

# NEW METHODS FOR ESTIMATING NON-TIMBER FOREST PRODUCT OUTPUT: AN APPALACHIAN CASE STUDY

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**Abstract**—Assessing the size and structure of non-timber forest product (NTFP) markets is difficult due to a lack of knowledge about NTFP supply chains. Harvesting ginseng and other wild medicinal plants has long provided a source of income and cultural identity in Appalachian communities in the eastern United States. With the exception of ginseng, the extent of the harvest of medicinal forest products is unknown. Surveys with ginseng dealers about other NTFPs generate data on the trade volume for a variety of other products, and the geographic distribution of their harvest. A multi-method approach is required to fully utilize and contextualize these data. Socio-economic data on the study area integrated with FIA data can help explain harvest distribution. Interviews with buyers put the data in the context of the practice of the trade and a complex fluctuating market.

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## INTRODUCTION

Ginseng (*Panax quinquefolius*) is the most iconic and valuable Appalachian non-timber forest product (NTFP) but dozens of other medicinal plant species are commercially harvested in the region, entering a global supply chain dating to at least the middle of the 19<sup>th</sup> century. Traditionally, harvesting medicinal forest products has helped generate supplemental income for agricultural workers in the offseason and in unstable economies reliant on coal and timber. Harvesters sell to local buyers who often operate other associated businesses such as fur buying, scrap metal/recycling, sporting goods, and convenience stores. Regional aggregators purchase from local buyers and sell to manufacturers. Most of the products leave the region as raw commodities and are manufactured into supplements, tinctures, teas and other consumer goods elsewhere. Today harvesting these other roots, barks and foliage continues to be an important resource in economically marginalized communities (Newfont

2012). It is also a meaningful practice that transmits values, and helps form cultural and family identity.

Ginseng has a limited harvest season and mandated reporting of volume and origin due to its inclusion in the 1973 Council on the International Trade in Endangered Species (CITES) treaty. Other more common medicinal plants collected in the region are not tracked, and are harvested throughout the year. Apart from industry estimates for a few species, there is no periodic estimate for regional output that includes where plants are harvested. This lack of reliable data on product output is a problem in most NTFP economies. It leads to increased instability and risk for people who trade them. It creates a barrier for private and public landholders interested in managing for or cultivating them, and is one reason the effect of harvesting on wild populations is not well understood (Vaughan and others 2013).

## METHODS

This ongoing study seeks to create a voluntary, replicable mechanism for assessing the variety, volume and origin of commercially traded Appalachian NTFP species. The models for the study include other NTFP

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surveys (Schlosser and Blatner 1995), the US Forest Service's Timber Product Output Program (TPO), qualitative surveys of non-timber forest product markets (Greenfield and Davis 2003) and ethnographic work with NTFP harvesters and buyers (Emery and others 2003). A multi-method approach is used to gather data. Using the "Tailored Design Method (Dillman 2000)," surveys are distributed to ginseng buyers, who are required by law to be registered. Ginseng buyers were asked about the volume and origin of 12 other forest products purchased from harvesters. Data on harvest location were reported by FIA zone rather than county to preserve confidentiality and enable correlation with other inventory programs. In addition to the surveys, interviews are being conducted with medicinal forest product buyers to contextualize the data, get feedback on the project, improve response rates and identify trends, challenges and opportunities in the regional NTFP market.

## STUDY AREA

The study area comprises states that permit ginseng harvest with territory falling within the Appalachian Regional Commission's definition of Appalachia (Appalachian Regional Commission 2015). In 2013 Virginia and North Carolina were surveyed for the 2012 harvest year. The 2014 survey included all Appalachian states in the USFS Southern Region with ginseng programs: Alabama, Georgia, North Carolina, Tennessee and Virginia. In the summer of 2015 the survey is extended to include Maryland, Ohio, New York, Pennsylvania and West Virginia for the 2014 harvest year.

## RESULTS

### The Products

In 2013, 61 percent of the Southeastern ginseng buyers who responded reported purchasing other products. Of the 12 species surveyed, the most commonly purchased were goldenseal (*Hydrastis canadensis*), purchased by 50 percent of respondents, bloodroot (*Sanguinaria canadensis*) purchased by 36 percent and black cohosh (*Actaea racemosa*), purchased by 31 percent. While the

survey asked for total weight purchased for each product, uncertainty about nonresponse bias and the amount of horizontal trading prevented a total estimate of output for 2013. It was possible to determine relative harvest volume by comparing each species to the total adjusted dry weight (Fig 1). Black cohosh, slippery elm bark (*Ulmus rubra*) and goldenseal had the highest volume of trade at 47 percent, 34 percent and 8 percent respectively. Data collection is still ongoing for the 2014 harvest year. Aided by respondent input, this year's data collection will account for horizontal trading, and will also include product value.

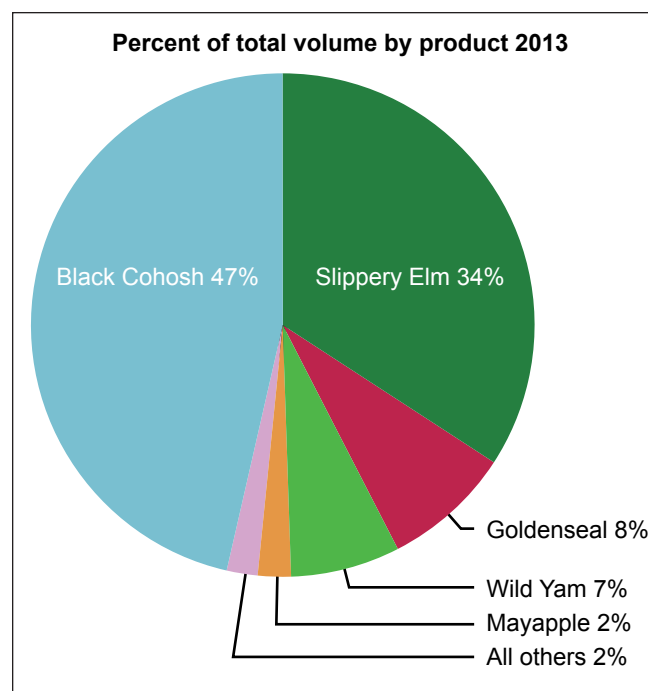


Figure 1—Percent of total reported 2013 medicinal forest product harvest in Southern Region by adjusted dry pounds.

### Harvest Distribution

In 2013 harvests occurred throughout the products' ranges in the Southern region, but were concentrated in eastern Kentucky and southwest Virginia. For example, see the distribution of the harvest for black cohosh (Fig. 2). Preliminary results indicate that West Virginia is also an important source, and is included in the next round of data collection.

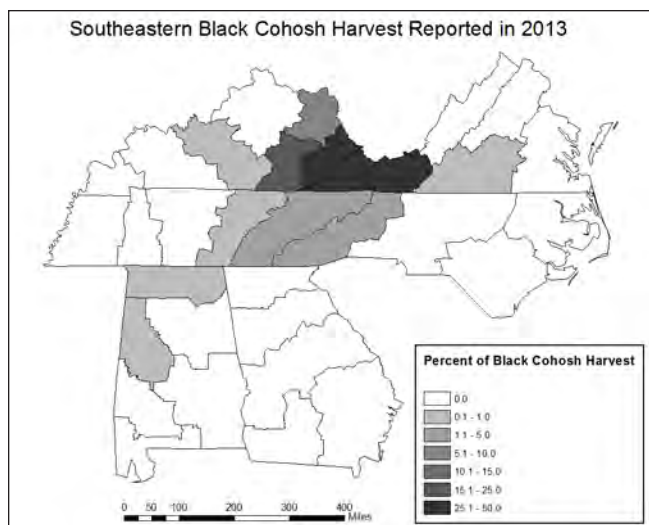


Figure 2—Percent of Black Cohosh Harvest in the Southern Region in 2013 by FIA Zone

## DISCUSSION

Ginseng buyers are purchasing other medicinal forest products and can serve as a sample frame for assessing those product's harvest. Generating an estimate for total regional output is not possible at present while data collection is ongoing, but using this method provides new data on which medicinal plants are most commonly traded, the percentage of total trade volume by species and where the products are harvested. A knowledge of the products is necessary to interpret these numbers, as the plants vary in size, abundance and value. The study is designed to be replicated, which is necessary to due to yearly fluctuations in value and output evidenced seen in some previous industry surveys (AHPA 2012).

In interviews, participants gave a number of explanations for the reported geographic distribution including presence of plant habitat, access to forests, a stronger tradition of wildcrafting and socioeconomic factors such as higher unemployment. Past NTFP Studies use socioeconomic data (Bailey 1999) and FIA data on forest composition and timber harvest (Chamberlain and others 2013) to analyze NTFP harvests. After an additional year of data collection, it will be possible to incorporate both FIA and socioeconomic data to test these explanations by

ranking zones by forest cover and composition, presence of ideal site conditions, land ownership (public, private, absentee), population distribution, and socioeconomic indicators like unemployment and income. While FIA does not currently include understory plants in monitoring programs, the potential to correlate harvest and market data collected using these methods with data on plant populations is possible, and presents an opportunity to better understand the effect of NTFP harvesting and other human and environmental factors on plant populations. This integration of data sources and methods and engaging NTFP stakeholders directly is key to improved estimates for non-timber forest product output in Appalachia and beyond.

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