

Non-Timber Forest Products Enterprises in the South: Perceived Distribution and Implications for Sustainable Forest Management

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Abstract: Forests of the southern United States are the source of a great diversity of flora, much of which is gathered to produce non-timber forest products (NTFPs). These products are made from resources that grow under the forest canopy as trees, herbs, shrubs, vines, moss and even lichen. They occur naturally in forests or may be cultivated under the forest canopy or in agroforestry settings. NTFPs may be marketed with little processing, such as dried roots and herbs, graded and bundled leaves and twigs, or live plants. Some are processed into finished products, such as carvings, walking sticks, jams, jellies, tinctures, or teas. Over the last decade, interest in managing forests for NTFPs has grown tremendously, yet very little is known about the materials collected, the people who collect them, or the enterprises that produce and market them. NTFP enterprises are found throughout the south, and may be small family owned operations with a few employees or may be an individual gatherer or craft person. The current state of knowledge about the major NTFPs is identified and discussed. We examine and present the estimated distribution of NTFP enterprises, by major product category, throughout the southern United States. This is correlated with ecological distribution of the major species and forest type data. Issues and concerns regarding the sustainable management of non-timber forest resources to support these enterprises are discussed. To sustain non-timber forest product enterprises will require considering and including them in forest management.

Key words: Crafts, Edibles, Enterprises, Floral, Medicinal, Non-Timber Forest Products, Sustainability,

Introduction

Just as the plants and other biological material harvested for non-timber forest products (NTFPs) are critical in the functioning of healthy forest ecosystems, the trade and use of the products are valuable to rural economies and livelihoods. Unfortunately, the research and knowledge needed to understand the impact that collection of these plants has on either the ecology or the economy is not available to guide forest landowners and managers. In general, NTFPs are only now beginning to be accepted as natural resources, similar to timber, that require active management programs.

Research and evaluation is needed in many areas concerning NTFP resources and their markets. An inventory of products available for collection is wanting. The market channels through which NTFPs travel are not well understood. Unlike the timber-based industry, the demographics of NTFP market players has not been examined, nor fully described. Further, the volume of NTFPs being processed through various market channels has not been estimated. With development of this knowledge, our understanding of the regional social and economic impact of NTFPs would be greatly enhanced. Coupling this with future inventory data will help to answer questions concerning the sustainability of important non-timber forest products. This information is essential to incorporate these plants into improved forest management strategies.

This paper presents preliminary results of an ongoing study designed to provide an overview of the NTFP industry in the southern United States. The findings are based on the perceptions of Cooperative Extension agents, working primarily at the county level, although some states have had to extend the geographic responsibilities of the agents due to budget constraints. The data represent the first round of analysis and will be improved through additional field work. Albeit, results provide valuable information that will help provide focus for future efforts.

Approach

The overall goal of this study is to improve the understanding of the magnitude of the non-timber forest products industry in the southern United States. The study is designed to aid in defining and articulating the importance of NTFPs generated from southern forests. Through this effort, we expect to begin to describe and estimate the distribution of NTFP enterprises throughout the region.

The study is limited in geographic scope to the area within the contiguous United States that defines the U.S. Forest Service Region 8 (R-8). This region covers 13 states from Texas and Oklahoma east to the Atlantic Ocean and north to include Kentucky and Virginia. Although Puerto Rico is included in R-8, it has not been included in this study. The biological diversity of the southern Appalachian hardwood forests has been compared to that of the tropical rain forests. Many NTFPs gathered from this region are found only in these forests.

Unlike the timber industry where directories of primary and secondary manufacturers are readily available to aid in contacting firms, no such sample frames exist for the non-timber forest products industry. Because of this obstacle, the approach taken in this study is to focus on county level extension agents, as it was felt that these people would have the best understanding of NTFP enterprises within the counties. To test this assumption, we initially contacted Cooperative Extension Service agents, Department of Forestry county agents, and Resource Conservation and Development Specialists in Virginia to determine which group would be the best to contact regarding NTFP enterprises. After receiving many responses from the latter two groups that they “don’t do any work in this area,” we decided to focus on Cooperative Extension Service agents. Contact information for Cooperative Extension agents was obtained from appropriate websites for the respective states and counties. In some states, due to budgetary constraints and reorganization, the agents have responsibilities for multiple counties. Reorganization has resulted in the loss of older more experienced agents, which has an unfortunate consequence of reducing the knowledge base gained from this experience.

Each Cooperative Extension agent throughout the region was sent a one-page fax explaining the purpose of the project with a request to complete a short data matrix of pertinent information. Agents were asked to estimate, based on their experience, the number of NTFP enterprises in each of five categories that are active in their geographic area of responsibility. The categories for which agents were asked to provide information were: edible products, specialty wood products, floral and decorative products, landscape products, and medicinal and dietary supplements. Agents were provided examples of products within each of these categories to clarify any possible misunderstandings. They were invited to add to the list of products to make sure no important examples were missed. Finally, agents were asked to identify any products of concern for sustainability.

As is needed to ensure adequate response, follow-up procedures were initiated two weeks after the initial fax was sent to the agents. The first round of follow-up entailed sending a reminder fax to each agent who had not responded. If this did not generate a response, the next means of follow-up was to place a telephone call to the respective agents and ask if they would take a few minutes to complete the matrix at that time. This approach, as developed by Dillman (1978), is readily accepted in similar research.

Non-Timber Forest Products

A variety of terms (e.g., non-traditional, secondary, minor, non-wood, and special or specialty) have been used to describe products that come from the forests that are not timber-based. National legislation uses the term “Forest Botanical Products” to describe these products (H.R. 2466 1999). The USDA Forest Service defines them as special forest products (USDA Forest Service 2001). A more common and widespread term is “non-timber forest products.” Whatever the chosen term used to describe these products, they are all based on plants or fungi or other flora materials. They do not include wildlife or other fauna.

Non-timber forest products are defined as plants, parts of plants, fungi, and other biological material harvested from within and on the edges of natural, manipulated or disturbed forests. This includes fungi, moss, lichen, herbs, vines, shrubs, or trees. Plant parts harvested include the roots, tubers, leaves, bark, twigs and branches, fruit, sap and resin, as well as the wood (Chamberlain et al. 1998). These products are commonly classified into four major product categories: culinary, wood-based, floral and decorative, and medicinal and dietary supplements. A newly emerging category of NTFPs used in the landscape industry includes products such as pine straw and live native plants collected from the wild. More than 30 species of plants are commonly gathered as non-timber forest products in the southern United States (Table 1). Clearly, the majority of non-timber forest products are used for medicinal purposes. Plants used for floral and decorative uses are also well represented. Chamberlain and Predny (2002) present a more comprehensive list with additional information on many of the products.

Table 1. Non-timber forest products common to the southern United States.

Common Name	Botanical Nomenclature	Use
Fraser fir	<i>Abies fraseri</i>	Floral Decorative
Black cohosh	<i>Actaea racemosa</i>	Medicinal
Ramps, wild onions, leeks	<i>Allium tricoccum</i>	Edible
Virginia snakeroot	<i>Aristolochia serpentaria</i>	Medicinal
Smokevine	<i>Aristolochia macrophylla</i>	Woody-based crafts, Floral Decorative
Blue cohosh	<i>Caulophyllum thalicroides</i>	Medicinal
Star grub, devil's bit, false unicorn	<i>Chamaelirium luteum</i>	Medicinal
Pipsissewa, common wintergreen	<i>Chimaphila umbellata</i>	Floral Decorative
Running cedar	<i>Diphasiastrum digitatum</i>	Floral Decorative
Persimmon	<i>Diospyros</i> spp.	Edible
Sweet Joe-pye weed	<i>Eupatorium purpureum</i>	Medicinal
Galax	<i>Galax urceolata</i>	Floral Decorative
Witch hazel	<i>Hamamelis virginiana</i>	Medicinal
Goldenseal	<i>Hydrastis canadensis</i>	Medicinal
Log mosses	<i>Hypnum curvifolium</i> , <i>H. imponens</i> , <i>Thuidium delicatium</i>	Floral Decorative
Black walnut	<i>Juglans nigra</i>	Medicinal
Mountain laurel	<i>Kalmia latifolia</i>	Floral Decorative
Dog-hobble, switch ivy	<i>Leucothoe editorum</i>	Floral Decorative
Indian tobacco	<i>Lobelia inflata</i>	Medicinal
Princess pine, ground-pine	<i>Lycopodium obscurum</i> , <i>L. clavatum</i>	Floral Decorative, Medicinal
American ginseng	<i>Panax quinquefolius</i>	Medicinal
Longleaf pine	<i>Pinus palustris</i>	Floral Decorative
Mistletoe	<i>Phoradendron flavescens</i>	Floral Decorative
Mayapple	<i>Podophyllum peltatum</i>	Medicinal
Seneca snakeroot	<i>Polygala senega</i>	Medicinal
Common Solomon's seal, giant Solomon's seal	<i>Polygonatum biflorum</i>	Medicinal
Wild black cherry	<i>Prunus serotina</i>	Medicinal
Red raspberry	<i>Rubus idaeus</i>	Medicinal
Bloodroot	<i>Sanguinaria canadensis</i>	Medicinal
Sassafras	<i>Sassafras albidum</i>	Medicinal, Woody-based crafts
Slippery elm	<i>Ulmus rubra</i>	Medicinal

Though no formal estimates have been made of the total value of the NTFP markets in this region, available data illustrates the economic importance of some individual products. For example, in 1995, the U.S. exported moss and lichen, much of which was from southern forests, valued at more than \$14 million (Goldberg 1996). In 1996, collectors of the fruit of black walnut, which is found in eastern hardwood forests, were paid more than \$2.5 million (J. Jones, Hammons Products Company, personal communication). One company in southwest Virginia specializing in pine roping had sales in excess of \$1.5 million in 1997 (Hauslohner 1997). A volunteer fire department in western North Carolina generates approximately 35 percent of its budget from its annual ramp (wild onion) supper. In 1999, the retail sales of saw palmetto exceeded \$45 million, representing a 34 percent increase over the previous year (Blumenthal 2000). Based on 2001 prices, we estimate the average wholesale value of forest-harvested ginseng to collectors in a four state region exceeds \$18.5 million. Certainly, the aggregate value of non-timber forest products to the southern economy far exceeds these examples.

NTFP Enterprises

Non-timber forest products are commonly organized into four major product categories: culinary (edible), specialty wood-based, floral and decorative, and medicinal and dietary supplements. An emerging product category includes plants and plant materials that are used in landscaping, such as live native plants and pine straw. This paper focuses on the major product categories identified above, as the understanding of these segments are more developed than that of landscape forest products. The non-timber forest products industry is made up of a diverse collection of enterprises. In general, enterprises involved in NTFPs may collect, buy, sell, process, or work with these products to produce goods and services. In this diverse industry, an enterprise may be an individual who collects and sells raw materials with little or no processing, such as an individual that digs and sells ginseng; a family farm or small business that produces wreaths or other value-added products; or a formal corporation that employs many people. These NTFP enterprises include a vast array of firms, from individual entrepreneurs to multi-employee organizations, from the point where the NTFP is collected to the point of final consumption. The fundamental thread that embraces these organizations is the use of products gathered or collected from natural or manipulated forests (e.g., agroforests), that are derived from flora or fungi, but not timber-based.

Edible NTFPs. Culinary non-timber products include mushrooms, fruits, ferns, greens, as well as roots and tubers. In the southern Appalachian hardwood region, food festivals are organized around the emergence of wild onions (*Allium tricoccum*), locally known as ramps. Maple syrup festivals also are common in communities in higher elevations and further north within the region. Fiddleheads (the young, tightly coiled fronds of the fern *Matteuccia struthiopteris*), dandelion (*Taraxacum* spp.) greens, and poke salat (*Phytolacca decandra*) are also commonly eaten in the spring. Nuts and berries — including black walnuts (*Juglans nigra*), muscadine grapes (*Vitis rotundifolia*), blueberries (*Vaccinium* spp.), raspberries and blackberries (*Rubus* spp.), and persimmons (*Diospyros virginiana*) — are also commonly gathered, consumed, and sold throughout the southeastern U.S.

Figure A. Perceived distribution of enterprises that use edible forest products.

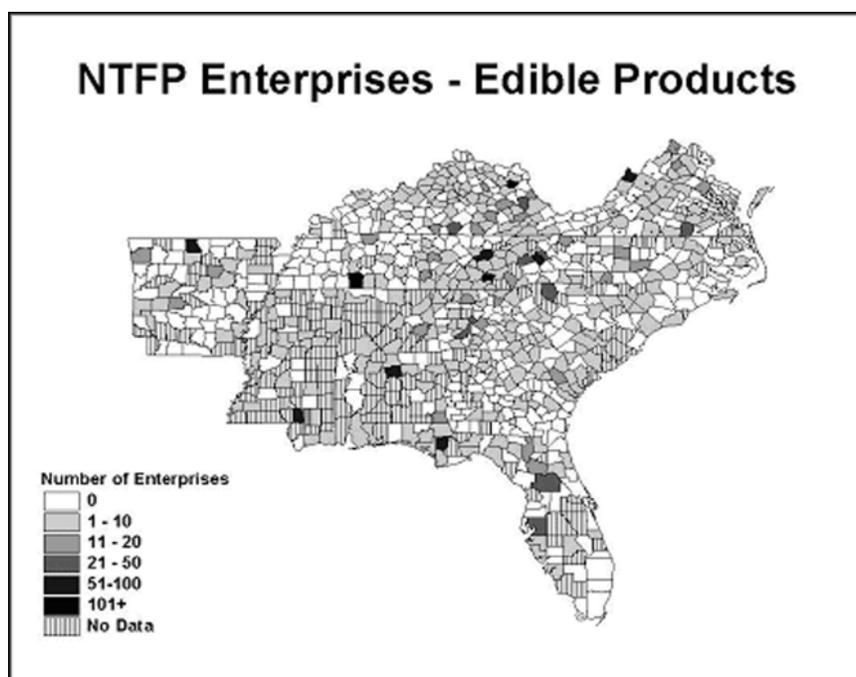
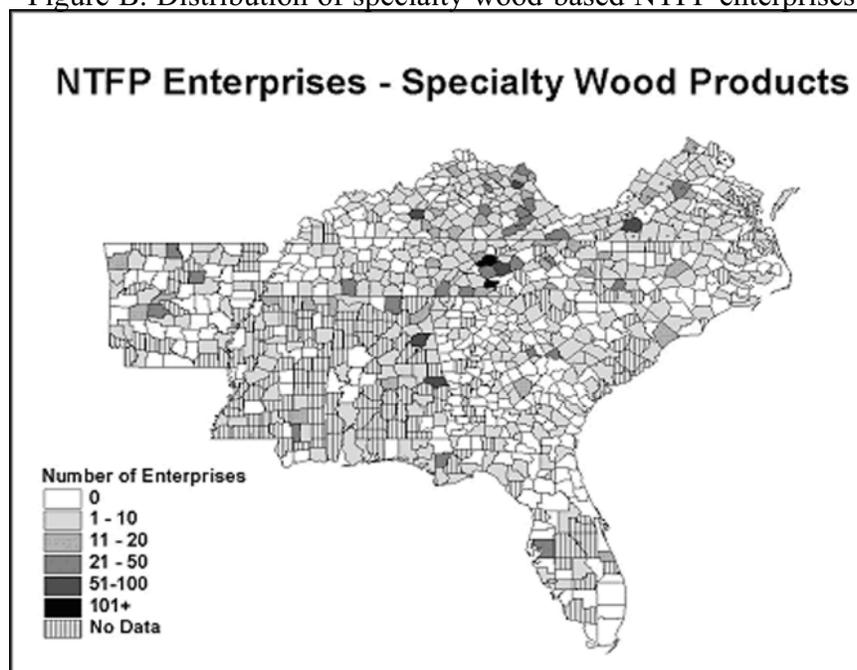


Figure A illustrates the perceived distribution of NTFP enterprises in the southern United States that use edible forest products. The distribution does not seem to be concentrated in one area, but is widely distributed throughout the region. A few counties in Florida, Georgia, South Carolina, North Carolina, Virginia and Kentucky appear to have between 21 and 50 enterprises.

Three counties, one in Kentucky and two in Tennessee, are perceived to have more than 100 NTFP enterprises using edible forest products. Seven counties in the states represented by the map are perceived to have a range of 51-100 NTFP enterprises. Further research and investigation will aid in better understanding the reasons for the scattered pockets of high distribution.

Specialty Wood-based NTFPs. Wood-based NTFPs are produced from trees or parts of trees, excluding products made from cut timber. Some of the more important wood-based NTFPs include sassafras stems for walking sticks (*Sassafras albidum*), willow branches for furniture (*Salix* spp.), and bald cypress knees for carving (*Taxodium distichum*). Products made from vines, such as smokevine (*Aristolochia macrophylla*) and grapevine (*Vitis* spp.), are also included in this category. A variety of hardwoods are used for carvings, a few of which are listed in the accompanying table (Table 1). The number of species with potential for use in the production of crafts is only limited to the crafters imagination and what the market will accept.

Figure B. Distribution of specialty wood-based NTFP enterprises.

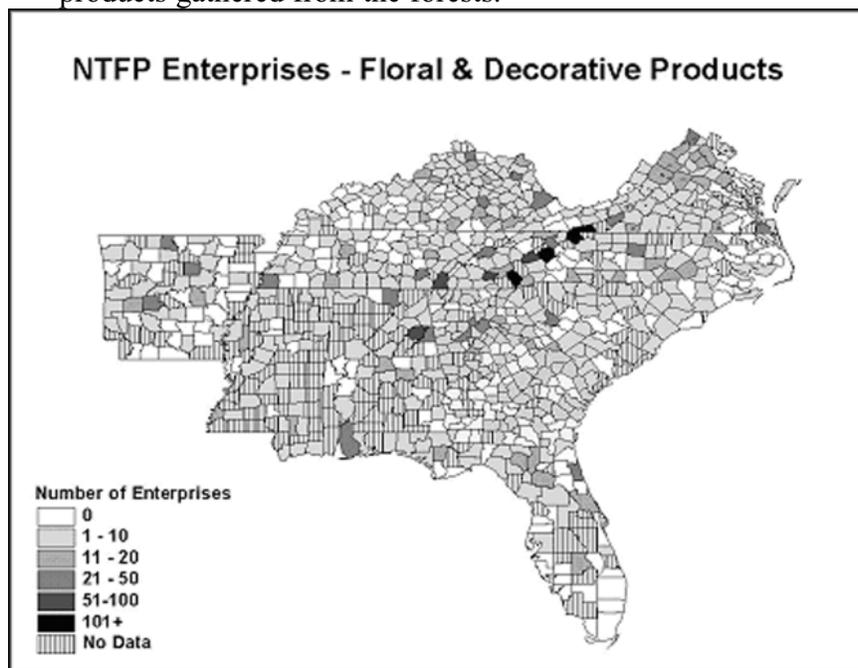


NTFP enterprises using specialty wood products are widely distributed throughout the south (Figure B). Extension agents perceive that a great many counties have one to ten

enterprises that use specialty wood products. Several counties in western North Carolina and eastern Tennessee have more than 20 NTFP enterprises. Nine counties in Kentucky have more than 21 such enterprises, while another ten counties are estimated to have between 11 and 20 enterprises. Another 15 counties throughout the region are perceived to have more than 21 NTFP enterprises that produce specialty wood products. The specialty wood-based segment of the NTFP industry is very fragmented and primarily small, home-based enterprises, making it difficult to identify and catalog the many enterprises.

Floral and Decorative NTFPs. Many forest species are harvested and used in the floral industry as compliments to flower arrangements. The leaves of galax (*Galax urceolata*), an evergreen herbaceous perennial, are collected and exported to Europe for background foliage. Crooked-wood (*Lyonia ferrugenia*) from the forests of Florida is used to compliment dry flower arrangements. Grapevine (*Vitis* spp.) and smokevine (*Aristolochia macrophylla*) are collected throughout the region and crafted into wreaths, baskets and other sundry items. Several species of moss are harvested from Appalachian forests for the European floral industry.

Figure C. Perceived distribution of NTFP enterprises that use floral products gathered from the forests.

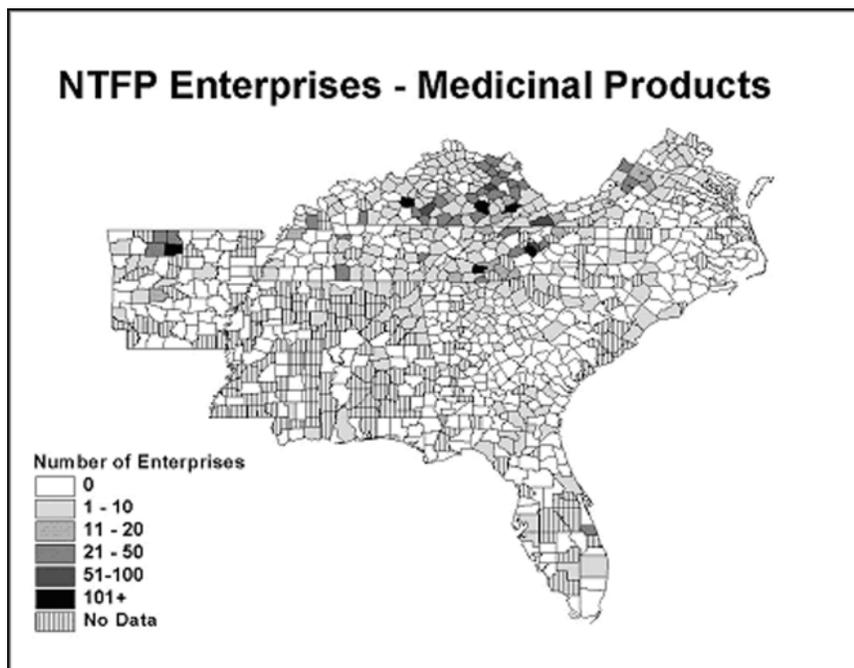


NTFP enterprises that use floral and decorative materials gathered from the forests also appear to be scattered throughout the region (Figure C). Counties in western North Carolina and eastern Tennessee are perceived to have the largest concentration; at least nine counties in this area are perceived to have between 51 and 100 enterprises producing for the floral industry. Extension agents in northern Virginia perceive that there are between 11 and 20 such enterprises in each of nine counties. One county agent in that region feels that there are between 21 and 50 such enterprises. Six counties in Florida are considered to have more than 11 floral-based NTFP enterprises. Floral and decorative products are used locally and are also exported worldwide.

Medicinal and Dietary Supplement NTFPs. Forest harvested plants used for their therapeutic value are marketed either as medicines or as dietary supplements. Plants that have been tested for safety and efficacy and meet strict U.S. Food and Drug Administration standards are marketed as medicines or drugs. Otherwise, they are legally considered food items, sold as dietary supplements, and product labels can make no claims about their medical benefits. According to Farnsworth and Morris (1976), 25 percent of all prescriptions dispensed in the United States contain active ingredients extracted from higher order plants. Over the last decade the markets for some herbal medicines and dietary supplements have grown astronomically.

The number of plant species harvested from southern forests with medicinal value exceeds 125 (Krochmal et al. 1969, TRAFFIC 1999). Of these, approximately 50 are commonly harvested and purchased by herb dealers. More than 80 percent of the forest-harvested ginseng comes from Virginia, Kentucky, Tennessee and North Carolina. The pine forests of Florida are the primary world source of saw palmetto (*Serenoa repens*), a popular medicinal plant. The Appalachian hardwood region is the principal source of many medicinal plants, including black cohosh (*Actaea racemosa*), American ginseng (*Panax quinquefolius*), and bloodroot (*Sanguinaria canadensis*).

Figure D. Perceived distribution of NTFP enterprises based on medicinal plants.



The greatest perceived concentration of NTFP enterprises that use medicinal plants are in Kentucky, southwest Virginia, western North Carolina, and eastern Tennessee (Figure D). Several counties in Northern Arkansas are perceived by local county extension agents to have more than 21 medicinal plant enterprises. Although a few other counties are considered to have large numbers of medicinal plant-based enterprises, for the most part, distribution is limited to counties represented by southern Appalachian hardwood forests.

Discussion

These preliminary findings provide valuable initial results that may help in development of new strategies to help sustain NTFP enterprises. They can help to identify geographic sub-regions with high concentrations of NTFP activities, which may be priority areas for future investigations. They also can provide insight into areas that may have potential for further enterprise development. But, the findings presented here are only preliminary and must be further developed to provide maximum benefits.

As this study is on-going, the data presented in not fully complete. Table 2 summarizes the responses from County Extension Agents, as of April 2003. Response rates exceeding 90

percent were attained for Kentucky, Tennessee, and Georgia. We therefore consider the first phase of data collection for these states completed. We also feel that the response rates from Virginia (88.7%) and North Carolina (86%) are sufficient to warrant moving to the next phase of data collection. In North Carolina, a few counties in the western hardwood forested area where a majority of NTFP resources are found are still classified as “no data,” which may warrant additional investigation. Additional follow-up and investigation is needed for South Carolina (76% response), Florida (79.1% response), and Arkansas (76% response). Our research in Alabama and Mississippi is still very much in the follow-up phase of this initial data collection.

Table 2. Responses from County Extension Agents.

State	Total Counties	Response to:			% Response	No Data Available	To Call / Still Waiting for Response **
		Fax 1	Fax 2	Phone			
Kentucky	120	30	31	56	97.5%	3	0
Tennessee	95	21	24	44	93.7%	6	0
Georgia	158	45	49	50	91.1%	14	0
Virginia	106	35	37	22	88.7%	10	2
North Carolina	100	23	43	20	86.0%	8	6
South Carolina	46	13	11	11	76.1%	10	1
Florida	67	16	25	12	79.1%	10	4
Arkansas	75	18	15	24	76.0%	2	16
Alabama	65	19	11	0	46.2%	0	35
Mississippi	82	14	23	0	45.1%	2	43
Total for All							
States	914	234	269	239	86.0%	65	107
Percentages		26%	29%	26%		7%	12%

** Follow up phone calls are still in progress

The data presented represents the perceptions of County Extension agents and warrants further investigation to validate these findings. We have found that due to reorganization of state agencies, some agents may have new counties for which they are now responsible, and are not

yet familiar with NTFP activities within the new areas. Perceptions depend on the length of service and familiarity within a particular county. Certainly, the longer an agent works in a county, the better her/his perceptions are of the actual situation. In addition, perceptions will depend on a person's interest in these enterprises. A county agent who is interested in NTFP-type enterprises will have a different perception of activities than someone who has no interest in them. To confirm these findings, these and other challenges must be overcome. On-site visits to a randomly selected sample of counties will help to confirm the findings.

While further investigation and analysis is needed to confirm the existence of NTFP enterprises at the county level, some general patterns can be seen from the accompanying maps. For example, there is a strong concentration of medicinal plant-based enterprises in the southern Appalachian hardwood forests of western North Carolina and eastern Tennessee ranging northward into southwestern Virginia and western Kentucky. In addition, the Ozark hardwood forests of northern Arkansas also have a greater concentration of these types of enterprises. There appear to be concentration areas of floral-based NTFP enterprises in the mountains of western North Carolina, northern Virginia, and mid-Florida. Further investigation of three major segments (i.e., Christmas greenery, pine straw, and live-plant nurseries) may reveal other areas of concentration. Both western North Carolina and western Kentucky seem to have higher concentrations of specialty wood-based NTFP enterprises. At this time, there does not seem to be an area with higher concentrations of enterprises producing edible products. Through further investigations, we expect to more clearly define the distribution of NTFP enterprises throughout the south. Currently the findings provide an initial assessment of the distribution and will aid in identifying general patterns of activities.

Sustainability Issues

Sustainable management for non-timber forest products requires consideration of three types of issues: ecological, economic, and social. The potential ecological impact of over-harvesting under current management strategies could be devastating for entire plant populations. The biological material harvested for NTFPs is a critical part in the functioning of healthy forest ecosystems. Unfortunately, current scientific knowledge cannot adequately determine if harvest levels and practices have long-term ecological impact on the NTFP resources. To rectify this will require new and additional funds to support targeted, basic and applied ecological research

and technology transfer. The collection and trade of these products is crucial to the economic well-being of rural people and communities. Hence, the loss of access to gathering areas, or a significant decline in plant populations could have tremendous economic impact on the collectors and associated businesses. Knowledge from research about the economic impact of NTFP activities is needed to influence policies to support the sustainable management of the region's forests. Finally, as many place recreational importance on gathering NTFPs, the social value gained from harvesting NTFPs is vital to local communities and needs to be understood. The wealth of traditional ecological knowledge could offer valuable insight into improving management. This valuable opportunity may be threatened if collection is banned, or if it is no longer feasible due to species loss. To achieve sustainable forest management of NTFPs will require a concerted effort to address all of these issues.

The markets for many non-timber forest products are well established and have formal channels through which the products flow, yet remain unknown and mysterious to many forest landowners. Some segments of the NTFP industry have grown rapidly over the last decade, and some have great potential to continue to grow. The demographic conditions and consumer preferences in the United States are encouraging for the continued growth in the trade and use of NTFPs. In general, consumers are moving toward things that are organic or made of natural materials. Many Americans in the "baby boomer" generation have become frustrated with the high costs of western medicines and are looking for alternatives, which include herbal medicines. More than half of the nearly 40 million men who will turn 50 in the next decade may experience prostate problems. Many of these may choose alternatives such as saw palmetto, a plant whose berries have been shown effective against inflamed prostate.

For the landowner who is willing to explore unusual markets and to take the risks associated with new ventures, non-timber forest products may provide alternatives for increasing forest income. To realize the potential of these products, landowners and extension agents need to have a clear understanding of what NTFPs are found in local forests. For example, recommending that a landowner in Louisiana plant ginseng is foolish because it does not grow in that climate. Without an inventory there is no way to know what is available, how much can be harvested, or when to harvest. Additionally, one of the greatest challenges to the forest landowner is to identify and figure out appropriate market entry points. It is essential to identify where and to whom the products will be sold, and to understand current and projected demand.

Without this knowledge, products could be harvested that have no ready markets. Conversely, the landowner could invest time and energy into cultivating products only to have the market decline or disappear at harvest time. For the entrepreneur the pitfalls may not be as daunting as perceived. Yet, like any business venture, before getting involved in harvesting NTFPs, landowners need to determine if the projected benefits offset the costs.

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