2005: 1023). Taken as a whole, these laws and related regulations require the Forest Service to manage resources under its jurisdiction in ways that provide adequate protection for threatened and endangered species, and that ensure long-term sustainable harvest of its renewable resources (Antypas et al. 2002).

Federal agencies are "loath to encourage commercial exploitation of nontimber forest products where conflict with existing subsistence uses might result."

The Alaska National Interest Lands and Conservation Act of 1980 (ANILCA), which establishes priority for subsistence use of fish, wildlife, and other renewable resources, also affects NTFP management on the two national forests in Alaska (Mater 2000, Schroeder 2002). According to Schroeder (2002: 303), ANILCA has made federal agencies "loath to encourage commercial exploitation of nontimber

[2] USC 473-478, 479-482, 551 authorizes the Secretary of Agriculture to regulate "occupancy and use and to preserve the forests" administered under the forest reserve system; it also authorizes the Secretary of Agriculture to sell timber from the reservations, a provision which has been interpreted in the code of federal regulations as applying to a broad range of forest products. In addition, the act authorizes the Secretary to set forth regulations governing the free use of timber and stone (and by extension, other forest products) for domestic purposes.

[3] Floyd (1999) discusses more than 80 laws influencing national forest management.

forest products where conflict with existing subsistence uses might result." In addition, under the American Indian Religious Freedom Act of 1978, national forests throughout the United States are required to protect the religious cultural rights of American Indians, including rights to harvest culturally sacred plants (Mater 2000). Indian-reserved rights to NTFPs also apply on many national forests (Danielson and Gilbert 2002, Fisher 2002, Goodman 2002).

The Forest Service's explicit regulation of NTFPs dates back to at least 1928 (Emery 1998). Regulation S-21 in the 1928 *National Forest Manual* authorized regional foresters to issue instructions regarding sales of NTFPs and to establish minimum prices for NTFPs that differed from those set for timber (USDA FS 1928). Two decades later, Brown's (1950) book on forest products "other than timber" lists a variety of NTFPs harvested on national forest lands during the immediate post-World War II era. National forests in California, Wisconsin, and the Rocky Mountains, for example, sold Christmas trees; national forests in Appalachia sold mountain laurel (*Kalmia latifolia*); and national forests in Colorado and New Mexico sold coniferous wildlings (Brown 1950). Other products sold by national forests at the time included decorative pine cones, seed cones, boughs, leaf mold, ferns, peat, roots, burls and knots (Brown 1950). In a research note published in 1949, a researcher with the Pacific Northwest Forest and Range Experiment Station noted that Christmas tree cutting on national forest is "carefully controlled" (Shaw 1949: 4), and that fern pickers are "required to obtain a permit, and usually pay a

Table 1—Laws and policies relevant to NTFP management on national forests

Date enacted	Laws and policies	Description
1897	Organic Act	Gives the Forest Service the authority to develop and administer rules governing forest occupancy, use, and related activities.
1900	Lacey Act (amended in 1935; 1945; 1981) 16 U.S.C. 3371-3374	Amended in 1981 to apply to indigenous wild plants, with the Secretary of Agriculture given authority to enforce violations related to interstate and international commerce in plants.
1928	Regulation S-21 in National Forest Manual (USDA FS 1928)	Authorized regional foresters to issue instructions regarding sales of NTFPs and to establish minimum prices.
1960	Multiple-Use Sustained Yield Act	Directs the Forest Service to manage the national forests for multiple uses on a sustained yield basis. The uses explicitly stated in the law include timber, range, watershed protection, fish and wildlife, wilderness, and recreation.

(continued)

Table 1—Laws and policies relevant to NTFP management on national forests (continued)

Date enacted	Laws and policies	Description
1969	National Environmental Policy Act (NEPA)	Creates the environmental impact statement (EIS) and environmental assessment (EA) as instruments of environmental policy. Requires public participation.
1973	Endangered Species Act	Establishes a formal procedure for federal agencies to classify plant and animal species as threatened or endangered and provide for their protection.
1974	Forest and Rangeland Resources Planning Act (RPA)	Directs the Secretary of Agriculture to prepare a national renewable resource assessment, to be updated every 10 years (Section 3), which includes an analysis of the "present and anticipated uses, demand for, and supply of the renewable resources" and an inventory of "present and potential renewable resources, and an evaluation of opportunities for improving their yield of tangible and intangible goods and services…."
1976	National Forest Management Act (NFMA)	Directs the Forest Service to integrate renewable resource management into its planning processes. Requires national forests to develop forestwide plans by using procedures designed to encourage public participation.
1980	The Alaska National Interest Lands and Conservation Act (ANILCA)	Established subsistence use priority for fish, wildlife, and other renewable resources. Significantly affects NTFP management on national forests in Alaska.
1992	Memo from the Chief of the Forest Service to regional foresters and station directors regarding ecosystem management of the national forests and grasslands (Robertson 1992).	Established ecosystem management as the guiding policy for managing lands in the National Forest System. Calls for managing for biological sustainability while simultaneously taking into account human needs and values.
1994	The Northwest Forest Plan (USDA and USDI 1994)	An interagency regional planning document developed to establish forest management guidelines for the northern spotted owl zone in the PNW; includes requirements for inventorying and monitoring numerous species, many of which are harvested for commercial, recreational, or subsistence use.
2000	Consolidated Fiscal Year 2000 Appropriations Act, Sec. 339 of P.L. 106-113.	Rider entitled "Pilot Program of Charges and Fees for Harvest of Botanical Products" requires the FS to charge fair market value fees for NTFPs and conduct analyses to ascertain whether NTFP harvesting levels are sustainable.
2001	National Strategy for Special Forest Products (USDA FS 2001b)	This strategy constitutes the agency's overarching policy statement with respect to NTFP management.

Table 1—Laws and policies relevant to NTFP management on national forests (continued)

Date enacted	Laws and policies	Description
2002	Forest Service Handbook 2409.18 Chapter 80; effective December 16, 2002	Added new direction for NTFP management on national forests, including requirements that national forests manage NTFP sustainably, incorporate NTFPs into forest plans, and subject NTFP harvesting activities to NEPA analyses. The directive also encourages forests to conduct inventories to assess impacts of management actions on NTFPs and collaborate in local partnerships to manage NTFPs.
2005	Final Rule, National Forest System Land Management Planning (36 CFR Part 219)	Adopts environmental management system (ISO 14001) as a management framework, including emphasis on adaptive management and ongoing monitoring as part of the forest planning process.

small fee per unit" (Shaw 1949: 5). The Forest Service thus has a long-standing history of managing the National Forest System for NTFPs, albeit on a limited scale.

The principal regulations within the CFR that authorize how the Forest Service can dispose of NTFPs on national forest reserves include 36 CFR 223.1, which sets forth the procedures for disposing of forest products, 36 CFR 223.5, which covers the circumstances under which free use of forest products is permitted, and 36 CFR 223.6, which sets forth appraisal and fair market value requirements for forest products harvested on national forest lands (GPO 2004). The Forest Service Manual (FSM) and Forest Service Handbook (FSH) elaborate specific policies and directives applicable nationwide, as well as to specific regions and national forests (USDA FS 2005b).[4] The directives in the Forest Service Manual contain guidance needed by line officers and primary staff on more than one administrative unit, whereas the Forest Service Handbook directives provide guidance primarily for specialists and technicians. Although the regions and the national forests provide management direction on NTFPs to the ranger districts, the districts exercise some discretion in how they implement those directives (Emery 1998).

The FSH 2409.18 Chapter 80 (USDA FS 2005b) constitutes an important source of national-level management direction for NTFPs on national forests. An amendment dated December 12, 2002, removed obsolete direction under this handbook chapter regarding firewood, naval stores, pine-distillate wood, and Christmas trees

[4] See Chamberlain (2000) for a summary of the key sections of the Forest Service Manual that pertained nationally to NTFP management in 2000. He also provided an overview of recent directives applicable to NTFP management in Region 8, and examples of national forest directives for the Ozark-St. Francis National Forest and the national forests of North Carolina.

and greens. It also added important new direction for sustainable management of NTFPs, reserved treaty rights, NTFP valuation, collection of deposits for NTFP harvesting, control of harvesting activities, and reporting of NTFP harvest volumes and revenues.

The FSH 2409.18_80 defines NTFPs as:

a. Non-timber vegetative products, such as mosses, fungus, and bryophytes, echinatia [sic], roots, bulbs, berries, seeds, wildflowers, beargrass, salal, ferns, and transplants;
b. Non-convertible timber products, such as Christmas trees, tree sap, boughs, bark, cones, burls, yew bark, and transplants of trees; and
c. The following convertible timber products: posts, poles, rails, shingle and shake bolts, firewood, fence stays, vegas [sic], mine props, and bow staves (FSH 2409.18_87.05).

It excludes "sawtimber, pulpwood, non-sawlog material removed in log form, cull logs, small roundwood, house logs, telephone poles, derrick poles, minerals, animals, animal parts, insects, worms, rocks, water, and soil" from the agency's categorization of nontimber forest products (FSH 2409.18_87.05). Among other items, the amendment directs the agency to manage natural resources (including NTFPs) "in such a manner that there is not impairment of the productivity of the land" (FSH 2409.18_87.11), to use inventories "to determine the effects of proposed management actions" (FSH 2409.18_87.12), to incorporate NTFPs into forest plans (FSH 2409.18_87.13), and to conduct NEPA-mandated environmental analysis for NTFP harvesting (FSH 2409.18_87.14). The amendment also encourages agency managers to use "locally based partnerships and collaborative projects" (FSH 2409.18_87.17) in NTFP management. Additionally, FSH 2409.18_87.3 requires NTFP managers to apply minimum rates established under FSM 2431.31b to convertible NTFPs (e.g., firewood, posts, poles, etc.) and allows the regional foresters to set minimum rates for nonconvertible NTFPs (e.g,. moss, bark, needles, etc.). The FSH 2409.18_87.3 also directs forest supervisors to set standard rates for NTFPs sold on their forests, and to update the rates annually. Under FSH 2409.18_87.51a, national forests may choose to grant individuals free use to special forest products for personal use.

The Southern Region (Region 8) supplement to FSM 2460, effective date May 7, 2002, provides an example of regional direction for NTFP management. It states that the region's objective for NTFP sales is to sell such products "in a cost efficient manner and at fair market value while serving local needs and meeting Forest Land and Resource Management Plan objectives" (R8 Supplement 2400-2002-4, 2467.02). The same supplement also notes that NTFP management measures "shall perpetuate or increase the production of special forest products in

compliance with land and resource management plan objectives and principles of ecosystem management" (R8 Supplement FSM 2467.03.1), and specifies that units in the region will "manage special forest products on a sustainable basis without impairment to the productivity of the land" (R8 Supplement FSM 2467.03.2). It prohibits sales and free use authorizations for plants on the federal threatened and endangered species list (R8 Supplement FSM 2467.03.7). The supplement calls for integration of NTFP sales activities into annual work plans and budgets (R8 Supplement FSM 2467.03.3), and also requires a positive net public benefit from NTFP sales (R8 Supplement FSM 2467.03.4). The Region 8 supplement also calls for forest supervisors to ensure that NEPA documentation takes place for NTFP sales activities and to provide "for administration and monitoring to assure management objectives and permit terms are followed" (R8 Supplement FSM 2467.04.2b and c). The supplement also notes that forest supervisors have the responsibility to "develop direction for the traditional gathering of special forest products by local residents and Native Americans" (FSM 2467.04.2.e.).

The NEPA, The Forest and Rangeland RPA, and the NFMA also shape how the Forest Service incorporates NTFPs into its planning process. Under NEPA, all federal agencies must prepare detailed statements for "major Federal actions significantly affecting the quality of the human environment" (Section 102 (C)). The Forest and Rangeland RPA of 1974 as amended by the NFMA of 1976 requires national forests to develop forestwide plans by using procedures designed to encourage public participation while developing the plans (Section 6).

Additionally, the RPA directed the Secretary of Agriculture to prepare a national renewable resource assessment to be updated every 10 years from 1979 onward (Section 3). Among other things, this assessment must include an analysis of the "present and anticipated uses, demand for, and supply of the renewable resources" (Section 3 (1)), an inventory of "present and potential renewable resources, and an evaluation of opportunities for improving their yield of tangible and intangible goods and services, together with estimates of investment costs and direct and indirect returns to the Federal Government" (Section 3(2)).

The 2004 Final Planning Rule, effective January 5, 2005 (Federal Register 2005), emphasizes the importance of monitoring, not just inventorying, as a central part of the forest planning process. Under the Final Planning Rule, the Forest Service adopts the use of the environmental management system based on International Organization for Standardization (ISO) 14001, an international standard for environmental management. The Final Planning Rule requires (Federal Register 2005: 1033):

> ...each administrative unit to implement an EMS [environmental management system] that includes defined procedures for identifying environmental conditions, keeps that information current, and includes monitoring and measurement procedures for continually evaluating conditions in the unit.

The requirement to conduct monitoring and maintain current information for each management unit exists in addition to the agency's obligation to develop NEPA documents for any of its actions. The Final Planning Rule calls for forest plans to contribute to sustainability, which it conceptualizes as being composed of three elements—social, economic, and ecological (Federal Register 2005: 1059). Although the 2004 Final Planning Rule does not explicitly call for monitoring NTFPs, it does so implicitly through the statement that the goal of the ecological element is to "provide a framework to contribute to sustaining native ecological systems by providing ecological conditions to support diversity of native plant and animal species in the plan area" (Federal Register 2005:1059).

The Forest Service uses a variety of mechanisms to allocate access to NTFPs.

In addition to preparing the forestwide plans mandated under the RPA and NFMA, and the site-specific environmental impact statements and assessments mandated under NEPA, during the 1990s, many national forests in the Pacific Northwest began developing watershed and landscape analyses to meet requirements of the Northwest Forest Plan (USDA FS and USDI 1994).[5] The ecosystem management planning documents differ from environmental impact statements, environmental assessments, and forest plans in that they are categorized as planning documents rather than decision documents and thus are not subject to the public input requirements mandated by NEPA and NFMA.

The Forest Service uses a variety of mechanisms to allocate access to NTFPs on national forest lands, including nonexclusive harvest permits, exclusive leases, stewardship contracts, and stewardship leases. Permits for short-term, nonexclusive access are frequently mentioned in studies of NTFP harvesting on national forests (Emery 1998, Hansis 1998, Love et al. 1998, McLain 2000, Parks and Schmitt 1997, Richards and Creasy 1996). Some national forests require harvesters to obtain permits to gather NTFPs for personal consumption, whereas others have chosen to forgo permits for noncommercial uses (McLain 2000). In the Pacific Northwest, several national forests have experimented with the use of longer term leases that grant holders exclusive access to NTFPs in areas specified in the lease (Lynch and McLain 2003, Thomas and Schumann 1993). Some national forests also regulate

[5]The Northwest Forest Plan is an interagency planning document developed by the USDA Forest Service, the Bureau of Land Management, and the U.S. Fish and Wildlife Service to establish forest management guidelines for the northern spotted owl (*Strix occidentalis caurina*) zone in the Pacific Northwest (USDA and USDI 1994: Volumes I and II).

activities associated with commercial NTFP harvesting, such as camping, buying, or hauling. For example, many national forests in Oregon, Washington, and Montana require mushroom harvesters to camp in designated industrial camp sites, and a few require mushroom buyers to purchase permits to buy wild mushrooms on national forest lands (McLain 2000, McLain et al. 2005, Parks and Schmitt 1997)

The Forest Service also has a history of managing NTFPs by using nonregulatory means, albeit on a limited scale when compared to other resources, such as timber and grazing. Nonregulatory forms of NTFP management include the use of controlled burns and canopy thinning to expand habitat or increase productivity of desired understory species. For example, during the 1960s, Forest Service employees working on the Gifford Pinchot National Forest made efforts to expand production of a socially important huckleberry patch through thinning, slash burning, and scarification (Minore 1972). The Forest Service's Pacific Northwest Research Station subsequently funded experiments of factors affecting huckleberry production in southwestern Washington and northwestern Oregon during the 1970s with the objective of enhancing huckleberry production (Minore et al. 1979). Similarly, Thomas and Schumann (1993) reported that the Chippewa National Forest actively managed a few hundred acres for wild blueberry production, relying on controlled burns in the late fall.

During the past decade, the Forest Service has greatly expanded its active NTFP management efforts, often through collaborative partnerships with interested stakeholders, to include a variety of products in forests around the country. Some examples include applied research on sweetgrass (*Muhlenbergia filipes* [M.A. Curtis] J. Pinson and W. Batson) in South Carolina (Hart et al. 2004), several medicinal plants in the southern Appalachians (USDA FS 2001a), ginseng in the Ozark mountains (Chamberlain 2000), salal (*Gaultheria shallon* Pursh) in western Washington (Ballard 2004), and wild rice (*Zizania* spp.) in the Great Lakes region (Danielsen and Gilbert 2002).

The Forest Service also plays a key role in the federal government's effort to manage nonnative invasive species, some of which constitute NTFPs and others that affect native NTFP species. The agency is a member of the National Invasive Species Council (NISC), which President Clinton established on February 3, 1999, under Executive Order 13112 to "prevent the introduction of invasive species and provide for their control and to minimize the economic, ecological, and human health impacts that invasive species cause" (Federal Register 1999: 6183). As a member of the council, as well as other groups, such as the Plant Conservation Alliance's Alien Plant Working Group, the Forest Service manages, educates the

public, and conducts research on invasive species affecting national forests, other federal lands, and private lands (NISC 2001).

In 1992, the United Nations Conference on Environment and Development (UNCED) called for the world's nations to encourage sustainable forest management as a means to achieve sustainable economic development (UNCED 1992b). Agenda 21, the Rio Declaration on Environment and Development, the key policy document emerging from the UNCED deliberations, laid out nonbinding guidelines for accomplishing sustainable forest management (UNCED 1992a). The guidelines included a specific call for countries to address NTFPs in their forestry planning and management efforts (Tewari 1994).

In 1994, the United States and 11 other countries initiated a series of deliberations, known as the Montreal Process (Montreal Process Working Group 1995). The Montreal Process working group adopted a set of criteria and indicators that provide a common framework for evaluating the sustainability of the participating countries' forest management practices and policies (USDA FS 2004). A diverse set of stakeholders selected by the USDA Forest Service and the U.S. Department of State (USDA FS 2004) contributed jointly to the development of the criteria and indicators ultimately adopted by the Montreal Process working group (USDA FS 2004).

The stakeholder forum from which the Montreal Process Criteria and Indicators were developed subsequently evolved into a forum known as the Roundtable on Sustainable Forests (USDA FS 2004). The roundtable has convened periodically since 1998 to clarify and elaborate on the indicators, to identify means for measuring the indicators, and to develop systems for tracking the indicators at a national level (USDA FS 2004). Tracking indicators involves inventory and monitoring efforts. In 2002, the United States took part in the World Summit on Sustainable Development, and confirmed its intention to continue supporting the criteria and indicators process as a means for evaluating progress toward the principles laid out in Agenda 21 (USDA FS 2004).

In 1999, the UNITED STATES Congress clarified the legal mandate of the USDA Forest Service regarding NTFP management through the addition of a rider, known as Section 339, on P.L. 106-113, the Consolidated FY 2000 Appropriations Act. The rider was entitled "Pilot Program of Charges and Fees for Harvest of Forest Botanical Products" (Antypas et al. 2002). Section 339 included provisions requiring the Forest Service to charge fair market value fees for NTFPs and conduct analyses to ascertain whether NTFP harvesting levels are sustainable. Additionally, Section 339 prohibits the Forest Service from allowing unsustainable harvests and

permits administrative units to retain a portion of the revenues obtained through permit and contract fees.

As Chamberlain et al. (2002) noted, however, few national forests have the staffing levels and requisite knowledge of NTFPs among their current employee base to implement the provisions of Section 339. Similarly, as Emery (1998: 144) observes, the Forest Service's lack of knowledge about NTFPs hampers its ability to adequately fulfill its legal mandates originating in the NEPA and the NFMA to provide for the protection of plant and animal community diversity on national forests (Emery 1998: 144):

> Central to this act [the RPA as amended by the NFMA] and its implications for NTFP management are its requirements that the Secretary of Agriculture conduct and maintain a current inventory of all renewable resources on National Forest lands and provide for public participation in planning for their management. In so doing, the Act broadens the primary duties of the Agency from managing resources as a relatively autonomous body of experts to managing information on those resources and conducting their decision making in an open manner. This places a nearly impossible demand on Agency personnel vis a vis NTFP. There is a general dearth of comprehensive information about the herbaceous layer of forests, from which a majority of NTFP are derived.

Thus, from the mid-1980s onward, internal and external pressures mounted for the Forest Service to expand the scope of its NTFPs programs to include a much broader array of species and products than the historical big three–firewood, posts and poles, and Christmas trees. In response to these pressures, in 1994 the agency began developing a national strategy for NTFPs. In 2001, the agency published a document entitled *National Strategy for Special Forest Products*. The national strategy document outlines "strategic goals and suggests key actions for managing renewable resources associated with special forest products (SFP) within the framework of ecosystem management" (USDA 2001b: iii). It also "provides guidance and direction for the Forest Service to manage SFP resources on National Forest System lands and provide assistance to State and private forest managers." This strategy, along with the provisions outlined in FSH 2409.18 Chapter 80, effective date December 12, 2002, and discussed earlier in this report, constitute the agency's most explicit national policy on NTFP management.

Research Design

This study describes findings derived from a survey of NTFP management distributed to all ranger districts in the National Forest System during 2003. Survey questionnaires are a common data-gathering method used to obtain general information relatively quickly (see Bernard 2002 for a detailed discussion of the history, use, advantages, and disadvantages of survey research). Bernard (2002) notes that self-administered surveys work best when three conditions are met: respondents are literate, the likelihood is high that a large percentage of the potential respondents will return the completed survey, and answering the questions does not require visual aids or face-to-face interaction. Given that we had a reasonable expectation that these conditions could be met, and that we lacked the resources to carry out phone or face-to-face interviews, we adopted the self-administered survey approach to gather data on the Forest Service's NTFP management efforts.

We designed the survey questionnaire to take from 30 to 45 minutes to complete. We included a mix of closed- and open-ended questions. Both the closed- and open-ended questions addressed key themes mentioned in the NTFP literature or issues that the survey designers had observed over many years of meetings, interviews, and participant observation related to NTFP management. Questions included in the survey questionnaire were developed on the basis of the authors' interactions with Forest Service NTFP managers over the course of a decade. Our fieldwork between 1993 and 2003 associated with several NTFP-related projects (Jones 2002, Jones et al. 2004, Love et al. 1998, Lynch and McLain 2003, McLain 2000) included discussions with NTFP managers on national forests and districts in Regions 1, 2, 3, 4, 5, 6, and 8 (i.e., most of the Western and Southeastern United States). Using the information acquired during those visits, we refined the list of questions and the phrasing of each question. In addition, senior Forest Service managers and researchers provided feedback on the question sets prior to the survey's distribution.

A key weakness of closed-ended questions is that they result in information only about a specific set of predetermined items (Bernard 2002). As a result, the closed-ended question format usually does not provide a way for informants to easily share other information that they might consider more relevant or more important. We thus used open-ended questions for those aspects of NTFP management where the range of possible answers was difficult to determine in advance given the geographic scope of the survey.

The USDA Forest Service is a large multilevel agency that was undergoing office consolidations and closures throughout the period in which the surveys were administered. The size and shifting nature of the agency led us to approach the

national headquarters to distribute the survey. We sent the survey out as an email attachment from the Washington office under a directive signed by the Associate Deputy Chief. The email survey was distributed to all district rangers in the system. By 2003, the Forest Service had developed a culture of using email to communicate within the agency, and thus one could reasonably assume that email would be an effective method for delivering the survey. We conducted one round of followup emails 2 months after the initial survey to elicit responses from districts that had not submitted a response to the initial email request.[6] The limited funding available for the study precluded additional followup, as well as an investigation of nonresponding districts to determine how those districts might have differed from responding districts in their responses.[7]

Study Objectives and Survey Topics

We viewed this survey as an exploratory data-gathering process aimed at constructing a rudimentary picture of the Forest Service NTFP programs across the country. We asked respondents to provide information on the following aspects of NTFP management (app. 1):

- Major types of products harvested.
- Types of mechanisms used for allocating access to different categories of NTFPs.
- Presence of NTFP concerns in key planning and decision documents.
- Presence of NTFP program managers and law enforcement.
- Presence of NTFP inventory and monitoring.
- Barriers to implementing NTFP inventory and monitoring.
- Presence of systems for tracking the effects of NTFP management on biodiversity.
- Managers' familiarity with the USDA Forest Service national NTFP strategy.
- Managers' familiarity with three information resources developed through collaborative partnerships between the USDA Forest Service and the Institute for Culture and Ecology (i.e., two books and one Internet database).
- Barriers to and opportunities for including harvesters in NTFP inventory and monitoring.
- Barriers to expanding commercial NTFP harvesting on national forest lands.

[6] A more rigorous followup effort would likely have yielded a higher response rate; however, the methods used are adequate for an exploratory study.

[7] Determining response bias is critical when implementing a statistically robust survey design; it is, however, not necessarily indicated for an exploratory survey.

Units of Analysis

Selecting the appropriate administrative units for analysis was complicated, and involved making a difficult tradeoff. Ranger districts and national forests constituted the two logical choices for analysis units.[8] We did not include national grasslands or stand-alone national recreation areas in the analysis owing to the added complexity their inclusion would have meant for analysis and the limited time and funding available. The question we faced was whether to administer the surveys to the individual ranger districts and then aggregate the district data to the national forest when reporting our findings, or administer the surveys directly to the national forest units and avoid the complications of aggregating that data to national forests.

Ranger districts are administrative subunits of national forests, and thus are dependent on forest and regional directives for guidance. However, historically, district rangers and their staffs have enjoyed considerable autonomy from both forest supervisor and regional offices in their day-to-day decisionmaking. The Forest Service tends to establish broad management and policy guidelines at the national, regional, and forest level. The agency then grants the ranger districts leeway in developing local practices as long as they fit within the framework of those guidelines. Ethnographic fieldwork on the part of the research team members prior to and during the surveys indicated that district managers often are more familiar with on-the-ground NTFP harvesting activities than are national forest managers (Jones 2002, Jones et al. 2004, McLain 2000). Because most of the interaction between harvesters and foresters takes place at the district level, we opted to administer the survey to districts.[9]

On the other hand, conducting a survey of district NTFP managers posed a number of logistical and analytical difficulties. The Forest Service has undergone a series of administrative consolidations during the past two decades, with some districts combining some of their functions and others becoming essentially one administrative unit while maintaining separate public identities. Determining which districts are administratively separate entities and which are linked (and how they are linked) administratively with neighboring districts is very time-consuming.[10] We opted to aggregate district data into national forest data for analysis to address this issue, and the needs of managers and policymakers for forest-level reporting.

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[8]The number of ranger districts per forest differs greatly, ranging from 2 or 3 in many national forests to as many as 10 in the Humboldt-Toyaibe National Forest in Nevada.

[9]Chamberlain's (2000) and Emery's (1998) work in eastern national forests supports the notion that districts constitute the primary point of interface between harvesters and the Forest Service.

[10]A number of national forests also have combined administrative functions during the past decade.

However, as we did not obtain data or a response from every district for every forest, the aggregated data constitute only a partial representation of what is taking place on the reporting national forests.[11] Thus, we report only presence data for forest analyses. For example, with our data set we can make statements such as "Respondents from 60 percent of the reporting national forests listed berries as important products." However, because the forest data are partial for many cases, we cannot draw the conclusion that respondents on the remaining 40 percent of reporting forests do not consider berries an important product.

Response Rates

We received responses for 218 of 531 ranger districts, a district response rate of 41 percent (app. 2). These districts were distributed across 81 national forests. In addition, staff from three national forest supervisors offices (George Washington-Jefferson, Modoc, and Nez Perce) did not provide district breakdowns in their answers. Including the responses from these three forests with the 81 national forests from which we had district responses, 84 national forests, or 77 percent of national forests, participated in the survey.[12] [13] Regional response rates for the national forests are described in table 2. Limited financial resources did not permit us to conduct a sample survey of nonresponding districts to determine how their programs differed from responding districts. Our conclusions thus apply only to those districts and forests that responded to the survey and cannot be generalized to all districts or forests in the National Forest System. In the following sections, we provide regional breakdowns for some of the survey answers. However, because we did not use a random sample approach to gathering the data, it is not possible to determine whether the differences among national forests in different regions are statistically significant or merely the result of random variation within small sample sizes.

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[11] Tim Max, statistician with the Pacific Northwest Research Station, advised that as we were tallying results on a presence basis only, aggregating to national forests constituted the best approach to analyzing the data set.

[12] We contacted each of the regions to obtain figures for the number of ranger districts and national forests. This process yielded a list of 531 ranger districts and 109 national forests. The district and forest response rates are within the standard expectations of 30 to 40 percent for a mail survey (Parfitt 1997).

[13] The USDA FS Internet home page (USDA FS 2005a) states that the National Forest System comprises 155 national forests and 20 grasslands. A list of the forests and grasslands is located at www.fs.fed.us/intro/directory/nfs.html (USDA FS 2003). In practice, several national forests, such as the Okanogan and Wenatchee, have combined their administrative functions. We excluded all of the national grasslands and treated any combined forests as one national forest. This process yielded 109 as the base figure for the total number of national forests in 2003.

Table 2—Survey response rate by region

Region	Total national forests	National forests with at least one district response	Response rate
			Percent
1	12	8	75
2	11	9	82
3	11	8	73
4	13	8	62
5	17	11	65
6	16	12	75
8	13	13	100
9	14	13	93
10	2	2	100
All	109	84	77

Data Processing and Analysis

We began analyzing the survey results by entering the responses into a spreadsheet. We copied the information from each questionnaire directly into the spreadsheet, including full text responses to the open-ended questions. Given the quantity and length of some of the responses, we then developed coding systems to handle the text answers. The code lists were arrived at through independent coding by two researchers, who then reconciled differences on a case-by-case basis to produce one master list. They then coded the remaining questionnaires by using the master list.

We used the spreadsheet's sorting function to assist us in aggregating the district data into forest data. We then transferred the forest data into a statistical database for further analysis.

We also developed a district database to analyze the questions dealing with district data, such as presence of a district NTFP coordinator and district-level NTFP law enforcement, which we could not easily aggregate into forest data. We then ran frequency distributions and cross-tabulations on key variables by using the data analysis function within the software program. We excluded missing values from all calculations.

Limitations of the Study

Bernard (2002) noted that self-administered questionnaires reduce interviewer bias, as all respondents answer the same questions. However, in a self-administered

survey, the survey designers have no control over how people interpret the questions and are not available to clarify questions. As a result, the findings need to be treated cautiously. For example, many respondents indicated that their districts collaborate with harvesters in NTFP management. However, collaboration is a broad term that could encompass a variety of agency-harvester interactions, ranging from casual conversations between NTFP program managers and people seeking NTFP harvesting permits to complex, participatory inventory and monitoring of NTFP species.

The survey findings provide only a coarse-grained snapshot of what NTFP programs on the reporting national forests look like. Other research methods, geographically limited case studies, or stratified random sample surveys would capture more of the complexity of these programs.

NTFP Products or Species

During the past two decades, scientists have published a number of studies about NTFP harvesting and management in the United States. However, most studies encompass relatively small geographic areas, such as portions of states (Danielsen and Gilbert 2002, Emery 1998, Fisher 2002, Hansis 1998, London 2002, Love et al. 1998, McLain 2000, Weigand 1997) or a geographical region or two (Chamberlain et al. 2002, Hosford et al. 1997, Schlosser and Blatner 1995, Schroeder 2002).[14] Consequently, we were interested in clarifying the extent to which NTFP harvesting takes place on public forests throughout the United States.[15] We thus asked survey respondents to list the five most important NTFPs harvested on their district or forest. We purposefully did not define the term "nontimber forest product" so

[14] Teel and Buck's (2002) work on agroforestry and NTFPs addresses four regions (the Pacific Northwest, the Midwest, the Northeast, and the Southeast).

[15] The surveys measure only the extent to which national forest employees are aware of NTFP harvesting taking place on the lands they administer. In practice, our fieldwork (Jones 2002, Jones et al. 2004, McLain 2000) and similar work by Emery (1998) in Michigan's Upper Peninsula strongly suggest that many forest managers are unaware of the extent of NTFP harvesting taking place on the lands they manage. The harvesters interviewed during that study mentioned 473 products and species (Jones et al. 2004).

as to avoid biasing the results by imposing on the respondents our concept of what constitutes an NTFP.[16]

Respondents listed 132 products or species (see app. 3 for a full list of the products and species).[17] To facilitate analysis of the data set, we grouped the products and species into 21 categories (table 3). We could not calculate the total number of botanical species encompassed by the product lists because most respondents used generic product terms, such as moss, floral greens, or bark that potentially consist of many species.[18] Additionally, respondents provided information only about the five NTFPs that they considered most important for their district or forest, rather than a comprehensive list of every product or species harvested. The number of products or species actually harvested on national forests around the country is thus likely higher than the number of products and species mentioned.[19]

The survey data demonstrate that NTFP harvesting takes place in all regions of the United States.

The survey data demonstrate that NTFP harvesting takes place in all regions of the United States. Figure 2 depicts the percentage of reporting national forests for which at least one respondent mentioned various types of NTFPs among the five most important NTFPs. Firewood, posts and poles, and Christmas trees figured

[16] The term "special forest products" was the dominant term in use by the Forest Service at the time we conducted the survey. We thus used the term in the survey itself, although we use the term NTFP in this analysis. Adding a definition would have imposed outside categories on the respondents. Our fieldwork suggests that, despite official agency definitions, field managers treat a variety of products as SFPs. Some field managers include sand, rock, and gravel in their conceptions of what constitutes an SFP even though the authority for managing such products comes under different CFRs than for vegetative products (i.e., minerals fall under 36 CFR 228.62 and FSM 2852). Others include ceremonial house logs, very small amounts of timber (known in the West as salvage logs), antlers, and insects in their conceptions of what constitutes an NTFP, even though such products are explicitly excluded in the agency's definition of NTFPs. By not imposing a definition, we were much more likely to capture a full range of variation of what field managers actually consider NTFPs. Moreover, on many districts there is no special forest products program per se. On some districts, NTFPs are managed through the small sales program; on other districts they are managed through special uses programs, on still other districts they are managed through the cultural resources program. The products conceptualized as "special forest products" thus may differ based on the type of program such products are managed under.

[17] The full product list consists of the terms used by the respondents. Some of the terms potentially entail overlap (i.e., boughs and boughs-conifer may refer to the same product). However, some of the terms that appear to refer to the same product (i.e., boughs-cedar and boughs-conifer) could also represent two distinct products (for example, boughs-cedar could refer to boughs harvested for grave blankets, whereas boughs-conifer could refer to noble fir boughs used to make wreaths). Moreover, terms such as "mushrooms" and "medicinal plants" could, and most likely do, encompass multiple species.

[18] Both product and species data are important, as multiple products can be derived from one species.

[19] In a study of NTFP harvesting on the Hiawatha National Forest, Emery (1998) found that Forest Service employees could list only six NTFP products that people harvested on the forest. In contrast, the harvesters she interviewed named 138 NTFPs derived from 100 different species (Emery 1998).

Table 3—Nontimber forest product categories

Product categories		
Animal products[a]	Craft wood[c]	Mushrooms
Bark	Edible plants	Needles
Botanical specimens	Firewood	Sand, rock, and gravel[d]
Boughs	Floral greens	Saps and resins
Christmas trees	Medicinal plants	Seeds
Cones	Miscellaneous plants	Transplants
Construction wood[b]	Moss	General/miscellaneous

[a]Most definitions of NTFPs exclude animal products, such as hides, furs, and meat. However, several respondents mentioned deer and elk antlers in the surveys.

[b]Many national forests conduct sales of very small quantities of logs through their NTFP programs. In many cases, the logs are harvested for special uses, such as cedar logs for building traditional canoes by northwestern Indian tribes or oak logs for the construction of ceremonial structures by members of southwestern Indian tribes.

[c]Many national forests also sell very small quantities of wood used as raw materials for craftwork. For example, national forests in the Pacific Northwest often sell stumps and burls to small-scale furniture makers.

[d]Most definitions of NTFPs are restricted to botanical products; however, many national forests manage sand, rock, and gravel under their NTFP programs.

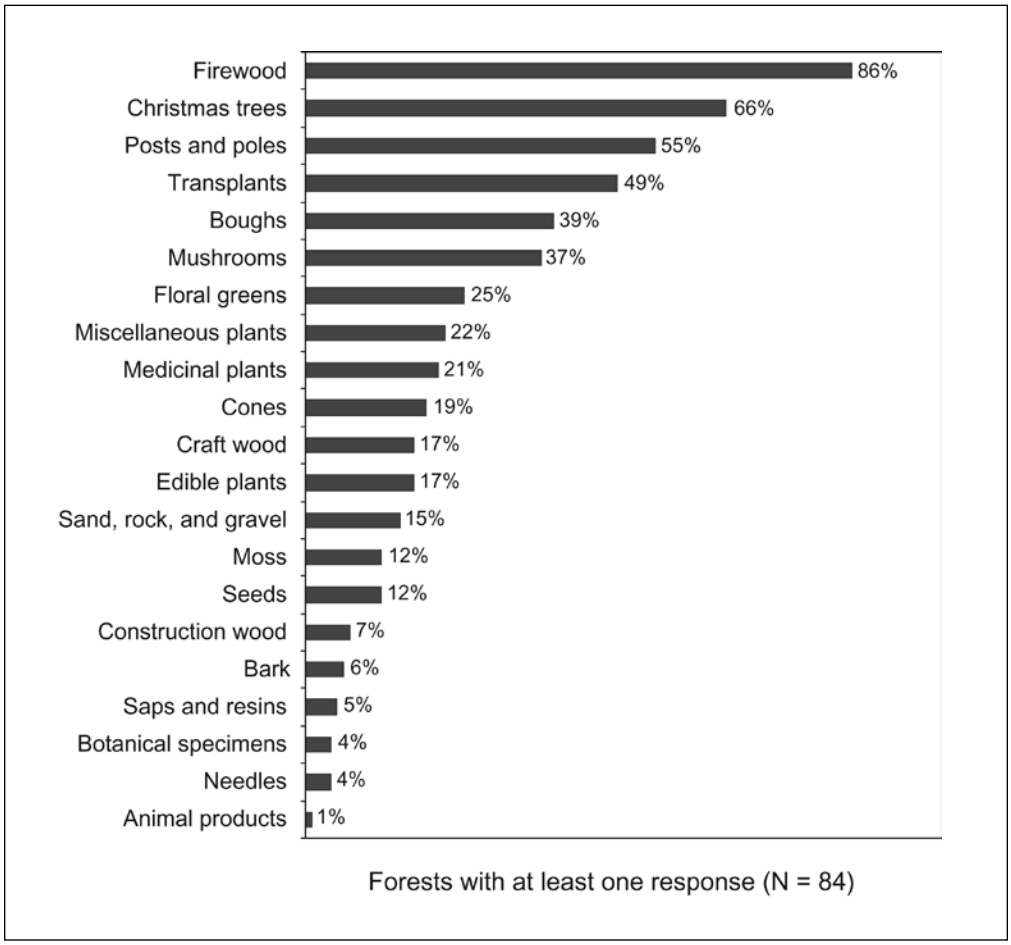

Figure 2—Products harvested on national forests.

on the lists of the five most important NTFPs on 50 percent or more of the reporting national forests (table 4). Transplants, boughs, and wild mushrooms appeared as important products on between one-third to one-half of the reporting national forests. All of the remaining product categories were listed as among the most important NTFPs by less than one-third of national forests.

An analysis of the product categories listed by region revealed regional differences (table 5). For example, respondents listed Christmas trees as important products on the reporting forests in all regions except the Southern United States (Region 8). Posts and poles, which reporting national forests in most regions listed as important, were mentioned by respondents from only a small percentage of the reporting forests in Region 9 (Northeast). Mushrooms figured commonly as important NTFPs on reporting national forests in just three regions, all in the West. Cones appeared as important products in relatively few of the reporting forests in most regions, but were listed by respondents from most of the Pacific Southwest forests (Region 5). Respondents from more than half of the reporting Southern forests (Region 8) mentioned both miscellaneous plants and medicinal plants among the important NTFPs harvested on their forest, but only a small percentage of respondents from other parts of the country listed medicinal plants as important.

Table 4—Five most frequently listed NTFP product categories by region

Region 1	Region 2	Region 3	Region 4	Region 5
Firewood	Firewood	Firewood	Posts and poles	Christmas trees
Post and poles	Transplants	Posts and poles	Firewood	Cones
Christmas trees	Posts and poles	Christmas trees	Christmas trees	Firewood
Transplants	Christmas trees	Transplants	Transplants	Mushrooms
Mushrooms	Rock, sand and gravel; seeds[a]	Boughs; edible plants; miscellaneous plants; mushrooms; seeds[a]	Boughs	Posts and poles; boughs[a]

Region 6	Region 8	Region 9	Region 10[b]	All regions
Firewood	Firewood	Firewood	Craft wood	Firewood
Christmas trees	Misc. plants	Christmas trees	Boughs	Christmas trees
Mushrooms	Medicinal plants	Medicinal plants	Bark	Posts and poles
Floral greens	Craft wood	Mushrooms	Edible plants	Transplants
Transplants; posts and poles[a]	Posts and poles; transplants[a]	Boughs	Firewood	Edible plants

[a] Products with identical percentages within specified region.
[b] Data available for only one forest.

NTFP Program Administration and Enforcement

A major theme in the NTFP literature is the lack of capacity within the Forest Service to administer NTFP programs and enforce regulations governing NTFP harvesting and buying activities (Anderson et al. 2000, Chamberlain et al. 2002, Jones et al. 2004, Lynch and McLain 2003, McLain 2000, Parks and Schmitt 1997, Richards and Creasy 1996, Robbins 1999). Our research during the 1990s on Forest Service NTFP programs in Region 6 (Washington and Oregon) indicated that districts differed considerably with respect to the personnel allocated to NTFP management.[20] For example, some districts invested resources in funding full-time

[20]One of the authors participated in meetings of the Western Oregon Special Forest Products Council, an ad hoc committee composed of Forest Service and Bureau of Land Management employees between 1994 and 1998, and in regionwide NTFP conferences held in 1994, 1995, and 1998. Two of the authors organized and participated in a regionwide NTFP conference for Forest Service employees and harvesters in 2002. Two of the authors also conducted ethnographic research on wild mushroom policies and management practices in the Pacific Northwest, including those applied to national forest lands, between 1995 and 2002 (McLain 2000, 2002; Jones 2002).

Table 5—Distribution of NTFP product types by region

	National forests in region with at least one response									
Product type	**R1 (N=8)**	**R2 (N=9)**	**R3 (N=8)**	**R4 (N=8)**	**R5 (N=10)**	**R6 (N=12)**	**R8 (N=13)**	**R9 (N=13)**	**R10 (N=2)**	**All (N=83)**
	Percent of participating national forests									
Animal products	0	0	0	0	10	0	0	0	0	1
Bark	0	0	0	0	10	8	0	15	50	6
Botanical specimen	0	0	0	0	20	0	8	0	0	4
Boughs	50	22	25	38	50	42	31	39	100	39
Edible plants	13	0	25	25	0	17	23	23	50	17
Christmas trees	75	67	88	88	70	83	15	69	50	66
Cones	0	11	13	13	70	17	31	0	0	19
Construction wood	0	22	13	13	0	0	8	8	0	7
Craft wood	0	22	13	13	0	8	46	8	100	17
Firewood	100	89	100	88	60	92	77	92	50	86
Floral greens	13	11	13	13	40	58	23	23	0	25
Misc. plants	0	11	25	13	10	17	54	31	0	22
Moss	0	0	13	0	10	0	39	23	0	12
Medicinal plants	0	11	13	0	10	8	54	46	0	21
Rock, sand, gravel	25	33	13	25	10	0	0	23	0	15
Mushrooms	63	22	25	25	60	67	8	39	0	37
Needles	0	0	0	0	0	0	23	0	0	4
Saps and resins	0	0	0	0	0	0	0	31	0	5
Posts and poles	88	78	100	63	50	50	39	23	0	55
Seeds	0	33	25	25	20	0	0	8	0	12
Transplants	63	89	88	75	10	50	39	23	0	49

or near full-time employees to coordinate their NTFP programs, whereas others allocated little or no funding specifically for NTFP management responsibilities. Similarly, some districts had worked out strategies, often in collaboration with county and state law enforcement agencies, to support law enforcement efforts aimed specifically at enforcing rules governing access to NTFPs. As described earlier, the primary access allocation mechanisms include permits, leases, sales contracts, and stewardship contracts. Enforcement thus centers around ensuring that harvesters obtain legal authorization to harvest NTFPs and that they comply with conditions associated with their permit, lease, or contract. In addition, some Forest Service ranger districts or national forests actively regulate camping and buying activities associated with NTFP harvesting on national forest lands.

We reasoned that the presence of an NTFP coordinator, NTFP law enforcement, or both on a district serves as an indicator, albeit limited, of the district's capacity to administer and enforce its NTFP program. We thus asked respondents to the surveys to indicate whether their district has an NTFP coordinator and an NTFP law enforcement program. To determine whether there have been changes in the volume of NTFP permitting over time, we also asked respondents to indicate whether their district issued more or fewer permits between 1999 and 2003. We selected 1999 as the base year owing to the possibility that some ranger districts might have changed their permitting practices in response to the passage of Section 339 legislation in 1999 regarding botanical forest products.

NTFP Coordination and Law Enforcement

Respondents for 66 percent of the reporting districts stated that their district had a designated NTFP coordinator (fig. 3).[21] [22] As indicated in figure 3, the regions differ substantially in terms of the percentage of reporting districts with NTFP coordinators. Regions 2 (Rocky Mountain), 5 (Pacific Southwest), and 9 (Eastern) had the smallest percentage of districts with NTFP coordinators; Regions 1 (Northern), 6 (Pacific Northwest), and 10 (Alaska) had the highest percentage of districts with NTFP coordinators.

Sixty-one percent of the responding districts reported the presence of district-level law enforcement for NTFPs (fig. 4). The percentage of districts listing district NTFP law enforcement was lowest in Regions 2 (Rocky Mountain), 5 (Pacific

[21] The questions analyzed in this section deal specifically with district-level NTFP program coordination and law enforcement. We thus analyzed the data solely for districts rather than aggregating to national forests.

[22] Our experience with NTFP programs in Region 6 during the past 10 years suggests that full-time positions dedicated to NTFP programming are rare. Most NTFP coordinators carry out NTFP-related activities as part of a set of broader resource management responsibilities.

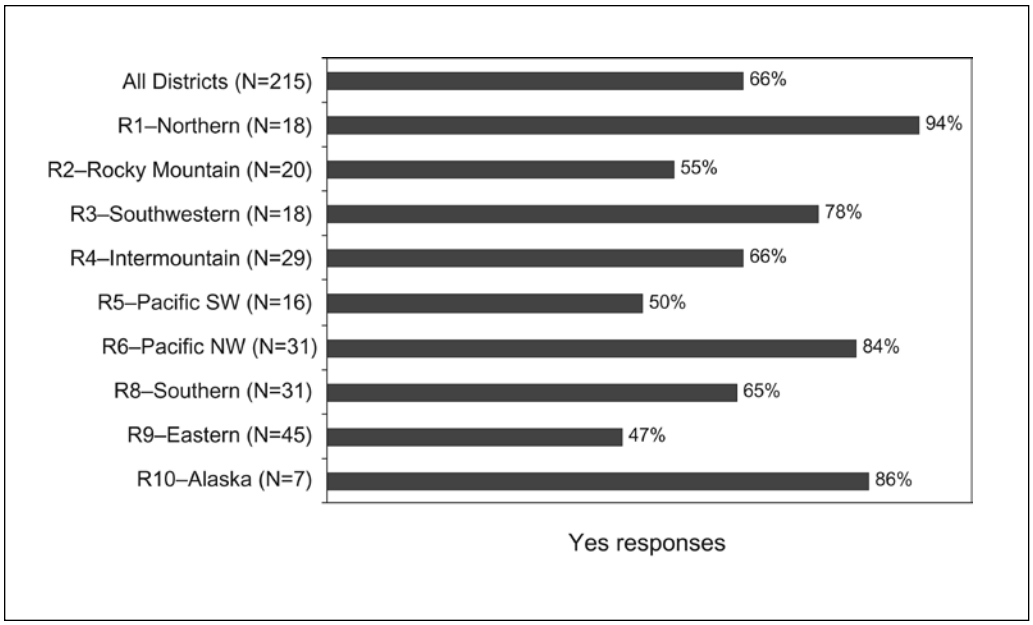

Figure 3—Presence of district-level NTFP coordinators by region.

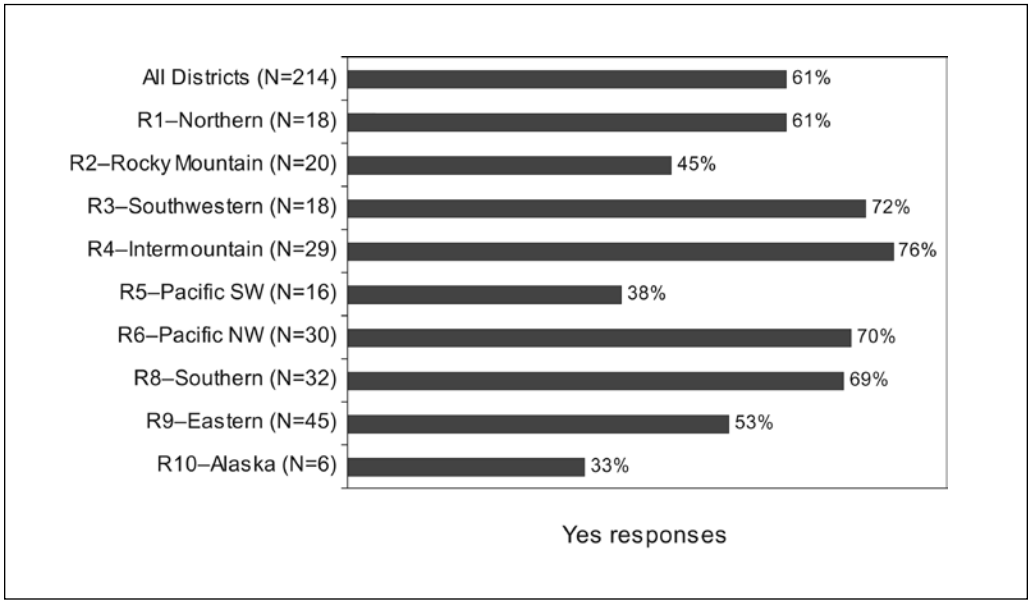

Figure 4—Presence of district-level NTFP law enforcement by region.

Southwest), and 10 (Alaska) and highest in Regions 3 (Southwestern), 4 (Intermountain), 6 (Pacific Northwest), and 8 (Southern).[23]

NTFP Permitting Changes

Respondents from 50 percent of the districts reported an increase in the number of permits they had issued, whereas respondents from 46 percent of the districts noted a decline (fig. 5). The remaining respondents indicated either that permit activity had remained stable or did not know what changes had taken place.

The regions differed in terms of changes observed in NTFP permitting levels. Many of the regions in the Western United States noted an increase in the number of NTFP permits. In contrast, most of the districts in the Eastern and Midwestern United States stated that the number of NTFP permits issued had decreased. The survey data do not permit us to determine whether declines in permitting activity were due to a decline in demand for NTFP products or to changes in district policies that restricted the issuance of permits. Likewise it is unclear whether the reported increases in permitting activity were due to an increase in the number of people harvesting NTFPs, to changes in district policies that required permits for activities previously allowed to take place without permits, or to an improvement in the districts' capacity to ensure compliance with permit requirements.

NTFPs in Resource Management Planning

The Forest Service has an implicit mandate under a variety of statutes, including the NEPA and NFMA, to include discussions of NTFPs in forest planning documents. These documents include, among others, forest plans (also referred to as land and resource management plans), environmental impact statements, environmental assessments, and a host of other large- and small-scale planning documents, such as watershed analyses, social impact assessments, landscape analyses, and biological assessments. We included several questions on the survey about the inclusion of NTFPs in commonly used planning documents. We also incorporated a question about the existence of NTFP documents.

Incorporation of NTFPs in Forest Planning Processes

Forest plans constitute the key documents guiding management decisions on national forests. Respondents on 87 percent of the reporting national forests indicated that their forest plan included discussion of NTFPs (fig. 6). Respondents on 67 percent of the reporting national forests stated that their forest included NTFPs

[23] As with NTFP program coordination, it is likely that most NTFP law enforcement takes place within the framework of broader law enforcement duties.

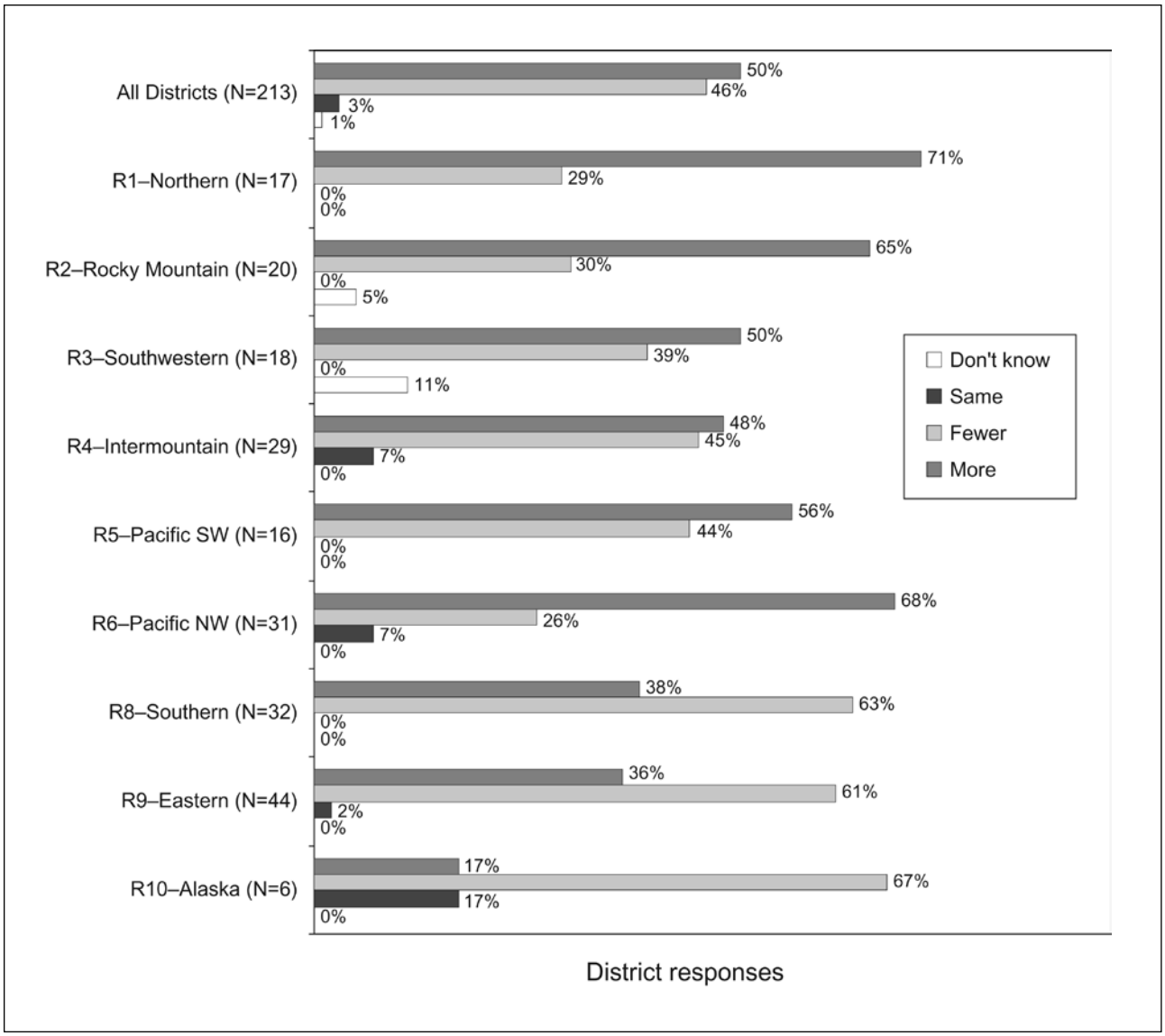

Figure 5—Changes in number of permits, 1999 to 2003.

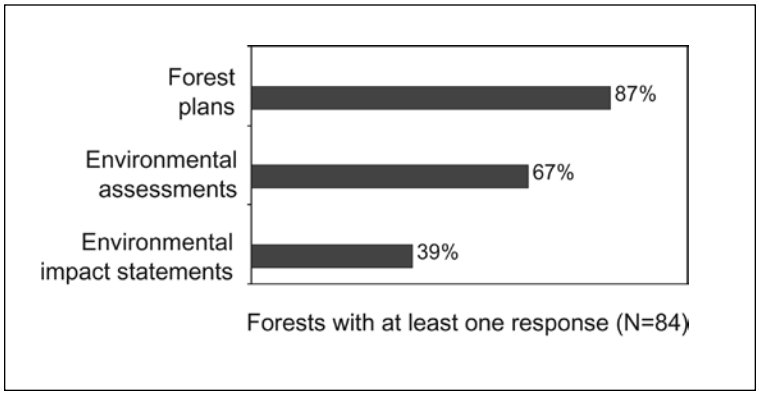

Figure 6—Inclusion of NTFPs in forest planning documents.

in environmental assessments (EA).[24] Respondents from only 39 percent of the reporting national forests, however, indicated that their forest included NTFPs in environmental impact statements. Reporting national forests in Regions 1, 3, and 4 had the highest rates of inclusion of NTFPs in the three major planning processes, whereas reporting national forests in Regions 5 and 9 had the lowest rates (fig. 7).

Respondents also indicated that their forests addressed NTFP considerations in a broad spectrum of other planning documents (table 6). These ranged from documents needed to fulfill ESA and NEPA mandates to regional-level planning requirements (e.g., watershed analyses, landscape analyses, and social impact assessments) to fuel treatment and product management plans.

[24] Federal agencies conduct environmental assessments to determine if the potential social and ecological impacts of a site-specific management activity (e.g., logging, thinning, controlled burning, campground construction) warrant detailed examination through the development of an environmental impact statement (EIS).

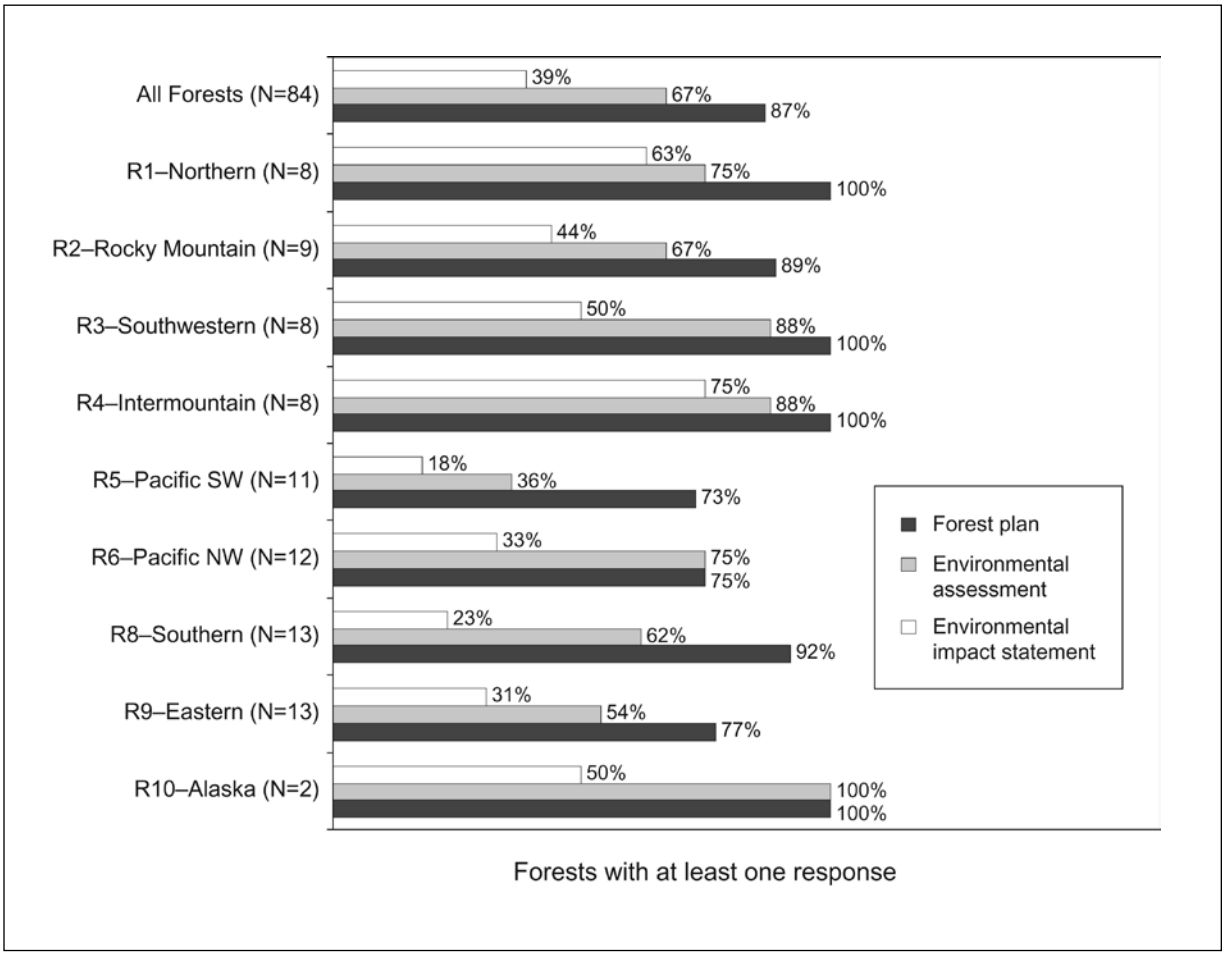

Figure 7—Inclusion of NTFPs in forest planning documents by region.

Table 6—Types of planning documents in which NTFPs are included

ESA[a] documents	NEPA[b] documents	Analyses and assessments (other than ESA)	Other documents
Biological assessment	Categorical exclusion	Adaptive management area analysis	District special forest product program plan
Biological evaluation	Decision memo	Cultural analysis	Forest plan supplement
Jeopardy documents	NEPA documents (site-specific)	Landscape analysis	Fuelwood action plan
		Ozark-Ouachita Highlands assessment	Memoranda of understanding with tribal governments
		Project analyses	Moss analysis
		Roads analyses	Stand exams (lycopodium and fern)
		Social impact assessment	Timber theft prevention plan
		Subsistence analysis	Wild and scenic river plan
		Watershed analysis	

[a]Endangered Species Act
[b]National Environmental Policy Act

NTFP Planning Documents

Respondents on 42 percent of reporting national forests indicated that their forest or district had prepared planning documents focused specifically on NTFPs. Survey respondents listed a wide spectrum of NTFP planning documents, ranging from site-specific biological and environmental assessments to forestwide NTFP policies and monitoring plans (table 7).

Differences exist between regions in the degree to which reporting forests have developed NTFP planning documents, such as wild mushroom EAs, categorical exclusions for medicinal plants, and district and forest NTFP strategic plans (fig. 8). For example, respondents from almost two-thirds of the reporting forests in Region 4 (63 percent) stated that their forests had developed such plans, compared to only 9 percent of the reporting forests in Region 9.

Forest Managers' Sources of Knowledge About NTFPs

We included questions regarding resource managers' familiarity with selected NTFP information resources. We also asked respondents to provide information about NTFP inventory and monitoring efforts on their forests, as well as their

Table 7—NTFP planning documents

Types of planning documents
Biological evaluations
Budget plan
Categorical exclusions
Decision memos
Environmental analyses
Environmental assessments
Fuel treatment/fire plan
Forest monitoring plan
Interim special forest products policy
NEPA documents (unspecified)
NEPA documents (unspecified)
Product plans (firewood, Christmas trees, boughs, post and poles, log moss)
Postfire harvest plan for mushrooms
Management situation analysis
Viability analysis
Vegetation management analysis

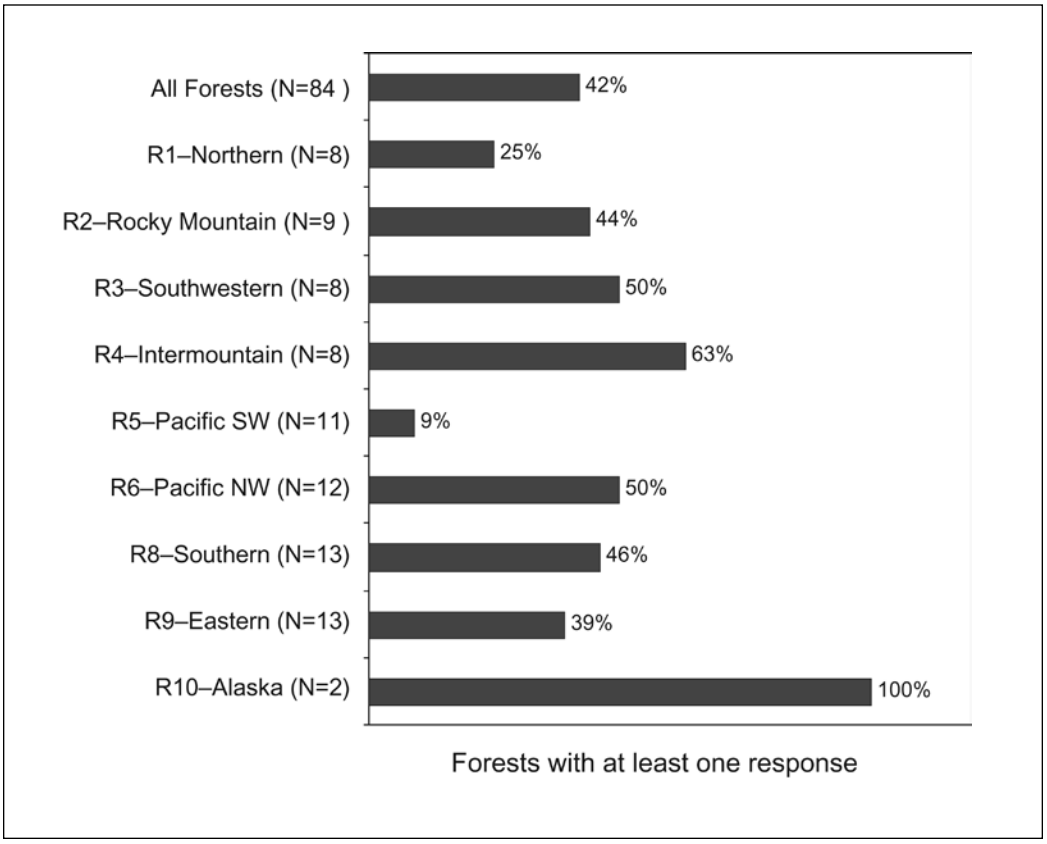

Figure 8—Existence of NTFP-specific planning documents by region.

perceptions of the contribution harvesters make, or could make, to NTFP management. The questions included yes-no and open-ended questions on the following topics:

- Familiarity with selected published and Internet resources on NTFP management.
- Inventory and monitoring of NTFP species.
- Monitoring the ecological impacts of regulatory and nonregulatory NTFP management.
- Views about involving harvesters in inventory and monitoring.
- Views about harvesters as a source of NTFP knowledge for management.
- How personnel are already collaborating with harvesters.

Managers' Familiarity With Selected Resources on NTFP Management and Policy

During the late 1990s and early 2000s, the Forest Service and the Institute for Culture and Ecology collaborated in the development of two texts and a Web site on NTFP management.[25]

We asked respondents if they had read the two texts, *Nontimber Forest Products in the United States* (Jones et al. 2002) and *Non-Timber Forest Products: Medicinal Herbs, Fungi, Edible Fruit and Nuts, and Other Natural Products from the Forest* (Emery and McLain 2001). Both texts emerged from a multiorganizational, multiyear national assessment funded in part by the Forest Service. Fewer than 20 percent of the reporting national forests had even one respondent who had read either book.

We included a question on another product of the national assessment effort noted above, the Web site, "Nontimber forest products: United States" (www.ifcae.org/ntfp/). Created in 1999, the Web site contains a national NTFP species database and an NTFP bibliographic database including all records from the Forest Service publication, *Conservation and Development of Nontimber Forest Products in the Pacific Northwest: An Annotated Bibliography* (von Hagen et al. 1996). At least one respondent from 25 percent of the reporting national forests stated that they had visited the Web site.

During the 1990s, the Forest Service developed and circulated a draft strategy for NTFPs, a document that the agency eventually published in 2001 under the title,

[25] Other Web-based information resources on NTFPs available in 2003, but not addressed by this survey, included NTFP Web sites developed by Virginia Polytechnic University and the University of Minnesota.

National Strategy for Special Forest Products (USDA FS 2001b). The developers of the strategy envisioned the document as a guiding framework for the agency's NTFP management program (USDA FS 2001b: v). The authors also viewed the strategy as a potential resource for state, tribal, and private forest managers (USDA FS 2001b: v). Forty-three percent of the reporting national forests had at least one respondent who had read the strategy.

Knowledge From NTFP Inventory and Monitoring Efforts

Inventory and monitoring are important mechanisms by which natural resource managers and policymakers can potentially obtain information regarding the status of NTFP species. Inventorying is the process of quantifying single or multiple species in an area, whereas monitoring is the process of observation over time to detect changes (Kerns et al. 2002b: 238). Monitoring is done to determine whether a management action needs to be taken or changed, and typically monitoring efforts focus around measuring key indicators related to criteria of management change. Longitudinal data assembled through monitoring permits the identification of trends, which provide information about what management strategies or tactics (in some cases, doing nothing) will work to bring about the changes needed to attain a desired condition.

Inventory and monitoring data are part of the foundation of scientific knowledge for informing sustainable forest management (Kerns et al. 2002a, 2002b). Therefore, we asked survey respondents if NTFP inventorying or monitoring took place on their districts.[26] If they indicated yes, we requested additional information regarding the species or products inventoried or monitored, methods used to conduct inventories and monitoring, and the types of employees, volunteers, or contractors responsible for doing the work. This information served as an indicator of the extent to which forest managers have access to locally relevant, systematically gathered data for NTFP management.

Respondents from 36 percent of the reporting national forests indicated that NTFP inventories take place on their forests, and respondents from 60 percent of

[26] Inventory and monitoring (I&M) on districts can involve a number of administrative layers. Some districts conduct inventory and monitoring on their own; in other cases, the national forests and regions are the major implementers and funders of I&M projects taking place on ranger districts. In still other cases, multiple players, including districts, national forests, and regions are involved. In some situations, organizations other than the Forest Service also play key roles in developing and implementing inventory and monitoring on districts. For these reasons, we deliberately left the question open as to the scale at which the I&M taking place on the district was occurring (i.e., respondents could, and did, include I&M efforts occurring on their districts but initiated and supported at other administrative levels).

the reporting national forests indicated that NTFP monitoring occurred. On forests where inventories occurred, firewood was the NTFP most commonly inventoried (fig. 9), followed by posts and poles and Christmas trees.[27]

Figure 10 shows a breakdown of NTFP inventory and monitoring efforts by reporting national forests within each region. Forests from the Southwestern Region (Region 3) had the highest incidence of both inventories (63 percent) and monitoring (88 percent). The forests from the Pacific Southwest (Region 5) had the lowest incidence of inventories (27 percent) and monitoring (27 percent).

[27]Respondents from 25 percent of the reporting national forests reported that they inventoried tree products, and respondents from 14 percent of the reporting forests indicated that inventories for general NTFPs took place. However, we could not accurately categorize the specific products included in these general terms, and thus opted to leave them out of the analysis.

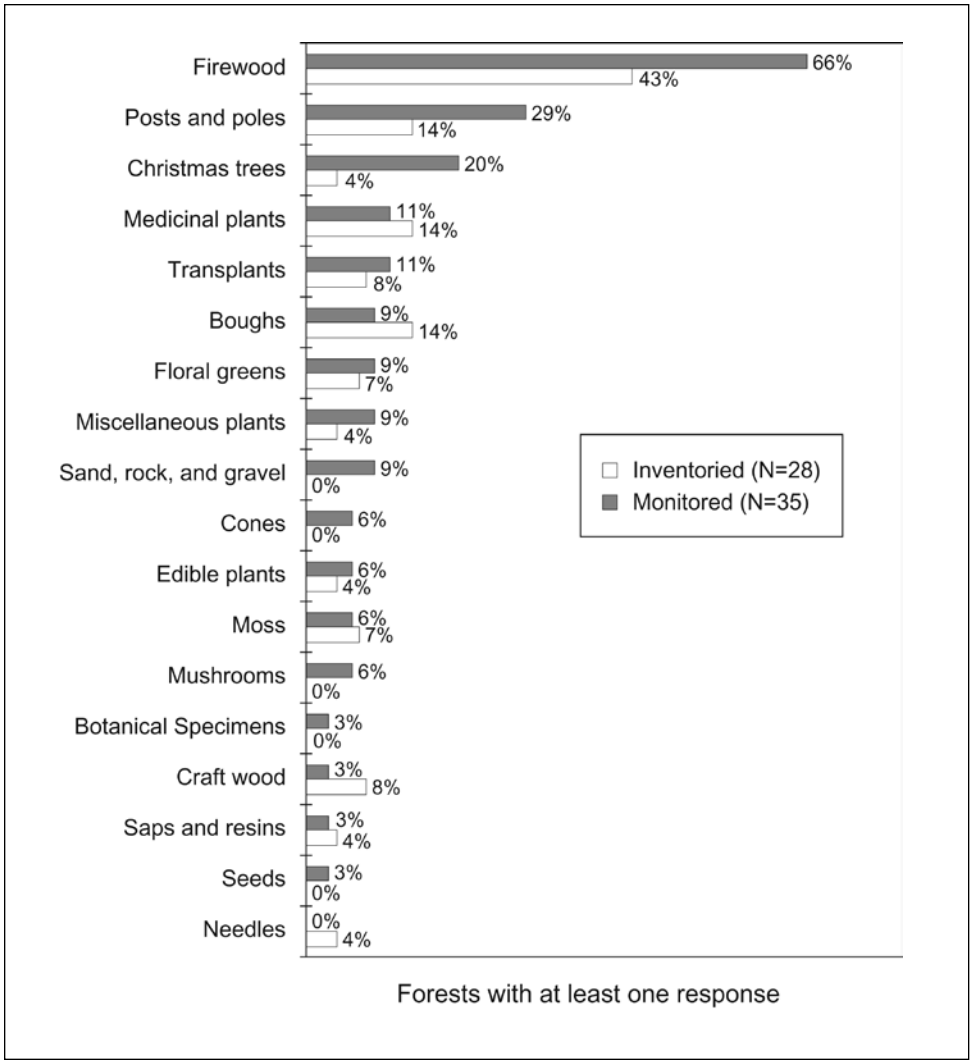

Figure 9—Products inventoried and monitored.

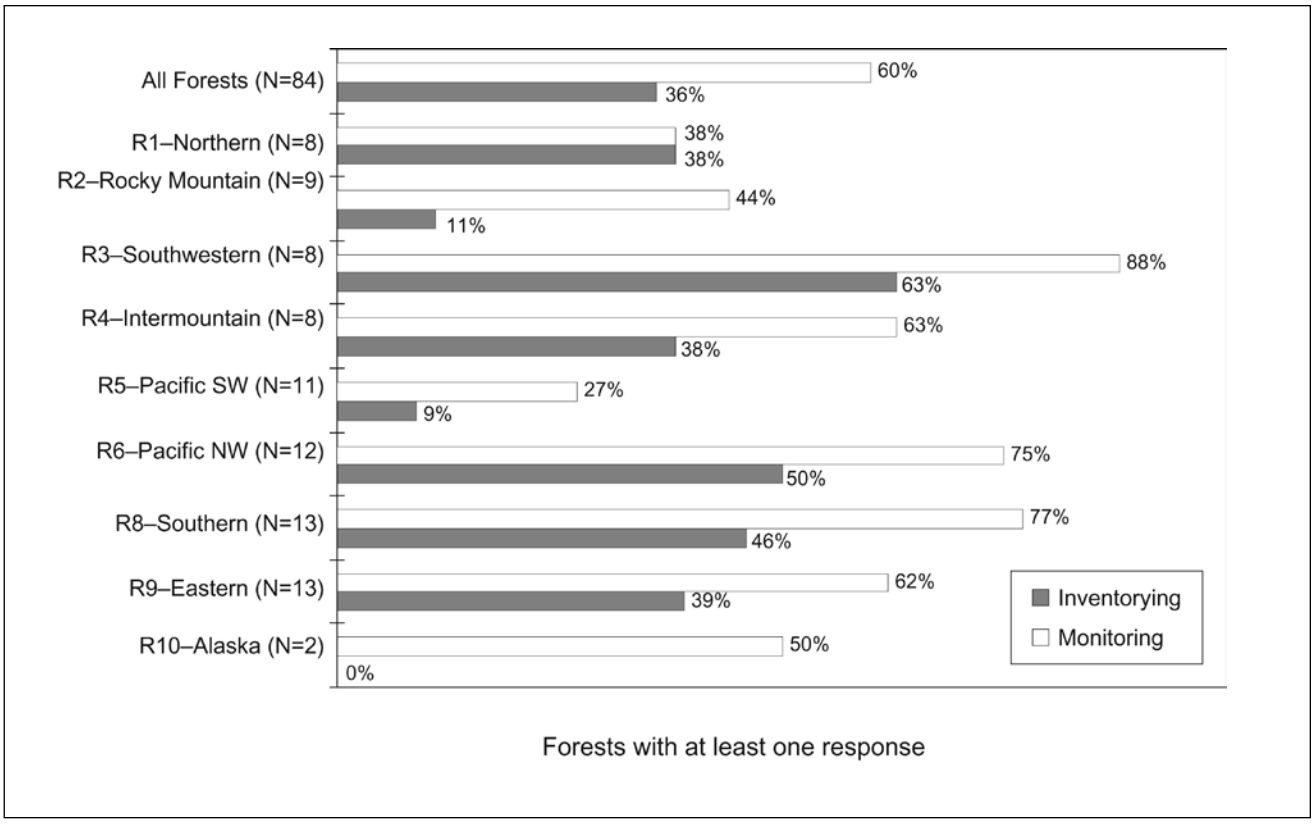

Figure 10—NTFP Inventory and monitoring by region.

Respondents on the 28 reporting national forests that indicated NTFP inventories took place listed 14 inventory methods (app. 4). We condensed these into four major categories to facilitate data analysis. The four categories were biological studies, informal field checks, permits, and cultural resource surveys. Respondents on the 35 reporting national forests where NTFP monitoring took place listed 10 monitoring methods. We grouped these methods into the same categories used for analyzing the data about inventory methods (appendix 4 lists all of the monitoring methods).[28] As indicated in figure 11, on the majority of reporting national forests, monitoring methods consisted of permit compliance checks (i.e., field visits to see if harvesters had obtained permission from the agency to remove products from a specified site) and informal visual checks of harvested areas during or after the harvest. Respondents from 38 percent of the reporting forests mentioned the use of biological studies.

[28] None of the respondents mentioned cultural resource surveys as a method for monitoring NTFP, thus the analysis shows the results for only three monitoring method categories: biological studies, informal field checks, and permits.

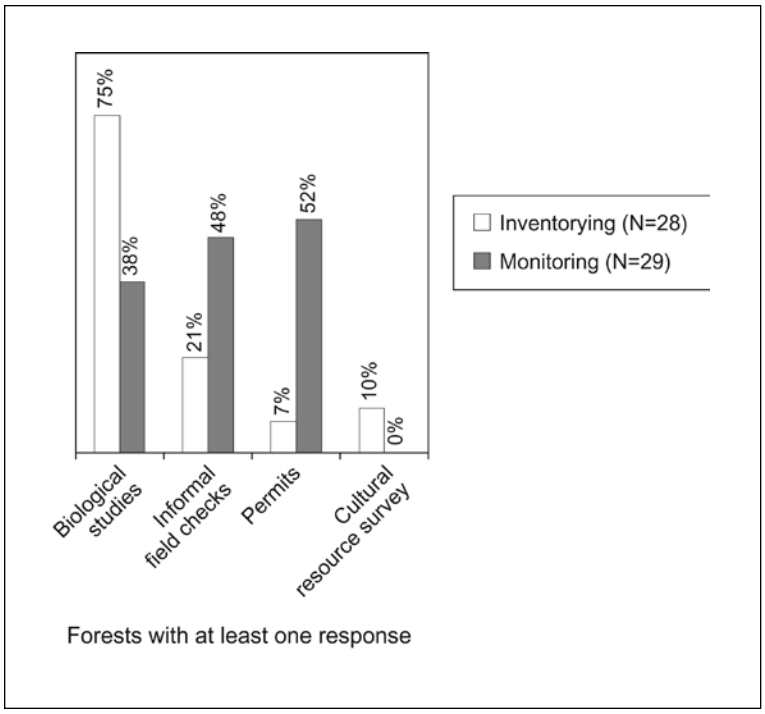

Figure 11—Methods of NTFP inventory and monitoring.

Biological studies were the most commonly listed monitoring method among the reporting national forests (fig. 11). Respondents from a small percentage of reporting forests (10 percent) indicated that NTFP inventorying was done as a part of cultural resource surveys. Such surveys are often used to inventory NTFPs of importance to Native American cultures, such as beargrass (*Xerophyllum tenax* (Pursh) Nutt.), which is harvested on national forests by some Western tribes for basket making.

Respondents from the reporting forests where NTFP inventorying occurred listed 15 types of people responsible for conducting inventories (app. 5). We condensed these into five major categories: Forest Service biological scientist, Forest Service forester, Forest Service vegetation team, other Forest Service personnel,[29] and non-Forest Service personnel. Respondents from the reporting forests where NTFP monitoring took place listed 24 types of people who carried out monitoring activities (app. 5). We condensed these into the same five categories as for inventories, and added a sixth category, law enforcement personnel.

[29]This category included diverse positions, including front desk personnel, engineers, and wildlife biologists. We grouped the wildlife biologists and technicians separately from the biological scientist category, which included specialists with backgrounds in plant or fungal studies, such as botanists, ecologists, and mycologists.

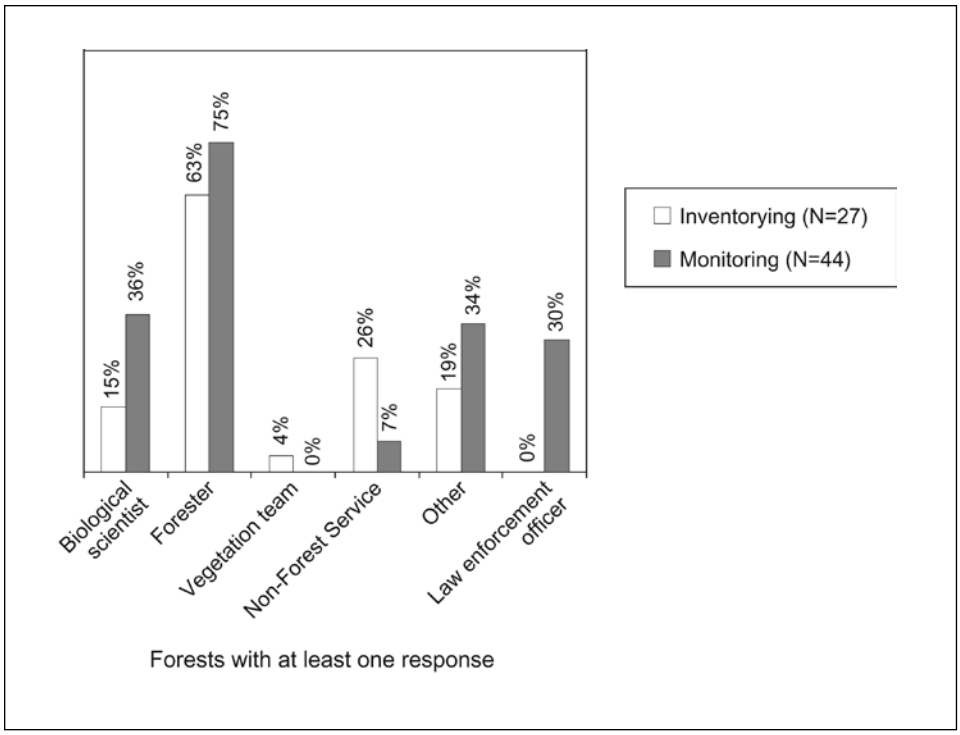

Figure 12—Who inventories and monitors NTFPs.

Foresters were most commonly listed as the persons responsible for conducting inventory and monitoring (fig. 12). Respondents from 15 percent of the reporting forests mentioned biological scientists as the persons responsible for doing inventories (fig. 12). Interpreting the survey data is difficult without additional information regarding the training of the persons involved in the inventories and monitoring, because people with a variety of scientific backgrounds hold positions labeled "forester" or "forest technician" in the Forest Service.

Monitoring of Ecological Impacts of Nonregulatory NTFP Management

We included a question on the 2003 survey to help determine the extent to which forest managers invest time and resources in assessing the effects of NTFP harvesting on biodiversity. We asked survey respondents whether their district or forest conducted ecological monitoring to determine the effects of regulatory (e.g., permits) and nonregulatory (e.g., fire prescriptions for berry production) NTFP management activities on biodiversity. The results indicate that ecological monitoring is taking place on at least 53 percent of the reporting national forests (fig. 13).

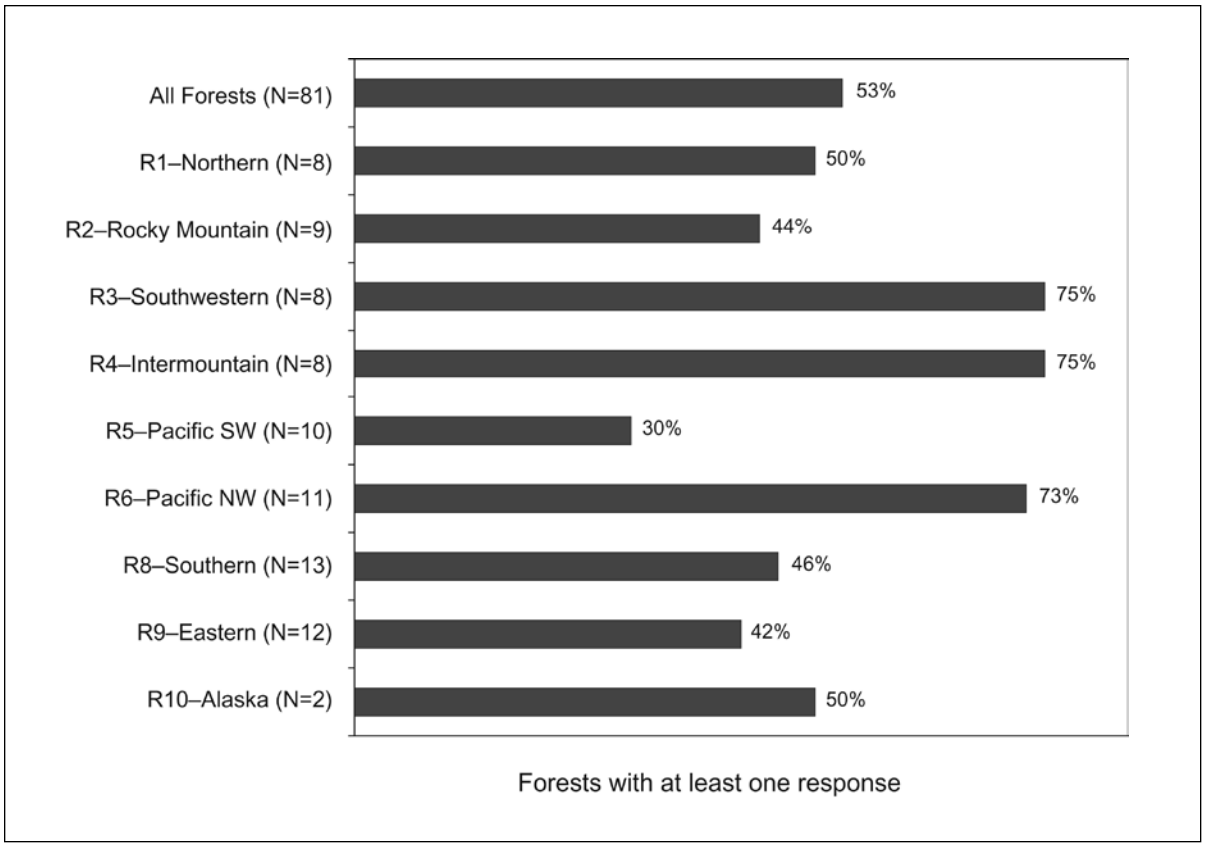

Figure 13—Monitoring of ecological impacts of NTFP management by region.

Patterns among regions for monitoring ecological impacts of NTFP management activities follow a pattern similar to NTFP inventory and monitoring (fig. 13). Forests reporting from the Southwestern, Intermountain, and Pacific Northwest Regions had the highest percentage of forests conducting NTFP inventory and monitoring, and forests reporting from Region 5 (Pacific Southwest) had the lowest percentage.

Respondents listed four types of ecological impacts: impacts on cultural resources, ecological resources, wildlife, and NTFPs (fig. 14). In addition, a small number of respondents noted that their forests conducted ecological monitoring of NTFP activities as a means to track ecological trends. As with the NTFP inventory and monitoring question discussed above, the respondents interpreted the term "ecological monitoring" to include a range of activities ranging from informal checks of harvest areas, general site inspections, and permit tracking to scientific field plots and surveys (fig. 15). Informal field checks constituted the major method used by the national forests to monitor ecological impacts of NTFP management.

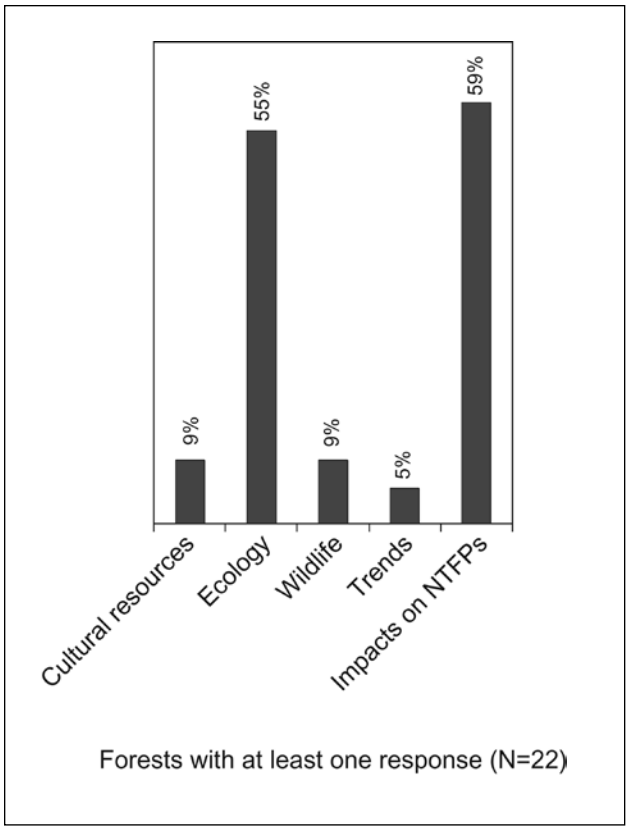

Figure 14—Types of ecological impacts monitored.

Survey respondents mentioned 23 types of people responsible for carrying out monitoring activities aimed at measuring the ecological impacts of NTFP management (app. 6). We condensed these into five categories corresponding to those developed for the questions on NTFP inventories and monitoring.[30] As with the previous inventory and monitoring questions, respondents from the majority of the reporting forests where ecological impact monitoring occurred most commonly listed foresters as the persons responsible for carrying out such work (fig. 16).

Manager Perspectives on Involving Harvesters in Inventory and Monitoring

This survey was conducted as part of a larger project examining the feasibility of developing participatory, multistakeholder NTFP inventory and monitoring programs. We asked survey respondents to provide their perspective on whether or not harvesters could contribute to NTFP inventory and monitoring on their forest. As indicated in figure 17, respondents on a majority of the reporting national forests

[30] The category "vegetation team" was not listed by any of the respondents to this question.

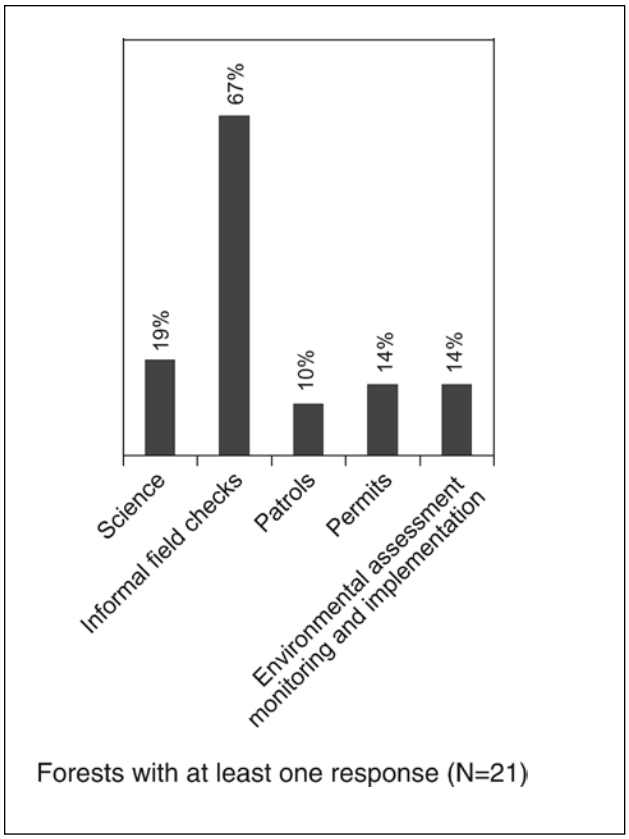

Figure 15—Methods of ecological impact monitoring.

stated that harvesters could contribute to NTFP inventorying (58 percent) and monitoring (54 percent).

We also asked respondents to explain why they thought harvesters could or could not be involved in inventory and monitoring. Respondents provided seven types of answers (app. 7) for why harvesters could be involved. We condensed these responses into the following five major categories (listed by order of frequency of forests with yes responses): harvesters have knowledge, they could provide labor, they could improve business and management (of NTFPs), they could assist law enforcement with monitoring, and they have an interest in inventory and monitoring (fig. 18).

As the following quotes from survey respondents indicate, managers who supported harvester involvement emphasized the knowledge that harvesters have to offer, as well as the fact that harvesters are already out on the ground, as reasons for encouraging their participation:

- They could easily describe locations where they are harvesting and make sure it [harvesting] is done in a sustainable manner. They

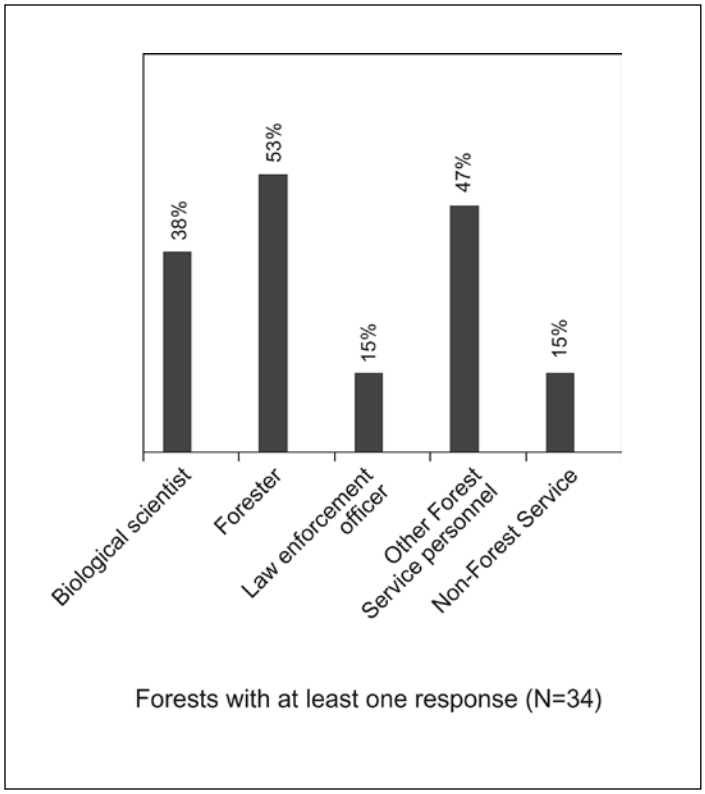

Figure 16—Who does ecological impact monitoring?

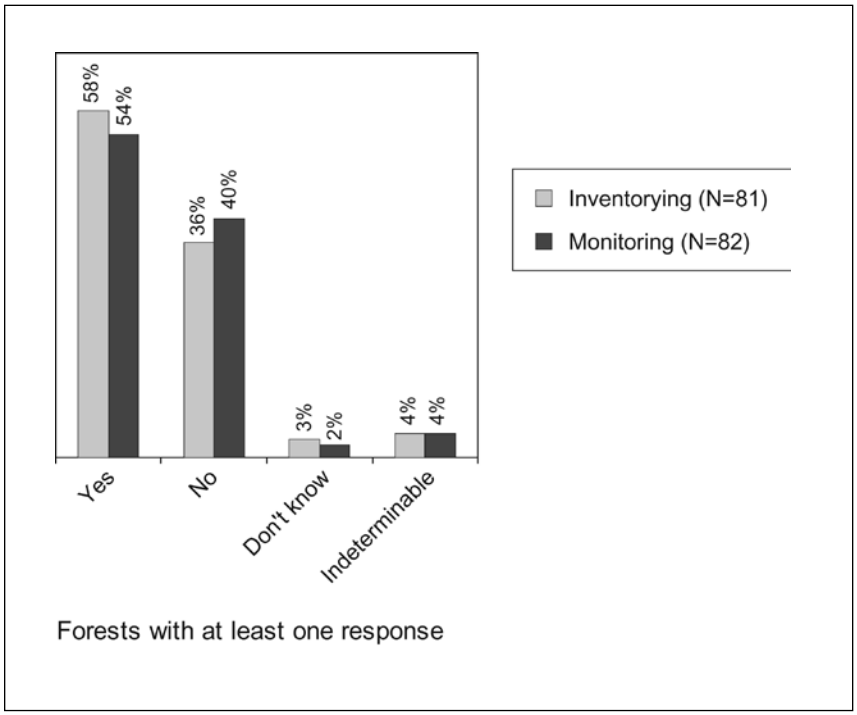

Figure 17—Views on whether harvesters could contribute to inventory and monitoring.

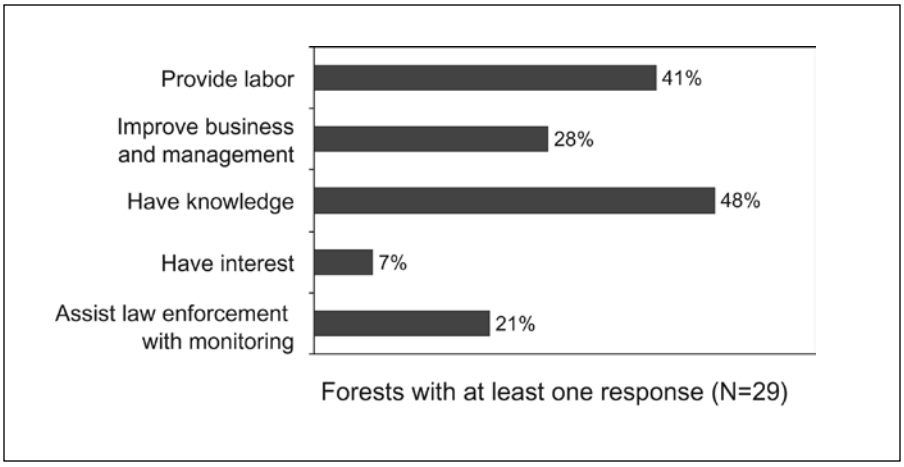

Figure 18—Reasons for including harvesters in inventory and monitoring.

could also inform the FS on situations where over-harvesting by other gatherers is happening.

- Commercial harvesters have knowledge of what species and products are available in the district and the amounts available. This information is valuable for inventorying products. They can provide valuable information on the effectiveness of harvest amounts and methods of promoting long-term viability of species.
- Native seed collectors are knowledgeable and do provide appropriate inventory and monitoring of the species they collect.

Several Forest Service respondents, such as the two employees quoted below, offered examples of how harvesters are already involved in NTFP inventory and monitoring, as well as other aspects of NTFP management:

- A local nonprofit group.... has a very strong working relationship with SFP harvesters. In conversations with this group, they encourage the active participation of harvesters in the monitoring of SFP populations.
- Sassafras harvesters are able to track supply in areas. Fuel wood harvesters already help clean up timber sale areas and reduce fuel hazards.

Respondents who indicated that harvesters could not contribute to NTFP inventory and monitoring provided 31 different types of answers (app. 8), which we condensed into eight major categories (fig. 19). These categories included the Forest Service's lack of funding for such activities, lack of Forest Service capacity to organize such work, perception that NTFP inventory and monitoring is unnecessary, political obstacles (internal and external), negative perceptions of the ability of harvesters to carry out such work, perception that harvesters did not have the

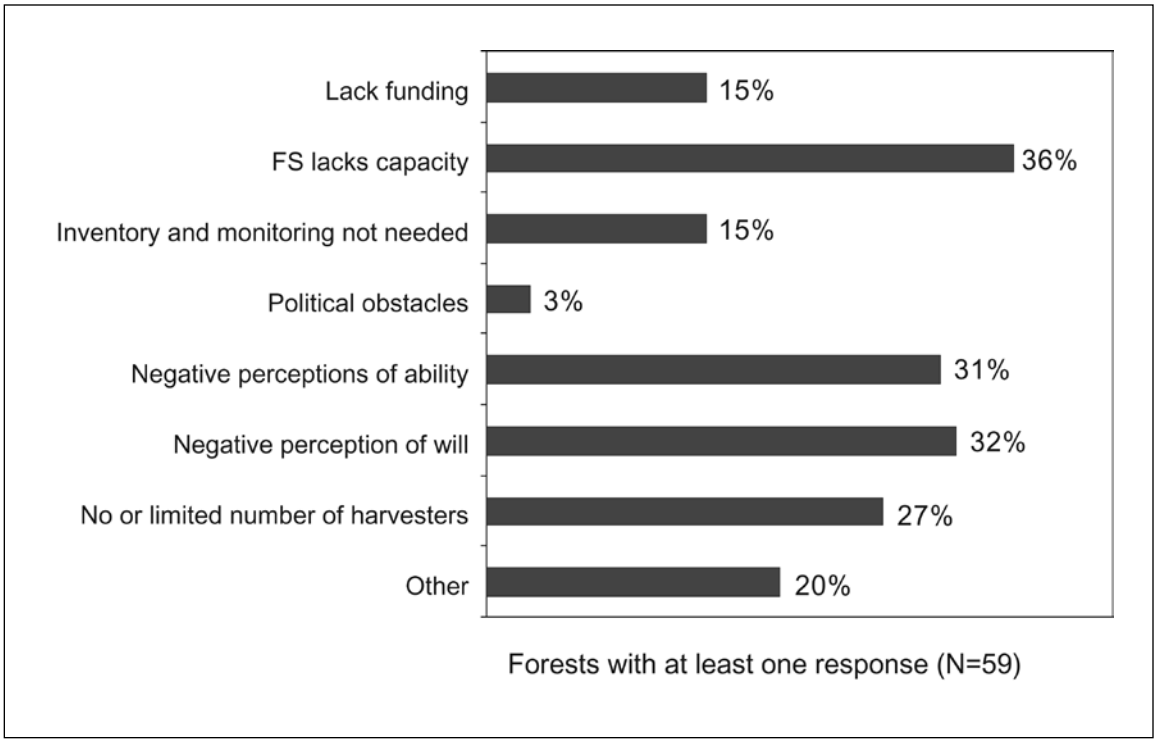

Figure 19—Reasons for not involving harvesters in inventory and monitoring.

ability or interest in doing NTFP inventory and monitoring, limited or no commercial harvesters, and other. The reasons most commonly cited by order of frequency were that the survey respondents believed the Forest Service lacked the capacity to involve harvesters in such activities, and that they believed harvesters lacked the ability or willingness to do such work. The quotes by survey respondents shown in table 8 illustrate some of the reservations regarding the involvement of harvesters in NTFP inventory and monitoring.

Agency Use of Harvester Knowledge and Collaboration With Harvesters

Ethnographic studies of contemporary NTFP harvesters indicate that many harvesters are knowledgeable about the ecological characteristics of the resources they harvest and the ecological conditions of their harvesting sites (Emery 1998, Jones 2002, Jones et al. 2004, Love et al. 1998, McLain 2000, Richards 1997, Turner and Cocksedge 2001). These studies, as well as others (McLain 2002), also demonstrate that forest managers may not include, or discount the importance of including, harvesters in forest management and planning. To assess the degree to which these

Table 8—Forest managers' reservations about harvester involvement

Concerns about harvesters' abilities
Commercial harvesters in this area typically do not have the means or the knowledge to conduct proper inventories. They could contribute to monitoring by providing accurate collection data.
[Data] needs to be collected in a scientifically useful manner. They could provide input and information to the design team and therefore contribute, but I don't see them collecting data.
Concerns about harvester bias
Commercial harvesters would only be of limited value in inventorying since they tend to focus on the best areas with the highest value product. Harvesters also are reluctant to share any information about areas where they traditionally harvest products. Monitoring would be biased as the harvesters have difficulty identifying areas where their operations could be having an adverse effect.
Lack of trust and incentives for harvesters
The limited availability [of product] has reduced the interest expressed by contractors to provide inventory and monitoring information.
It is doubtful that they would because collectors tend to be secretive of their source locations owing to competition, especially with regard to ginseng.
Lack of capacity within the Forest Service
Information is welcome, but we first need to develop a system to make such information useful.
No inventory protocols exist, and no personnel to develop them. The only commercial special forest products (SFP) permits issued are for boughs. It would take some additional involvement to coordinate with permittees. With no support or money, it does not happen now. There is an opportunity to increase the SFP program, both for personal use and commercial use on the forest, but it has not been funded.

site-specific findings apply to other areas of the country, we asked survey respondents to indicate whether harvesters contributed to NTFP management on their forests.

Respondents on 56 percent of the 84 reporting national forests stated that harvesters contributed knowledge that helps NTFP management in their area; and respondents on 38 percent of the reporting forests indicated that Forest Service employees are currently collaborating with harvesters.

We did not ask respondents to elaborate on the nature of agency-harvester collaborations. However, comments provided on open-ended questions indicate that, at

a minimum, collaboration consists of harvesters informing forest employees about resource conditions, quantities of NTFPs gathered, and unpermitted harvesting. Some examples of these comments are listed below:

- Commercial harvesters often provide information as to progress of harvesting activities and conditions.
- Commercial harvesters of SFPs help [increase] Forest Service awareness of commercially desired products and their locations.
- Most of the recent inventory [data] comes from harvesters.
- They could help, and do, where there is overgathering and poaching.
- They provide feedback on availability and conditions.

As noted earlier in this section, some harvesters also assist Forest Service employees in inventory and monitoring efforts.

Expanding Commercial NTFP Harvesting on National Forests

In the early 1990s, the Forest Service funded several studies that examined the economic development possibilities associated with expanding NTFP harvesting and processing (Mater Engineering 1992, Schlosser et al. 1991, Thomas and Schulmann 1993). Several years later, researchers funded through the Forest Service research branch explored the economic opportunities for managing forests jointly for timber and a variety of NTFPs (Pilz et al. 1999, Schlosser and Blatner 1997, Weigand 1997). The Forest Service research branch has also funded research aimed at developing methods for inventorying commercially important NTFPs (Kerns et al. 2002a, Vance et al. 2001) and predicting productivity of edible mushrooms (Pilz et al. 2002). Since the early 1990s, the Forest Service has also supported efforts to develop methods for assessing the ecological impacts of harvesting high-value commercial NTFPs on national forests (Ballard 2004, Chamberlain 2000, Hart et al. 2004, Hosford et al. 1997, USDA FS 2001a, Spero and Fleming 2002). The agency also funded Emery's (1998) work on NTFP livelihood strategies in the Upper Peninsula of Michigan and Chamberlain's (2000) study of NTFP management on Eastern national forests.

We included several questions on the survey questionnaire aimed at describing the range of perspectives among the respondents regarding the possibilities for expanding commercial NTFP harvesting in the areas in which they work. We asked respondents to list the barriers they thought existed to increasing commercial NTFP harvesting. We also asked them to describe proactive nonregulatory activities used on their districts to enhance NTFP productivity. Such activities might include the

use of controlled burns to enhance wild blueberry (*Vaccinnium* spp.) patch production, thinning the forest canopy to promote huckleberry production, or maintaining a dense forest canopy to produce market-quality salal leaves.

Given the importance of inventory and monitoring and the link between NTFPs and biodiversity we also asked respondents who reported that ecological impact monitoring occurred on their forest to indicate whether the monitoring activities had revealed positive or negative effects on biodiversity. We also asked each respondent to describe any barriers to conducting NTFP inventory and monitoring on his or her district.

Barriers to Expanding Commercial Harvesting

Respondents listed 32 types of barriers to expanding commercial harvesting (app. 9). Respondents from 52 percent of the reporting forests mentioned funding as a barrier, with lack of planning capacity and lack of staff being mentioned next most frequently. We condensed the 32 barriers into the following five major categories: insufficient funding, lack of agency capacity, business obstacles, regulatory restrictions, and political obstacles. As indicated in figure 20, respondents from 67 percent of the reporting forests mentioned business-related obstacles, such as lack of market demand and transportation difficulties, as important barriers to expanding commercial NTFP harvesting. Respondents from more than 50 percent of the reporting forests also cited lack of agency personnel and funding to administer expanded commercial harvesting programs as key obstacles.

Nonregulatory NTFP Management Activities

Respondents from 12 of the reporting national forests indicated the presence of efforts to enhance NTFP productivity or expand the quantity of NTFPs available. The kinds of enhancement activities used included burning, fire suppression, fuel-reduction activities, thinning, tree removals, and unspecified enhancement activities (fig. 21). Burning, for such purposes as enhancing berry fields and basketry material production, was by far the most commonly used active NTFP management practice. Several respondents noted that NTFP enhancement was a side product of wildlife habitat and fire-hazard-reduction activities rather than a management objective in itself.

Effects of NTFP Management on Biodiversity

Respondents from most of the reporting national forests that conducted ecological monitoring on NTFP activities noted that they either didn't know the results of the monitoring data or that the data was inconclusive. Respondents on fourteen percent

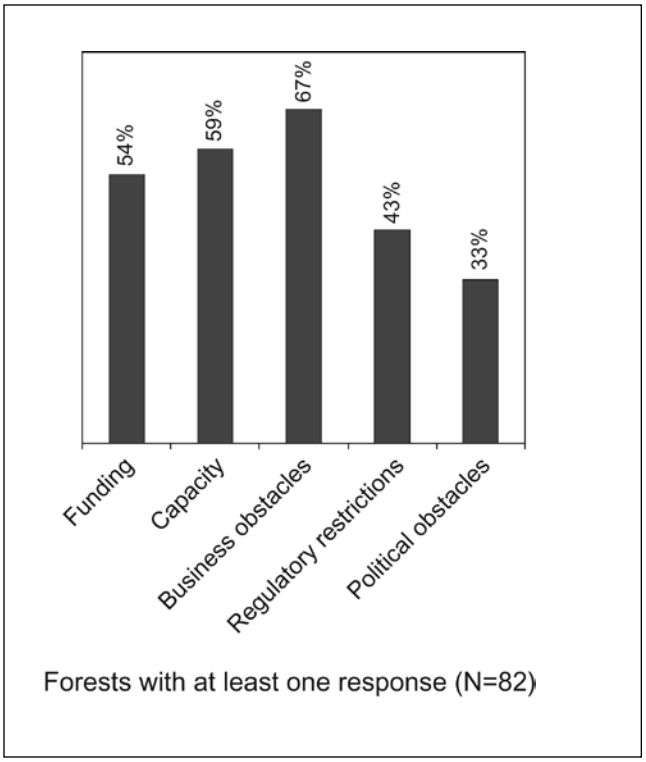

Figure 20—Barriers to expanding commercial NTFP harvesting.

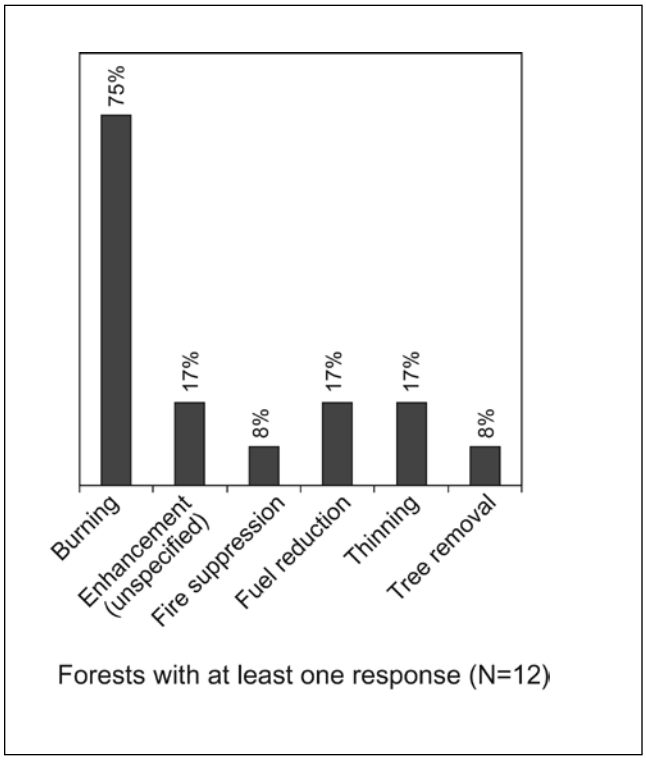

Figure 21—Types of nonregulatory NTFP management activites.

of the reporting forests stated that NTFP management had a positive effect on biodiversity; none reported a negative effect.

Manager Perceptions of Barriers to NTFP Inventory and Monitoring

The most commonly cited barrier to NTFP inventory and monitoring was lack of funding.

Survey respondents mentioned a variety of barriers to implementing NTFP inventory and monitoring, ranging from lack of funding to limited commercial demand for NTFPs to the low prioritization of such efforts within the agencies (app. 10). These barriers fell into four broad categories: lack of funding, lack of internal capacity, lack of political will within the agency, and limited or no perceived need because of either an abundant supply of NTFPs or a small number of harvesters relative to supply.

The most commonly cited barrier to NTFP inventory and monitoring was lack of funding, which respondents from 85 percent of the reporting forests listed (fig. 22). The second biggest barrier for the Forest Service was lack of staff, which respondents from 74 percent of the reporting forests mentioned. Both of these fall into the category of internal capacity.

Discussion

The survey data demonstrate that NTFP harvesting takes place on many ranger districts and national forests in all parts of the United States, rather than being an activity limited to a few parts of the country. The data also show that numerous NTFP products and species are harvested from national forest lands. Firewood, posts and poles, Christmas trees, transplants, and boughs form the backbone of the NTFP programs among the districts that responded to this survey. However, the data also indicate that a variety of other botanical products, such as mushrooms, floral greens, cones, and medicinal plants, are also removed from these districts.

The data also indicate that many ranger districts located in the Western United States increased the number of NTFP harvesting permits issued between 1999 and 2003. In contrast, the numbers of permits issued on many ranger districts in the Southern and Eastern United States declined during the same period. However, the survey data do not permit us to determine whether the declines in permitting activity are due to a decline in demand for NTFP products or to changes in district policies that restricted the issuance of permits. Likewise it is unclear whether increases in permitting activity are due to an increase in the number of people harvesting NTFPs, to changes in district policies that required permits for activities previously allowed to take place without permits, or to an improvement in the districts' capacity to ensure compliance with permit requirements.

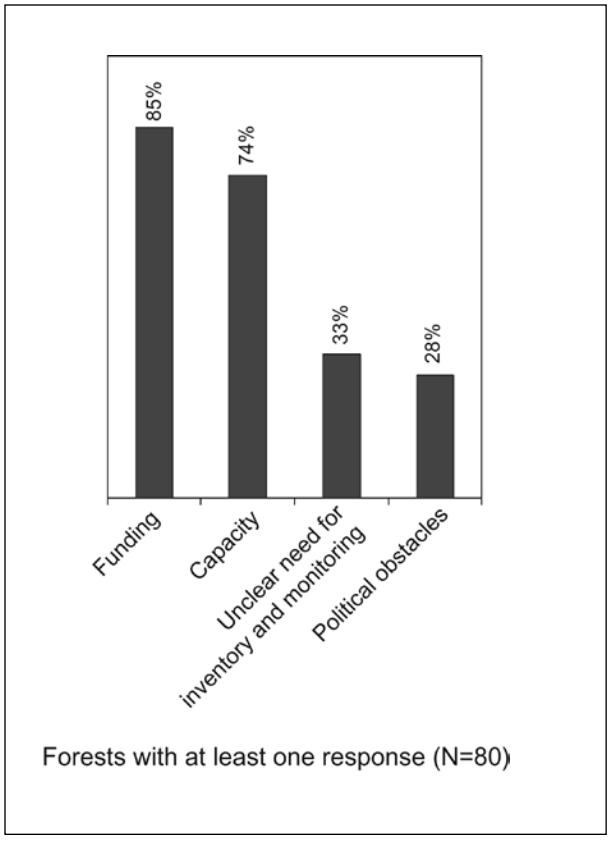

Figure 22—Barriers to inventory and monitoring.

The survey results indicate that some districts are already taking steps to develop their capacity to manage NTFPs. For example, two-thirds of the districts participating in the study have a designated NTFP coordinator, and slightly less than two-thirds have law enforcement personnel who handle NTFP enforcement activities. However, the presence of district-level NTFP coordinators and law enforcement personnel among the reporting ranger districts differed considerably by region. For example, 94 percent of the districts for which we had data in Region 1 (Northern) had designated NTFP coordinators compared with only 47 percent of the districts in Region 9 (Eastern). Similarly, the percentage of districts with NTFP law enforcement personnel ranged from 76 percent in Region 4 (Intermountain) to only 33 percent in Region 10 (Alaska). Without additional information on the percentage of total work time that NTFP coordinators and law enforcement personnel spend on NTFP management and enforcement, it is difficult to interpret these results.

The survey also reveals that many national forests include NTFPs in legally mandated planning documents, such as forest plans, environmental assessments,

and environmental impact statements (EISs). For example, respondents from approximately two-thirds of the reporting national forests indicated that their forest plans include some mention of NTFPs. Similarly, respondents from two-thirds of the reporting national forests indicated that their forests include NTFP concerns in environmental assessments. On the other hand, respondents from only one-third of the reporting national forests indicated that they had incorporated NTFP management issues into EISs.

The findings for inclusion of NTFPs in forest plans for Regions 8 and 9 differ from the study by Chamberlain et al. (2002) of NTFPs in forest plans for those same regions; they found that only 22 percent of the 32 national forests addressed NTFPs to some extent. The difference is likely due to differences in methods between the two studies. Chamberlain et al. employed a content analysis technique in which they examined each plan to determine the percentage of the text addressing NTFPs. They concluded that "the attention afforded to NTFPs is minimal" (Chamberlain et al. 2002: 11) and that "no plan provided comprehensive coverage similar to that of other natural resources" (Chamberlain et al. 2002: 12). Our study did not include ground-truthing of the plans, and a strong possibility exists that respondents may have interpreted even minor or oblique references to NTFPs as evidence that their forest plan included NTFPs. The likelihood that such is the case is suggested by comments from a number of survey respondents on their questionnaires that their forest planning documents provided only a cursory treatment of NTFPs or covered only a limited number of the more widely recognized NTFPs, such as firewood and posts and poles. An examination of forest plans similar to that conducted by Chamberlain et al. for other regions of the United States would clarify the extent to which the plans adequately address NTFP management.

Some possible explanations for why many national forests don't include analyses of NTFPs in EISs and EAs include the following:

- NTFP harvesting may be very limited in scale and scope in some areas.
- Some national forests lack information about the presence of NTFPs or NTFP harvesting activities within their boundaries.
- National forests may use a public scoping and comment process in which NTFP harvesters either can't or won't participate (McLain 2002).

It is unclear why a smaller percentage of reporting national forests included NTFPs in EISs than in EAs. One possible explanation is that national forests seldom prepare EISs. Thus it is possible that some national forests have not prepared EISs since the mid-1990s when NTFPs began to appear more prominently in national forest policy discussions. Those same national forests, however, have likely prepared numerous environmental assessments during that period.

Respondents from 42 percent of the reporting national forests indicated that they had developed planning documents that focused on NTFPs. Among the reporting national forests, substantial regional differences existed with respect to the development of NTFP planning documents. For example, 63 percent of the reporting forests in Region 4 (Intermountain) indicated that they had developed NTFP planning documents, compared to only 9 percent of the reporting forests in Region 5 (Pacific Southwest).[31] However, without an analysis of nonresponse bias, it is impossible to tell whether these differences are statistically significant or variations linked to small sample sizes.

Forests with NTFP documents sometimes have highly visible NTFP activity. For example, the Tongass National Forest developed a comprehensive forestwide NTFP policy in order to ensure adequate supplies of NTFPs for subsistence harvesters in the area. Similarly, several national forests in western and central Oregon developed EAs for NTFPs during the 1990s when demand for NTFPs, such as matsutake (*Tricholoma magnivelare* (Peck) Redhead) mushrooms, increased dramatically. Likewise, national forests in the Ozarks and Appalachians have recently developed strategies for addressing medicinal plant harvesting (Chamberlain 2000). The survey findings indicate that Forest Service offices across the country have begun to develop planning documents that address NTFP management concerns in some level of detail and at various geographic scales; they also indicate that much work remains to be done.

Responses to the questions regarding the Forest Service's national NTFP strategy and three selected information resources indicated that at least some NTFP managers on the reporting national forests are familiar with these resources. These findings indicate that some NTFP policy and management resources are reaching agency district or forest managers.

The answers to the inventory and monitoring questions indicate that many field offices within the agency inventory and monitor NTFPs. However, the quality of inventory and monitoring programs differs. Although monitoring of NTFP harvesting activities takes place on at least half of the reporting national forests, many of these efforts employed unsystematic forms of monitoring, such as informal site checks and permit compliance checks. Additionally, most respondents from the reporting national forests indicated that their NTFP monitoring efforts focused on tree products, such as firewood, posts and poles, and Christmas trees. Inadequate funding

[31] All of the national forests in Region 10 (Alaska) indicated they had NTFP-specific planning documents, but as the region has only two national forests, comparison with other regions is not particularly meaningful.

and internal capacity were listed as the primary barriers to more widespread use of NTFP inventory and monitoring.

The survey also reveals that many of the reporting national forests draw on harvesters' knowledge for managing their NTFP programs. In addition, nearly 40 percent of the reporting national forests collaborate in some form with NTFP harvesters to manage NTFPs. However, it is unclear from the survey data what such agency-harvester knowledge exchanges and collaborations consist of. Text answers from the respondents indicate that collaborations range from conversations between agency employees and harvesters about resource conditions to NTFP inventory and monitoring partnerships.

Many of the reporting national forests draw on harvesters' knowledge for managing their NTFP programs.

Respondents from the majority of reporting national forests indicated that they believed harvesters could contribute to NTFP inventory and monitoring, with knowledge of NTFPs and labor being considered the most important inputs harvesters could provide. However, support for involving harvesters is tempered by concerns about whether the agency has the capacity to manage collaborative inventory and monitoring efforts, doubts about the ability of harvesters to do the work in a scientific manner, and skepticism as to whether harvesters would be willing to be involved in such efforts.

Respondents from half the reporting national forests noted that they conduct ecological monitoring to determine the effects of NTFP management activities, such as regulatory restrictions and controlled burns. However, responses to further questions indicate that the data from such studies are insufficient to determine how NTFP harvesting affects biodiversity. Districts on only 20 percent of the reporting national forests are currently engaged in activities to enhance NTFP habitat or productivity. These data raise the possibility that national forests may lack the capacity to determine whether commercial harvesting levels are sustainable or to take action to enhance sustainability. Respondents from the majority of reporting national forests indicated that expanding commercial NTFP harvesting on national forests would require addressing several key internal constraints, including the agency's lack of funding, staff, and planning capacity, as well as external barriers, such as limited markets and transportation costs.

In summary, the study indicates that NTFP harvesting is widespread within the National Forest System. It also suggests that many managers are struggling with how to incorporate NTFPs into forest management and planning in an era of declining budgets and decreases in staffing levels. Survey respondents identified lack of funding and personnel as the two major internal barriers to NTFP inventory and monitoring. Many respondents indicated that agency-harvester collaborations could be used to develop and expand NTFP inventory and monitoring programs.

However, they identified lack of internal capacity as a major impediment to involving harvesters in collaborative inventory and monitoring efforts in addition to noting concerns about potential bias and lack of incentives for harvester participation. For agency-harvester collaborations to work, the designers would need to develop inventory and monitoring systems that simultaneously addressed the needs of harvesters (e.g., safeguards to protect information about site locations and the provision of access guarantees) and the needs of forest management agencies (e.g., data quality control). Effective collaborative NTFP inventory and monitoring systems would also require the development of suitable training materials for both harvesters and forest managers, as well as a long-term commitment on the part of upper level agency administrators to invest in such systems.

Research, Policy, and Management Implications

The NTFP survey revealed the following areas where managers, policymakers, and researchers could productively focus improvements in the Forest Service's NTFP program.

Managing Many NTFP Products and Species

The sheer variety of NTFPs and the species they are derived from requires that the agency improve its ability to manage for groups of species and products, rather than taking a species-by-species or product-by-product approach. This fits with the National Forest System's ongoing efforts to use indicator species to track groups of species as part of its coarse filter/fine filter approach to species management. The North Carolina national forests, which have recently developed a forest botanical products program of work for the southern Appalachians, serve as an example of how national forests might approach managing groups of NTFPs rather than focusing on individual products (USDA FS 2004a).

Managing Products of Regional or Local Importance

Given regional differences in NTFPs harvested, as well as differences in socioeconomic and ecological conditions, the agency will need to develop management guidelines and research activities that are regionally specific. For example, looking only at the national level, it would be easy to conclude that products such as maple syrup (*Acer saccharum* Marsh) and longleaf pine (*Pinus palustris* P. Mill.) needles are not important NTFPs. However, regional-level analysis of the national forests responding to this survey indicates that maple syrup constitutes an important NTFP in northeastern national forests, and longleaf pine needles are harvested on many southern national forests. At the local level (i.e., national forest), local biodiversity

may also be linked to local cultural practices. For example, the biodiversity of the Monongahela National Forest in West Virginia is extensive, and the local knowledge and use of NTFPs there is profound. Similarly, the Tongass and Chugach National Forests present a unique management environment within the National Forest System owing to subsistence rights of rural Alaskans and Native Alaskan claims that exist independently of subsistence rights legislation.

Developing Tools for Incorporating NTFPs Into Forest Planning

One approach to facilitating more widespread incorporation of NTFPs into forest planning processes is to develop communication systems within the agency for getting the word out about the existing state of knowledge and providing models for applying that knowledge to other forests. Such an approach would include cross-regional research to identify gaps. It would also involve developing explicit strategies for providing information about such gaps to managers in a usable form. By using common tools to assist in storing inventory and monitoring information, together with a set of existing policies, the Forest Service should be able to develop a broad set of standard yet flexible implementation tools. This would allow local forest management units to address the variability and uniqueness of their management situations with similar applications from other forests. Additionally, the development and implementation of NTFP data-gathering efforts would permit the agency to address at least one criterion and indicator important for monitoring the social and economic sustainability of forest-dependent communities under the Montreal Process. The agency should consider placing priority on funding the development of tools and strategies that take into account the likelihood that national forest budgets and staffing levels will continue declining in the near term.

Section 339 of P.L. 106-113 authorizes forests to retain receipts from the sale of NTFPs greater than 1998 levels of sales. This design allows for districts or forests to create a process whereby they can expand their NTFP programs, retain receipts, and possibly create sustainable programs that are outside the normal parameters of appropriated competition. Forest Resource Enterprises, a forest enterprise team based in central Oregon, has designed a fair market valuation program that provides resource managers the ability to fulfill their legal NTFP management obligations and also receive current and accurate prices for NTFP sales. The team has completed analysis for Regions 2, 6, and 10 and has started a similar analysis for Region 5. Implementation of the fair market valuation program, together with the retention of receipts once the agency implements regulations for Section 339, has the potential to address some of the concerns expressed about lack of funding for NTFP programs.

In developing tools for NTFP management, it would also be useful to explore the extent to which the Forest Service's standard economic tools and models used during forest plan revisions (i.e., Impact Analysis for Planning [IMPLAN]) allow them to look indepth at the contributions of NTFPs, as well as the extent to which the large-scale recreation data sets address links between NTFP gathering and recreation. The Southern Region has recently taken a step in this direction through the development of a strategy for research and technology transfer on NTFPs (Sallee et al. 2004). Technical guides on the social, economic, and ecological sustainability aspects of NTFPs will likely need development to facilitate adaptive management as the agency implements the 2004 Final Planning Rule.

Examining Barriers and Opportunities for Agency-Harvester Collaboration

Agency-harvester inventory and monitoring partnerships are emerging in parts of the National Forest System to overcome the difficulties of inadequate funding and staffing for monitoring and inventorying NTFP species. A companion piece to this report, *Nontimber Forest Product Inventorying and Monitoring in the United States: Rationale and Recommendations for a Participatory Approach* (Lynch et al. 2004), discusses in more detail examples of ongoing efforts to develop agency-harvester inventory and monitoring partnerships. Greater understanding of the barriers and opportunities for developing such collaborative efforts can assist forest managers and researchers in identifying appropriate modes of collaboration at the forest and district levels. Development and dissemination of materials to forest managers regarding the utility of traditional ecological knowledge, as well as training in how to communicate in mutually understandable ways with NTFP harvesters, constitute critical components of viable agency-harvester partnerships.

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Appendix 1: Survey Questionnaire

United States Department of Agriculture **Forest Service** **Washington Office** **14th & Independence SW P.O. Box 96090 Washington, DC 20090-6090**

File Code: 2450 **Date:** March 21, 2003

Route To:

Subject: Special Forest Products Survey

To: Regional Foresters

REPLY DUE APRIL 30, 2003

In 1999, scientists at the Institute for Culture and Ecology and the Pacific Northwest Research Station (PNW) conducted an email survey of Ranger Districts and National Forests in the U.S. to gain an understanding of the characteristics of Special Forest Products (SFP) programs in the National Forest System. This report summarizes key findings of the 1999 survey and identifies areas for further research. The information should be useful to you and your Forest Supervisors and Rangers in the management of the special forest products program. The report is in pdf format and is located at the following URL.

http://fsweb.wo.fs.fed.us/frs/fm/products/documents/IFCAE_1999_FS_SFP_Survey-Summary.pdf

The Institute for Culture and Ecology working with the PNW are conducting another survey and need the assistance of the Ranger Districts to again complete a 2-page survey. We believe the survey will provide us information on the trends since 1999 that should help us better manage our Special Forest Products program. We agreed to participate in the 2003 survey. Please forward to your Forest Supervisors and District Rangers for response. The survey should be completed by April 30 and sent to the address in the survey. The survey can be found at the following URL.

http://fsweb.wo.fs.fed.us/frs/fm/products/documents/IFCAE_2003_Survey_USFS_SFP_Regs_03-10-03.rtf

/s/ Abigail R. Kimbell

ABIGAIL R. KIMBELL

Associate Deputy Chief for National Forest System

cc: Roger Fight, Rebecca McLain

Survey of US Forest Service District Level
Special Forest Products Regulations and Management

This national survey represents the 2nd phase of a longitudinal study by the Institute for Culture and Ecology to examine changes in federal Special Forest Product (SFP) policy and management over the last several years. You or a colleague may have participated in the first phase of this survey which was distributed in January 2000 to all districts. This data informed several products including policy sections in our recent book (listed at end). A summary of the 1st survey results is attached and the complete analysis of both survey phases will be available in December 2003. Please take a few moments to complete this 2nd survey phase, regardless of whether or not you participated in the first phase. Funding for this research is provided by the National Commission on Science for Sustainable Forestry (www.ncssf.org). We greatly appreciate your assistance.

Instructions: You may complete this form electronically by highlighting the underscore lines and then typing in your answer. Alternatively, you may print, fill out, and mail this survey to the Institute for Culture and Ecology, P.O. Box 6688, Portland, OR 97228-6688. If you have questions, contact Eric Jones. Feel free to add any additional comments, clarifications, or documents, and use additional paper if needed. **Important**: Do not leave any questions blank. If a question doesn't apply please put n/a for not applicable.

Date: _____
Your Name: _____
Position: _____
District: _____
Forest: _____
Email: _____
Phone: _____

1. Is there a uniform SFP policy for your:
District? Yes___ No___, Forest? Yes___ No___, Region? Yes___ No___

2. Is there a designated SFP coordinator for your:
District? Yes___ No___, Forest? Yes___ No___, Region? Yes___ No___

3. Did your district issue more or fewer permits for SFP removal in 2002 than it did in 1999?
More___ Fewer___

4. Is there a SFP law enforcement program on your district? Yes___ No___
Forest? Yes___ No___

5. Which of your district and forest planning and data gathering processes include SFPs? (please mark all that apply)

__ Forest Plans
__ Environmental Assessments
__ Environmental Impact Statements
__ Social Impact Assessments
__ Watershed Analyses
__ Landscape Analyses
__ Other (list) _____

6. Does your district have any planning or analysis documents that focus specifically on SFPs?

Yes___ No___ (If yes, please list) _____
_____

7. Are SFPs inventoried on your district? Yes___ No___ (If yes, list species, methods, and the category/title of person who does the work, e.g., FS botanist, contractor, volunteer) _____

8. Are SFPs monitored on your district? Yes___ No___ (If yes, list species, methods, and the category/title of person who does the work, e.g., FS botanist, contractor, volunteer) _____

9. Product, Regulatory Mechanism, and Fee Table. ***Instructions***:

a) In order of importance (1–5), list the five most significant SFPs on your district in the top column;

b) Place a "**Y**" in each cell row to indicate if you use the regulatory mechanism listed in the left column;

c) Add a "**F**" in each cell to indicate if there is a fee.

	Product 1.	Product 2.	Product 3.	Product 4.	Product 5.
Commercial Use Permits					
Personal Use Permits					
Sales Contracts					
Leases					
Stewardship Contracts					
Buying Permits					
Transportation Permits					
Industrial Camping Permits					
Other? (specify type)					

10. List any SFP non-regulatory management activities (e.g., fire prescription for berry production) on your district.

11. Are ecological impacts of district regulatory and non-regulatory SFP management activities monitored? Yes, No

If Yes, list activities, methods, and who does the work, e.g., FS botanist, contractor, volunteer. If No, skip to question 13.

12. If monitoring the ecological impacts of SFP management activities occurs on your district, does your data show:

a. positive effects on biodiversity Yes___ No___ Undetermined ___

b. negative effects on biodiversity Yes___ No___ Undetermined ___

c. List supporting documents _____

13. What barriers exist to inventorying and monitoring SFPs on your district? _____

_____

14. Do SFP harvesters on your district contribute knowledge about SFPs that helps management? Yes___ No___

15. Are Forest Service personnel on your district collaborating with SFP harvesters on any projects? Yes___ No___

16. Could commercial harvesters contribute to inventorying district SFPs? Yes__ No__. Monitoring? Yes__ No__ (Why or why not?) _____

17. What barriers exist to increasing commercial harvesting of SFPs on your district? _____

_____

18. Have you read any part of the following publications before receiving this survey?

a. USDA Forest Service's *National Strategy for Special Forest Products*. FS-713. 2001. Yes___ No___

b. *Nontimber Forest Products in the United States* by Jones, McLain and Weigand. 2002. Yes___ No___

c. *Non-Timber Forest Products* by Emery and McLain. 2001. Yes___ No___

d. Have you used the U.S. Non Timber Forest Products website at www.ifcae.org/ntfp/ Yes___ No___

Appendix 2: List of Districts Responding

* Part of a multiple-district response (i.e., response received for the districts from a zone, management unit, or Supervisors Office employee).

Region	National Forest	Ranger District
1	Beaver-Deerlodge	Madison
1	Beaver-Deerlodge	Wise River*
1	Beaver-Deerlodge	Dillon*
1	Beaver-Deerlodge	Wisdom
1	Beaver-Deerlodge	Pintler*
1	Beaver-Deerlodge	Butte
1	Beaver-Deerlodge	Jefferson*
1	Clearwater	Lochsa
1	Clearwater	Powell
1	Custer	Sioux
1	Gallatin	Big Timber
1	Gallatin	Hegben Lake
1	Idaho Panhandle	Coeur d'Alene River
1	Idaho Panhandle	Bonners Ferry
1	Idaho Panhandle	Priest Lake
1	Kootenai	Cabinet
1	Lewis and Clark	Musselshell
1	Lolo	Missoula
2	Arapahoe-Roosevelt	Clear Creek
2	Arapahoe-Roosevelt	Sulphur
2	Arapahoe-Roosevelt	Canyon Lakes
2	Bighorn	Tongue
2	Black Hills	Bearlodge
2	Grand Mesa, Uncompahgre, and Gunnison	Grand Valley
2	Grand Mesa, Uncompahgre, and Gunnison	Paonia
2	Grand Mesa, Uncompahgre, and Gunnison	Gunnison

Region	National Forest	Ranger District
2	Medicine Bow-Routt	Yampa
2	Nebraska	Pine Ridge
2	Pike-San Isabel	South Park
2	Pike-San Isabel	Salida
2	San Juan-Rio Grande	Mancos-Dolores
2	San Juan-Rio Grande	Divide
2	San Juan-Rio Grande	Saguache
2	San Juan-Rio Grande	Conejos Peak
2	White River	Blanco
2	White River	Rifle
2	White River	Aspen
2	White River	Sopris
3	Apache-Sitgreaves	Alpine*
3	Apache-Sitgreaves	Springerville*
3	Carson	Camino Real
3	Coconino	Peaks*
3	Coconino	Mormon Lake*
3	Coronado	Nogales
3	Coronado	Sierra Vista
3	Gila	Black Range
3	Gila	Glenwood
3	Gila	Quemado
3	Gila	Reserve
3	Kaibab	Williams
3	Kaibab	Tusayan
3	Kaibab	North Kaibab
3	Prescott	Bradshaw
3	Tonto	Payson
3	Tonto	Pleasant Valley*
3	Tonto	Globe
4	Ashley	Flaming Gorge
4	Ashley	Vernal
4	Ashley	Roosevelt-Duch
4	Boise	Cascade
4	Boise	Emmett
4	Boise	Idaho City

Region	National Forest	Ranger District
4	Bridger-Teton	Kemmerer
4	Bridger-Teton	Big Piney*
4	Bridger-Teton	Greys River*
4	Bridger-Teton	Jackson*
4	Bridger-Teton	Buffalo*
4	Bridger-Teton	Pinedale*
4	Caribou-Targhee	Soda Springs*
4	Caribou-Targhee	Ashton-Island Park*
4	Fishlake-Dixie	Cedar City
4	Fishlake-Dixie	Escalante
4	Fishlake-Dixie	Richfield
4	Fishlake-Dixie	Loa-Teasdale
4	Fishlake-Dixie	Powell
4	Fishlake-Dixie	Fillmore
4	Humboldt-Toyaibe	Mountain City
4	Salmon-Challis	Challis
4	Salmon-Challis	Salmon Cobalt*
4	Salmon-Challis	North Fork*
4	Salmon-Challis	Middle Fork*
4	Salmon-Challis	Leadore
4	Salmon-Challis	Yankee Fork
4	Salmon-Challis	Lost River
4	Sawtooth	Fairfield
5	Eldorado	Georgetown
5	Eldorado	Pacific
5	Inyo	Mono Lake
5	Klamath	Goosenest
5	Klamath	Scott River
5	Klamath	Salmon River
5	Lassen	Hat Creek*
5	Lassen	Almanor*
5	Lassen	Eagle Lake*
5	Los Padres	Mont Pinos
5	Los Padres	Santa Lucia
5	Modoc*	
5	Plumas	Mount Hough
5	Shasta-Trinity	Lower Trinity

Region	National Forest	Ranger District
5	Sierra	Bass Lake
5	Stanislaus	Calaveras
5	Tahoe	Foresthill
6	Colville	Three Rivers
6	Fremont-Winema	Lakeview
6	Fremont-Winema	Chemult
6	Fremont-Winema	Chiloquin
6	Gifford Pinchot	Cowlitz Valley
6	Gifford Pinchot	Mount Adams
6	Malheur	Blue Mountain*
6	Malheur	Prairie City*
6	Malheur	Emigrant*
6	Mount Baker-Snoqualmie	Darrington*
6	Mount Baker-Snoqualmie	Mount Baker*
6	Mount Baker-Snoqualmie	Snoqualmie
6	Mount Hood	Clackamas River*
6	Mount Hood	Zigzag*
6	Mount Hood	Hood River*
6	Mount Hood	Barlow*
6	Nez Perce*	Forest response only
6	Okanogan-Wenatchee	Tonasket
6	Okanogan-Wenatchee	Chelan
6	Okanogan-Wenatchee	Cle Elum
6	Okanogan-Wenatchee	Naches
6	Olympic	Hood Canal
6	Olympic	Pacific
6	Rogue-Siskiyou	Powers
6	Rogue-Siskiyou	Prospect*
6	Rogue-Siskiyou	Butte Falls*
6	Rogue-Siskiyou	Applegate
6	Umpqua	Cottage Grove
6	Umpqua	Diamond Lake
6	Umpqua	North Umpqua
6	Umpqua	Tiller
6	Willamette	Middle Fork
8	Alabama National Forests	Bankhead
8	Chattahoochee-Oconee	Chattooga

Region	National Forest	Ranger District
8	Chattahoochee-Oconee	Oconee
8	Cherokee	Ocoee
8	Cherokee	Watauga
8	Daniel Boone	Redbird
8	Daniel Boone	London
8	Daniel Boone	Morehead
8	Daniel Boone	Somerset
8	Daniel Boone	Stearns
8	Florida National Forests	Seminole
8	Florida National Forests	Lake George
8	George Washington-Jefferson*	
8	Kisatchie	Winn
8	Mississippi National Forests	Bienville
8	Mississippi National Forests	De Soto
8	Mississippi National Forests	Holly Springs
8	Mississippi National Forests	Homochitto
8	North Carolina National Forests	Appalachian
8	North Carolina National Forests	Highlands
8	North Carolina National Forests	Wayah
8	North Carolina National Forests	Tusquitee
8	North Carolina National Forests	Pisgah
8	Ouachita	Oklahoma (Tiak, Kiamichi, Choctaw)
8	Ouachita	Womble*
8	Ouachita	Caddo*
8	Ouachita	Mena & Oden
8	Ozark-St. Francis	Sylamone*
8	Ozark-St. Francis	St. Francis*
8	Ozark-St. Francis	Boston Mountain
8	Ozark-St. Francis	Mount Magazine
8	Ozark-St. Francis	Pleasant Hill
8	Ozark-St. Francis	Bayou
8	Sumter	Andrew Pickens
8	Texas National Forests-Sabine	Sabine
9	Allegheny	Marienville
9	Allegheny	Bradford
9	Chequamegon-Nicolet	Lakewood-Laona

Region	National Forest	Ranger District
9	Chequamegon-Nicolet	Medford-Park Falls
9	Chequamegon-Nicolet	Great Divide
9	Chequamegon-Nicolet	Washburn
9	Chippewa	Walker
9	Chippewa	Blackduck
9	Chippewa	Marcell and Deer River
9	Green Mountain	Rochester and Middle
9	Hiawatha	Munising
9	Hiawatha	Rapid River-Manistique
9	Hiawatha	Sault St. Marie
9	Hiawatha	St. Ignace
9	Huron-Manistee	Baldwin-White Cloud
9	Huron-Manistee	Tawas-Harrisville
9	Huron-Manistee	Cadillac-Manistee
9	Huron-Manistee	Mio
9	Mark Twain	Ava-Cassville-Willow
9	Mark Twain	Doniphan-Eleven Pt.
9	Mark Twain	Houston & Rolla
9	Mark Twain	Cedar Creek
9	Mark Twain	Potosi
9	Mark Twain	Salem
9	Mark Twain	Poplar Bluff
9	Monongahela	Gauley
9	Monongahela	Marlinton*
9	Monongahela	White Sulphur*
9	Monongahela	Cheat
9	Monongahela	Potomac
9	Ottawa	Begland
9	Ottawa	Bessemer
9	Ottawa	Kenton
9	Ottawa	Ontonagon
9	Ottawa	Watersmeet
9	Ottawa	Iron River
9	Shawnee	Vienna
9	Shawnee	Jonesboro-Murphy
9	Superior	Laurentian
9	Superior	Tofte and Gunflint

Region	National Forest	Ranger District
9	Wayne	Ironton*
9	Wayne	Athens*
9	White Mountain	Androscoggin
9	White Mountain	Ammonusuc-Pemigewassett.
9	White Mountain	Saco
10	Chugach	Glacier
10	Tongass	Hoonah
10	Tongass	Petersburg
10	Tongass	Craig
10	Tongass	Wrangell
10	Tongass	Juneau
10	Tongass	Ketchikan-Misty Fiord

Appendix 3: Combined List of Products or Species

The list is composed of terms used by the respondents. We did not attempt to consolidate items (i.e., novelty wood and special wood), as we can't be certain whether the terms refer to the same items. Many respondents recorded general categories (e.g., floral greens) as well as nonbiological products; additionally only a few respondents provided scientific names for the species they listed. Owing to the difficulty of assigning scientific names to the products (i.e, cedar could include several species of trees, including incense cedar (*Calocedrus decurrens*) (Torr.) *Florin*, Spanish cedar (*Cedrela odorata* L.), Alaska cedar (*Chamaecyparis nootkatensis* (D. Don) Spach), common juniper (*Juniperus communis* L.), and eastern redcedar (*Juniperus virginiana* L.), we have listed the terms as used by respondents. Although some of the items included in the list likely overlap, many of the items listed also likely encompass more than one species or product. For example, on some districts that reported "mushrooms," multiple species of mushrooms are harvested. The list thus provides only an approximate picture of the numbers and types of species and products harvested on national forests.

Agave
Bark
Bark–birch
Bark–cedar
Basketry material
Bean sticks
Beargrass
Berries
Berries–huckleberries
Berries–saw palmetto
Botanical specimens
Botany permits
Boughs
Boughs–balsam
Boughs–Christmas
Boughs–conifer
Boughs–green
Brown ash
Burls
Chaparral
Christmas trees
Cohosh
Cohosh–black
Cones
Cones–acorn
Cones–conifer
Cones–dry
Cones–Frazier fir
Cones–pine
Cones–sugar pine
Cuttings
Ferns
Fiber
Firewood
Firewood–oak, religious
Floral greenery
Floral products
Fronds–palm
Fronds–palmetto
Galax
Galax leaves
Ginseng

Goldenseal
Grapevine
Gravel
Green alder
Hay
Herbs
Juniper products
Ladybugs
Latillas
Leeks
Lycopodium
Lyonia ferruginea
Manzanita
Maple taps
Medicinal plants
Minerals
Mistletoe
Moss
Moss–deer
Moss–log
Moss–sheet
Moss–wood
Mountain laurel–cuttings
Mountain laurel–sticks
Mushrooms
Native American materials
Nuts–acorns
Nuts–pinyon
Ocotillo
Ornamentals
Palmetto fronds
Pine products
Pine straw
Plants–miscellaneous
Poles–bean
Poles–ceremonial firewood
Poles–tepee
Posts–cedar
Posts–fence
Posts–locust
Posts and poles
Princess pine
Ramps
Rhododendron–sticks
Rock
Rock–decorative
Rock–landscape
Root wads
Salal
Sand
Sassafras
Scientific study collections
Seed
Seed–fescue
Seed–native plants
Seed–wildflower
Seedlings–Frazier fir
Shrubs
Sotol
Stays–fence
Stumps–cedar
Timber–sawlogs
Transplants–evergreen
Transplants
Transplants–aspen
Transplants–lodgepole pine
Transplants–rhododendron
Transplants–sagebrush
Trees
Trees–bonsai
Turkey oak tips
Twigs
Twigs–birch
Vigas
Vines
Walking sticks–aspen

Wildflowers	Wood–decorative
Wildings	Wood–house logs
Willows	Wood–salvage
Wood–carving logs	Wood–small sales
Wood–cedar	Wood–sticks
Wood–construction	Wood–stumps
Wood–craft	Yucca

Appendix 4: NTFP Inventorying and Monitoring Methods, 2003

Inventory methods

Biological studies	Informal field checks	Permits	Cultural resource survey
Plots	Informal check or inspection	Permit analysis or administration	Cultural resource survey
Field exam	Inspection	Permittee survey	
Compartment exam	Roadside surveys		
Inventory			
General survey			
Cruising			
Transect analysis			
Stand exams			

Monitoring methods

Biological studies	Informal field checks	Permits
Plots	Informal check or inspection	Permit analysis or administration
Field exam	Inspection	Permittee survey
Compartment exam	Roadside surveys	
Inventory	Site checks	
General survey		

Appendix 5: Personnel Who Inventory and Monitor NTFPs

Inventorying[a]

Forest Service forester	Forest Service vegetation team	Forest Service biological scientist	Other Forest Service personnel	Non-Forest Service personnel
Forester or silviculturalist	Vegetation team	Ecologist	Cultural resource manager	Contractor
Timber sales administrator			Wildlife technician	Graduate student
Forest technician			Wildlife biologist	Volunteers
			Special Forest Products Coordinator	

[a]"District staff," "forest management staff," and "temporary" excluded for lack of specificity.

Monitoring[a]

Forest Service forester	Forest Service law enforcement officer	Forest Service biological scientist	Other Forest Service personnel	Non-Forest Service personnel
Forester or silviculturalist	Law enforcement	Botanist	Front desk	Contractor
Timber sales administrator		Ecologist	Recreation	Volunteers
Forest technician		Mycologist	Cultural resources manager (CRM)	
			CRM technician	
			Engineer	
			Minerals specialist	
			Wildlife technician	
			Wildlife biologist	
			SFP coordinator	
			SFP technician	

[a]"District staff," "forest management staff," "resource officer," "specialist" and "temporary" excluded for lack of specificity.

Appendix 6: Personnel Who Monitor Ecological Impacts of NTFP Management Activities[a]

Forest Service forester	Forest Service law enforcement officer	Forest Service biological scientist	Other Forest Service personnel	Non Forest Service personnel
Foresters or silviculturalist	Law enforcement	Biologist	Cultural resources manager	Other agency
Timber sales administrator		Botanist	Cultural resources management technician	Contractor
Forest technician		Ecologist	Wildlife biologist	Nongovernmental organization
		Botany technician	SFP coordinator	Scientist
			SFP permit administrator	Users
			Fish biologist	Volunteers
			NEPA team	
			Fire staff	
			Hydrologist	

[a]"District staff," "specialist," and "temporary" were excluded for lack of specificity.

Appendix 7: Reasons to Involve Harvesters in Inventory and Monitoring

Assist law enforcement with monitoring	Have interest	Provide labor	Improve business and management	Have knowledge
Can help do law monitoring for enforcement	Harvesters have an interest in doing inventory and monitoring	Harvesters can provide labor	Involving harvesters will help small business do better	Harvesters have knowledge
			Harvesters involvement will improve management	Harvesters can report data or information from the field

Appendix 8: Reasons for Not Involving Harvesters in Inventory and Monitoring[a]

FS lacks funding	FS lacks capacity (not lack of money)	No inventory and monitoring needed	Political obstacles	Negative agency perceptions of harvester ability	Negative agency perceptions concerning harvester interest	Other
Lack of funding	Large areas makes management difficult	Limited resource supply	Potential for conflicts	Lack credibility	Limited (harvester) demand	Low market value
	Lack institutional capacity to carry out enforcement	No perceived need	Policies inconducive to collaboration	Doubt reliability	Lack of incentives for harvesters	Limited market
	Lack institutional capacity for developing trust with harvesters	Sufficient knowledge already	Lack of institutional support / political will	Bias	Secrecy	Commercial harvest not allowed
	Lack institutional capacity to do monitoring		Not an agency priority	Limited skills	Harvesters unwilling to cooperate	No or limited number of harvesters
	Institutional capacity lacking (system)			Harvesters have limited knowledge		Forest is remote
	Lack of personnel					
	Small program					

[a] "Limited public interest" and "interest lacking" excluded for lack of specificity.

Appendix 9: Barriers to Expanding Commercial NTFP Harvesting

FS lacks funding	FS lacks capacity (not lack of funding)	Business obstacles	Regulatory restrictions	Political obstacles
Lack of funding	Lack administrative capacity	Limited demand from harvesters	No commercial harvesting allowed	Lack of agency support
	Lack analytical capacity	Limited supplies of resources	Permits cost too much	Low agency priority
	Lack enforcement capacity	Unsuitable location	Planning, policy, or regulatory restrictions	Low benefit for cost
	Lack monitoring capacity	Market barriers	Site closures	Potential stake-holder objections
	Lack knowledge	No need	Access limitations	Concerns over conflicts
	Lack staff	No or small program		Concerns about sustainability
	Lack inventory and monitoring capacity	Remote location		
	Lack planning capacity	Variation in resource demand		
	Large acreage to manage	Variation in resource supplies		
		Scattered or wide distribution of resources		
		No or few commercial harvesters		

Appendix 10: Barriers to NTFP Inventory and Monitoring

FS lacks funding	FS lacks capacity (not lack of money)	Unclear to respondent if inventory and monitoring is needed	Political obstacles
Lack funding	Large area	Limited demand for resources	Lack of interest (within agency)
	Lack expertise	No perceived need	Lack political will or management support
	Lack planning capacity	Few harvesters	Not a priority
	Lack staff or personnel	Resources are abundant, no need to monitor harvesting	Lack of public interest
	Wide distribution		Limited resource supplies
	Remote location		
	Small program		

Pacific Northwest Research Station

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