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policy

Collection of Nontimber Forest Products from State Forests in the US South

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Little is known about the harvest of nontimber forest products (NTFPs) in state forests of the US South. We asked the state forestry agencies in all 13 southern states about the products harvested and the policies regulating harvest, as well as evidence of illegal harvest and the effects of harvest on biodiversity. Of the 12 southern states that have state forests, 7 allow some harvest of NTFPs and 6 of those have evidence of illegal harvesting. The most common products cited were pine straw, pine cones, and live plants used for transplants into nurseries and landscaping. Only two states had enough data on the impacts of harvest to say that there is no negative effect on biodiversity.

Keywords: nontimber forest products, public lands

Nontimber forest products (NTFPs) are a broad class of plant- and fungi-derived items that encompass edible, medicinal, decorative, nursery and landscaping, and fine arts and crafts uses. Items that can be sold (or converted to products for sale), traded, given as gifts, or used in collectors' households are abundant and found in all forest types throughout the US South (Chamberlain et al. 2002, Chamberlain and Predny 2003). Common examples of NTFPs found in the South include wild American ginseng (*Panax quinquefolius*) roots, pine (*Pinus* spp.) straw, saw palmetto (*Serenoa repens*) fruits, ramps (*Allium tricoccum*), and various berries.

NTFPs can be an important economic resource (e.g., Emery 2001, Emery et al. 2006, Alexander et al. 2011). In addition, in some cases there may be concerns about ecological damage or overharvesting (e.g., McGraw et al. 2010, Burkhart et al. 2012). An understanding of the rules, regulations, and restrictions to harvest NTFPs and a recognition of which species are frequently harvested are crucial to understanding economic and ecological impacts. State forests are one component of the landownership mosaic in the US South, but there is no single compiled source regarding restrictions to harvest and important NTFP species in state forests of the US South.

Although the total amount of material harvested from southern forests has not been estimated, there is reason to believe that the amount is nontrivial. The average annual harvest of medicinal forest plants suggests large volumes of biological material being removed. According to harvest records, more than 469,000 pounds of dried wild American ginseng root were harvested from the forests of southern states from 2000 through 2013 (Chamberlain et al. 2013). The average annual (2006–2010) harvest of saw palmetto from forests of Florida was estimated at more than 2.4 million pounds (Dentali and Zimmermann 2012). During that same period, Dentali and Zimmermann (2012) reported that more than 300,000 pounds of slippery elm (*Ulmus rubra*) bark and 280,000 pounds of black cohosh (*Actaea racemosa*) root were harvested, annually, from forests of the eastern United States.

NTFPs are harvested from public and private lands. Harvest on public lands such as national or state forests may involve permitting and fees. For example, in the federal domain, national forests allow harvest of NTFPs under a permitting system on a forest-by-forest decisionmaking basis. However, National Parks and National Wildlife Refuges prohibit collection (Chamberlain 2000). Data on NTFP collection permitted by national forests are reported in cut-and-sold reports, which indicate that from 2010 to 2014, the national forests of the South permitted the harvest of more than 2 million pounds of NTFPs (USDA Forest Service 2015). All citizens may harvest NTFPs from public forests, and regulations, policies and reporting records do not distinguish between ethnic groups. Harvesting by Native Americans on reservation and public forests may occur for ceremonial and cultural uses,

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but this is not differentiated in any public reporting.

However, there is very little information available about what collection of any types of NTFPs is allowed on state forests and which NTFPs are most commonly harvested. Jones et al. (2004), in addition to surveying national forest managers and NTFP harvesters, conducted a nationwide poll of 50 state forestry agencies in 2003 regarding NTFP harvesting on state forests. Their poll returned 34 usable responses, of which 82% listed at least one NTFP harvested and 47 percent listed at least four NTFPs harvested from state forests. To our knowledge, their work has not been updated since 2003, and no others have conducted similar research since that time. In addition, Jones et al. (2004) did not report responses by state or region and did not account for potential respondent bias; that is, state forestry agencies that prohibit harvesting of NTFPs from state forests may have seen little purpose in responding to the survey. To be fair, the Jones et al. (2004) study was more comprehensive than simply state forests, because they included national forests and harvesters in their research, so detailed information on state forests may not be expected.

To better understand the values that forests provide, an important first step is to know how many and which southern states allow harvest of NTFPs from state forests. We chose to update the Jones et al. (2004) component on state forests, targeted to the set of 13 southern states.

Methods

We used a modified version of the poll from Jones et al. (2004). We shortened it significantly to improve the response rate. Our poll provided the same examples of NTFPs as those given in the Jones et al. (2004) poll to make the results as comparable as possible. In February 2015, the poll was e-mailed to representatives of state forestry agencies for the 13 southern states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, Oklahoma, South Carolina, Tennessee, Texas, and Virginia) and Puerto Rico. Initial contact was made with the state forestry agencies via their representatives on the Southern Group of State Foresters' Environmental Services, Utilization & Marketing (SUM) Committee. We requested that the SUM committee member from each state forward it to the

> appropriate individual in [the] state forestry agency to respond to questions of NTFP harvest, management, and impacts in [the] state forests.

Respondents in all states were asked whether NTFP harvesting is allowed on any state forests, whether the state agency has evidence of illegal/poaching harvest, and whether they have data on the effects of NTFP harvest on biodiversity. Respondents who indicated that harvest is allowed were asked whether there is a uniform NTFP policy, what are the five most common NTFPs harvested, and in what ways is that access regulated. A copy of the questionnaire is available in Supplemental Appendix S1.[S]

Results and Discussion

We received responses from respondents in all 13 southern states, but not Puerto Rico. Seven states (Alabama, Florida, Georgia, Kentucky, North Carolina, South Carolina, and Tennessee) indicated that harvest of some nontimber forest products on state forests is allowed, at least in some cases, whereas five states (Arkansas, Louisiana, Mississippi, Texas, and Virginia) indicated that no NTFP harvest is allowed on any state forest, and one state (Oklahoma) has no lands designated as state forests. Five of the seven states that allow harvest have uniform statewide policies that guide the process.

The agency representative in each state was asked to list the top five "most significant NTFPs" harvested from state forests. Responses are listed in Table 1. Two states (Florida and North Carolina) actually listed six NTFPs, whereas three states (Alabama, South Carolina, and Tennessee) indicated that only a limited number of three or fewer types of NTFPs are the most significant NTFPs harvested from state forests.

Table 1. Most significant NTFPs collected from state forests in southern states where collection is allowed, as perceived by respondents from state forestry agencies.

	AL	FL	GA	KY	NC	SC	TN
Pine straw		X	X		X	X	X
Pine cones	X	X			X		X
Pine resin	X		X				
Pine pollen	X						
Boughs, branches, tips					X		
Vines and woody stems			X				
Crooked-wood (*Lyonia ferruginea*)*		X					
Palm fronds		X					
Berries				X			X
Mushrooms				X			
Moss				X	X		
Live plants (transplants for landscaping)		X		X	X		
Saw palmetto fruits		X	X				
Medicinal plants				X			
Wood for charcoal					X		
Bee placement			X				

* Used in the floral industry for decorations.

Management and Policy Implications

NTFPs are integral to the value of private and public forests in the US South. About half of the southern states allow NTFP harvest on state forests and have policies and practices in place to regulate harvest activities. The states that allow harvest have limited data from which to draw conclusions about the impact and sustainability of those harvests. In states that do not allow harvest, illegal harvest may be occurring but is not detected. Forest managers pride themselves on making science-based decisions for the long-term good, often balancing economic benefits from harvests with ecological sustainability and limiting environmental impacts. Good decisionmaking is challenged by the lack of economic and ecological research regarding NTFP harvest. Data collection could start by monitoring of economic use and ecological impacts of a few prominent NTFPs. Engagement with the harvester community may provide opportunities to identify impacts and improve stewardship.

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Our list of NTFPs (Table 1) provides an important glimpse of the types of products commonly harvested from state forests, but the total number of species collected is probably much larger than 16. Indeed, several of the "products" listed (mushrooms, berries, and medicinal plants) could include numerous species.

Jones et al. (2004) asked similar questions about listing the five most significant NTFPs and found that 86% of national forests reported firewood harvest and that at least some state forestry agencies reported firewood harvest (no percentage reported). Our results indicate, however, that except for North Carolina, which noted collection of wood for production of charcoal, firewood is not considered among the top NTFPs collected on southern state forests. Similarly, Jones et al. (2004) reported harvesting trees from state forests for use as Christmas trees, whereas southern states in our research did not list that among the most significant. In addition, in the Jones et al. (2004) survey, no states reported pine resin as a significant NTFP, whereas two southern states (Alabama and Georgia) did report it to us.

In our poll, only Kentucky mentioned medicinal plants as among the five most common NTFPs collected, and no states specifically mentioned wild American ginseng, which is recognized as one of the most valuable NTFPs in southern forests (Chamberlain et al. 2013). Almost all of the wild American ginseng harvest is for export to Asia, which is regulated under the Convention on International Trade-in Endangered Species of Wild Fauna and Flora (CITES) (US Fish and Wildlife Service 2014).

States that allow NTFP harvest control it by permits (free and for a fee), leases, and other contracts. The quality and accessibility of harvest data from these state forests based on permits and contracts is not known, but is likely to vary among states.

While only 6 of the 13 states reported evidence of NTFP poaching (illegal harvest), these 6 were all states that allow harvest. That is, none of the states that prohibit harvest reported evidence of illegal harvest/poaching. One possible explanation is that poaching is occurring throughout the South, but only those states that allow harvest actually monitor areas where NTFP harvesting is taking place well enough to recognize illegal harvest activities. It seems likely that some illegal harvest occurs in many states given that, at a minimum, wild American ginseng poaching has been well documented by ecological and sociological research (McGraw et al. 2010, Burkhart et al. 2012). However, wild ginseng is probably the most attractive and compelling NTFP to poach because of its high prices, and ginseng is not commonly found in many southern states. Illegal harvest of pine straw, for example, seems much less likely. An alternative explanation is that the states allowing harvest of NTFPs are those that have a more active NTFP harvest "culture" and more people seeking them out or that some states do not have state forests in areas where valuable NTFPs are found. We did not ask states about specific species or products that were poached.

Almost 85% of the states indicated that the biodiversity impact of harvest was undetermined. Two states (Florida and South Carolina) indicated that existing data from monitoring of the ecological impacts of NTFP harvest show that there is no negative effect on biodiversity. We know of no studies specific to state forests that either substantiate or indicate a reason to reject these claims.

Conclusions

Access to collection of NTFPs on state forests is highly variable among states. Whereas most states that allow harvesting have a uniform statewide policy to guide NTFP harvest decisions in a state agency, a number of instruments may be used to regulate access depending on individual circumstances.

Much is still unknown about NTFPs ecologically and economically. States that prohibit NTFP harvest have no evidence of poaching. One possible explanation for the lack of evidence in the states that prohibit harvest is that poaching is simply not being detected. State agencies often do not have enough resources to monitor plant populations to determine whether NTFP harvest has a negative or positive effect.

The existence of permit, lease, contract, and bids for NTFP harvests suggests there may be an opportunity for economic research about the values of NTFP resources on state lands. For example, data from this source could be used to determine the approximate quantity of product harvested, or permit recipients could serve as the base population for an economic survey.

Engagement in dialogue with legal harvesters about local ecological knowledge and citizen science efforts could help assess impacts and identify poaching events. Although there are some unscrupulous harvesters, many have a strong stewardship ethic (Jones et al. 2004, Burkhart et al. 2012) and might embrace the opportunity to ensure that the resource is conserved for the future.

NTFPs are integral to the value that society derives from forests, including many state forests. Foresters strive to make science-based management decisions for the long-term good. Decisionmaking is inhibited by the lack of economic and ecological research on NTFP harvests. Data collection could start by identifying a few prominent NTFPs and engaging legal harvesters to monitor economic use and ecological impacts of the harvest.

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