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Special Forest Products on the Green Mountain and Finger Lakes National Forests: A Research-Based Approach to Management

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Abstract

Special forest products (SFPs) are gathered from more than 200 vascular and fungal species on the Green Mountain National Forest (GMNF) and Finger Lakes National Forest (FLNF). This report documents those SFPs and proposes an approach to managing them in the context of legislation directing the U.S. Forest Service to institute a program of active SFP management. Based on the literature and primary research conducted on and around the GMNF and FLNF, we offer a system for classifying SFPs according to the likely sustainability of harvesting practices and present a suite of possible management strategies for each category. The report also includes suggestions for development of sustainable harvest guidelines, design of permit programs and fees, and opportunities for collaborative management. These suggestions incorporate insights from 40 individuals interviewed for the research. We dedicate a section to discussing results in terms of five key provisions of the U.S. Forest Service rule pending at the time of press. Objectives of the approach recommended here include effectively allocating scarce management resources, fostering voluntary compliance, and broadening the benefits and beneficiaries of forest management.

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Cover Photos

Left to right: wild blueberries on the vine, photo by Marla R. Emery, U.S. Forest Service; enjoying blueberries on the Green Mountain National Forest, photo by Alan R. Pierce; willow baskets and bundles of different colored willows, photo by Marla R. Emery, U.S. Forest Service; chanterelle mushrooms, photo by Marla R. Emery, U.S. Forest Service.

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BACKGROUND

Where there are people, plants, and mushrooms, there is gathering. Human uses of wild plants and mushrooms, collectively referred to as special forest products (SFPs),[1] have a long history in the Nation's forests, including the setting for the research reported on here. The Green Mountain and Finger Lakes National Forests (GMNF and FLNF) are located in western Vermont and the Finger Lakes region of New York State (Fig. 1). For millennia, these places have been inhabited by Abenaki and Iroquois peoples, respectively, who relied (and, in many cases, continue to rely) on wild plants for food, medicine, and functional, cultural, and spiritual materials (Arnason et al. 1981; Herrick and Snow 1995; Wiseman 1995a,b). European American residents of the areas also have made use of SFPs, as attested to in Zadock Thompsons's mid-19th century natural history of Vermont (1853) and interviews with contemporary Vermonters (Emery et al. 2005, Pierce 2014). Today, indigenous Vermonters and New Yorkers are joined in their continuing use of SFPs in the GMNF and FLNF by hunters, anglers, herbalists, hikers, green living enthusiasts, and folks looking to supplement their income.

This report documents the SFPs gathered on and around the GMNF and FLNF and the insights gatherers can contribute to planning for SFP management. The study on which the report is based was undertaken in 2008 and 2009 through a cost share agreement between the GMNF and FLNF and the University of Vermont, in consultation with the U.S. Forest Service's Northern Research Station (see Appendix 1 for a detailed description of methods). As we undertook the research and wrote this report, directions were pending from the U.S. Forest Service national office that would require each national forest to actively manage and regulate SFPs.[2] The time is ripe to gain a more detailed understanding of the plant materials and mushrooms gathered on and around national forests, their roles in the lives of the people who gather them, and the need and opportunities for management to ensure long-term sustainability.

Increasingly, forest managers inside and outside the U.S. Forest Service are becoming aware that SFPs are gathered on the land they manage and are wondering what, if anything, they should do about it. In an era of shrinking budgets, identifying where limited resources will be most effective is a pressing management need. So, too, is an understanding of the human values associated with the species and practices to be managed. The information about SFP species reported here provides a baseline for SFP management in upstate New York and northern New England. More general information about SFP values and approaches to their management is relevant throughout the United States. Thus, we offer this report and the research on which it is based as one possible model for managing SFPs and gathering in localities nationwide. We hope it will benefit

- Managers of public, private, and nongovernmental organization forests who are
  - Facing legal and other mandates to manage SFPs
  - Seeking to broaden the benefits and beneficiaries of forest management
  - Wishing to fulfill selected social mandates of certification under the Sustainable Forestry Initiative (SFI) or the Forest Stewardship Council (FSC)

[1] Also sometimes called nontimber forest products, nonwood forest products, and minor forest products.

[2] As directed by Congress under the terms of Public Law 106-113, div. B, Sec. 1000(a)(3)[title III, Sec.339], Pilot Program of Charges and Fees for Harvest of Forest Botanical Products Act of November 29, 1999, page 113 Stat. 1535, 1501A-119-200; 16 U.S.C. 528.

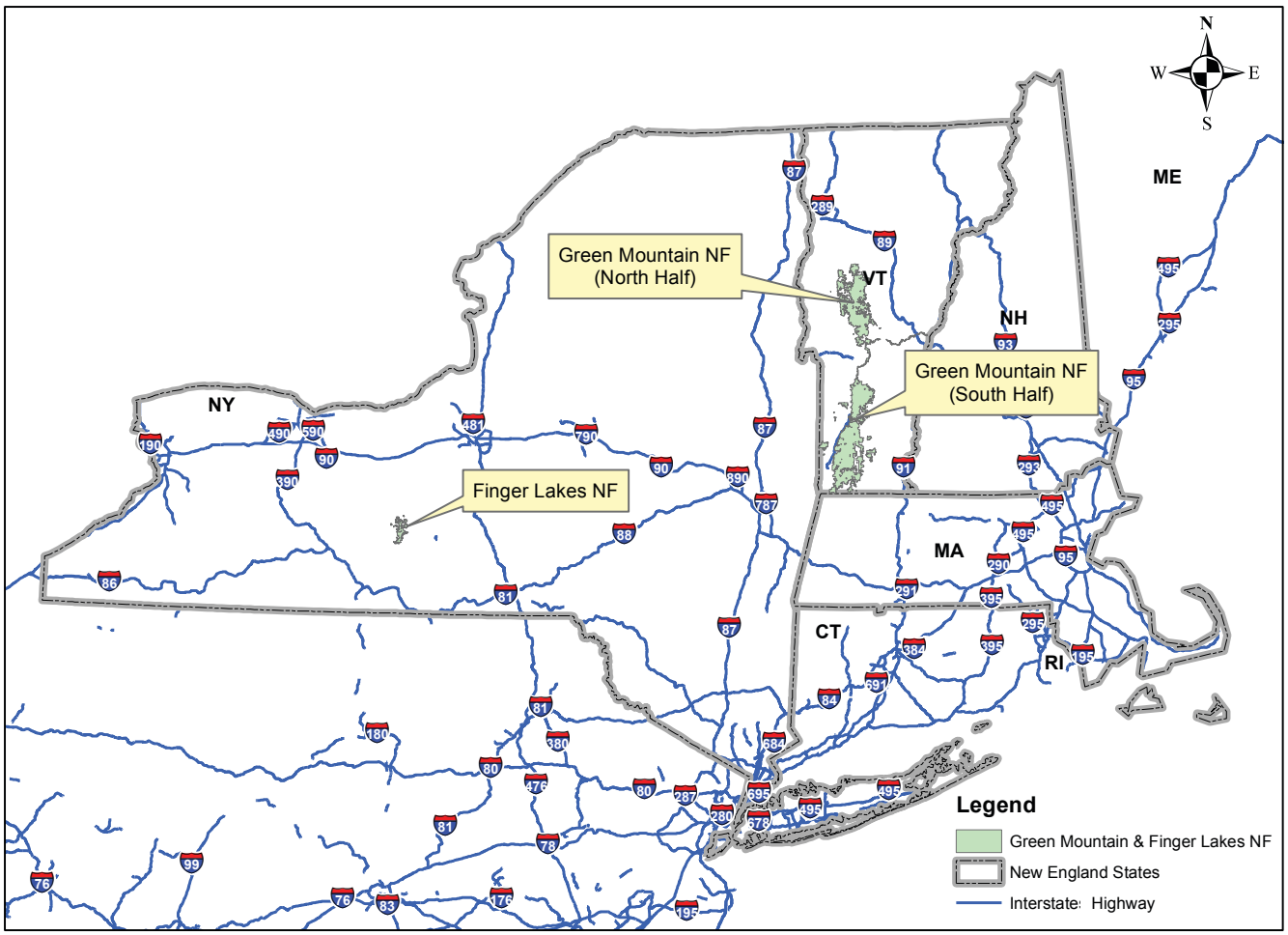

Figure 1.—Location of the Finger Lakes National Forest (FLNF) and the northern and southern units of the Green Mountain National Forest (GMNF).

- Scholars seeking a broader understanding of the role of forests in the day-to-day lives of people in the post-industrial world
- Individuals who wish to better understand and enjoy forests and forested landscapes

In the pages that follow, we report on the species gathered by 40 individuals who live inside or near the boundaries of the GMNF or FLNF. We document commodity chains for species that enter commercial markets and we explore the social, cultural, and economic values of gathering. Next, we offer a system for classifying SFPs according to the likely sustainability of harvesting practices and present a suite of possible management strategies for each category. We go on to provide information that may be used in the development of sustainable harvest guidelines, followed by study participants' suggestions for SFP management, including characteristics of potential permit programs and opportunities for collaborative management. Drawing on these ideas and additional research on U.S. SFPs, we discuss the implications of study findings for five components of the legislation directing the U.S. Forest Service to institute active management of SFPs: (1) honoring treaty obligations, (2) setting sustainable harvest limits, (3) instituting inventory and monitoring, (4) establishing a program of permits and fees, and (5) providing for free personal use. We conclude by suggesting potential next steps.

SFPs AND SFP VALUES

More than a decade of research in the United States has shown that, in any given location, dozens to hundreds of SFPs likely are gathered (see, for example, Baumflek et al. 2010; Emery et al. 2003). But at present there is no reference managers can consult to learn what those species are in the area they manage. Rather, to understand the species being gathered, their uses, and values, gatherers themselves must be engaged. To document the SFPs gathered on and around the GMNF and FLNF, we spoke with 40 people who live and gather there. Collectively, these gatherers have decades of experience harvesting wild edibles, medicinals, and other materials on and around the GMNF and FLNF. The information they shared with us provides the primary basis for this report, in combination with the larger body of research on SFPs in the United States.

SFPs Gathered on and around the GMNF and FLNF

Study participants reported gathering 173 vascular species (Appendix 2), with some differences in the lists for the FLNF, located in western New York State, and the north and south units of the GMNF in Vermont. Although site characteristics and land use history may account for some of these differences, we suspect that more are the result of the individual knowledge and preferences of the gatherers in our sample.

Common names represent important local ecological knowledge. Thus, the common names used throughout this report are those employed by study participants during interviews. Because the emphasis of this research is understanding the practices and significance of SFP gathering and their implications for management on the GMNF and FLNF, and because financial and human resources were limited, we did not collect voucher specimens. Rather, we are indebted to Diane Harlow Burbank and Erik Lilleskov for bringing their extensive local ecological knowledge and taxonomic expertise to bear in identifying the most likely Latin binomials for species mentioned by interviewees.

Table 1 lists the vascular species most commonly gathered on and around the GMNF and FLNF, in order of their frequency of mention by study participants. Although our sampling strategy cannot support statistical inference to the general populations of the FLNF and GMNF regions, we believe this list indicates well the plants that are most widely used and enjoyed.

Because plant part gathered is an important factor in the sustainability of harvest, we collected this information from all study participants. Of the vascular species mentioned, aerial parts other than flowers or fruit are gathered from 113 species, fruits from 53, roots from 36, flowers from 31, whole plants for 10, and other plant materials including sap from 6.[3] Interviewees use the plant species they gather for food, medicine, educational resources, craft materials, and spiritual observances. These materials contribute to gatherers' lifestyles and livelihoods through personal consumption, as part of education programs offered for a fee, sale in a processed form such as herbal tinctures or holiday decorations, as gifts, sale in a raw form, and through barter. Appendix 3 provides reported uses for each vascular species.

Of the 39 fungi (Appendix 4) gathered by people in our sample, 30 are eaten as food, 5 are used for medicinal purposes, 3 are used as craft materials, and 1 is used for other purposes (Appendix 5). All edible mushroom species are eaten by the people who gather them. About a dozen find their way onto restaurant menus, farmers market stands, and some local markets. Chanterelles and oyster mushrooms are the most commonly marketed of these species. Table 2 lists the fungi mentioned by five or more of our interviewees.

SFP Commerce

Some 50 species gathered by study participants are sold in raw or value-added form. These sales occur largely in the informal economy. That is, they are not recorded in official economic statistics. Quantities of plant materials involved are small, ranging from as little as a single flower used in the preparation of a flower essence to a pickup

[3] Plant parts, uses, and lifestyle/livelihood contributions add up to more than the number of species gathered because many have multiple uses in each of these categories.

Table 1.—Most commonly mentioned vascular species. Common name(s) used by interviewees, Latin binomial, and frequency of mention for all species mentioned by five or more study participants.

Common name	Genus	Species	Frequency
Blueberry	*Vaccinium*	*angustifolium* or *corymbosum*	24
Leeks, wild/Ramps/Wild onions	*Allium*	*tricoccum*	22
Apples	*Malus*	spp.	21
Dandelion	*Taraxacum*	*officinale*	21
Raspberries, red	*Rubus*	*idaeus*	20
Fiddleheads	*Matteuccia*	*struthiopteris*	19
Elderberry	*Sambucus*	*canadensis*	14
Grapes, wild/Fox	*Vitis*	*labrusca*	12
Beechnuts[a]	*Fagus*	*grandifolia*	11
Nettle, stinging	*Urtica*	*dioica*	11
Burdock	*Arctium*	*minus or lappa*	9
Princess pine/Ground pine[a,b]	*Lycopodium*	*obscurum*	9
Sumac	*Rhus*	*Most likely typhina*	9
Wintergreen/Teaberry	*Gaultheria*	*procumbens*	9
Black walnut	*Juglans*	*nigra*	8
Butternut	*Juglans*	*cinerea*	8
Cattail	*Typha*	*angustifolia or latifolia*	8
Coltsfoot	*Tussilago*	*farfara*	8
Comfrey	*Symphytum*	*officinale*	8
Daylilies	*Hemerocallis*	spp.	8
Goldenrod	*Solidago*	spp.	8
Mint (no sp. Identified)	*Mentha*	spp.	8
Plaintain	*Plantago*	*major*	8
Pine, white	*Pinus*	*strobus*	7
Raspberries, black[c]	*Rubus*	*occidentalis*	7
Service berries/Shadbush/ Mountain shad	*Amelanchier*	spp.	7
Spruce	*Picea*	spp.	7
Partridge berry[a]	*Mitchella*	*repens*	7
St. Johnswort	*Hypericum*	spp.	7
Wild ginger	*Asarum*	*canadense*	7
Willow (spp.)[a]	*Salix*	spp.	7
Chickory[a]	*Cichorium*	*intybus*	6
Chokecherry[a]	*Prunus*	*virginiana*	6
Cohosh, blue	*Caulophyllum*	*thalictroides*	6
Milkweed[c]	*Asclepias*	*syriaca*	6
Mullein	*Verbascum*	*thapsus*	6
Oak (spp.)	*Quercus*	spp.	6
Strawberries, wild	*Fragaria*	*virginiana*	6
Yarrow	*Achillea*	*millefolium*	6
Cherry, wild/ (black)[b]	*Prunus*	*serotina*	5
Clover, red	*Trifolium*	*pratense*	5
Jewelweed[a,b]	*Impatiens*	*capensis*	5
Lambsquarter	*Chenopodium*	*album*	5
Violet, wild (spp.)[a]	*Viola*	spp.	5

[a] Not reported on the FLNF.
[b] Not reported on the north half of the GMNF.
[c] Not reported on the south half of the GMNF.

Table 2.—Most commonly mentioned fungal species. Common name, Latin binomial, and frequency of mention for all species mentioned by five or more study participants.

Common name	Genus	Species	Frequency
Morels	*Morchella*	sp. or spp.	17
Chanterelle	*Cantharellus*	spp.	14
Hen of the woods	*Grifola*	*frondosa*	9
Oyster	*Pleurotus*	sp. or spp.	8
Chicken of the woods	*Laetiporous*	*sulphureus*	7
Black trumpets	*Craterellus*	?	5
Puffballs, giant	*Calvatia*	spp.	5
Shaggy manes	*Coprinus*	*comatus*	5

truck load of boughs made into wreaths or other holiday decorations. A small subset of vascular and fungal species is sold through formal retail outlets ranging from the local to the national and, in a few cases, international. These include edible, medicinal, and craft or cultural materials. Without exception, all species that find their way into markets also are used for personal consumption, often by the same individual, harvesting material for both uses in the same outing. Distinguishing between personal and commercial use thus represents a significant challenge.

To obtain information about edible GMNF- and FLNF-area SFPs entering formal markets, we surveyed six food cooperatives (five in Vermont and one just over the border with New Hampshire), six restaurants (four in Vermont, two in Ithaca, New York), and one produce distributor (in southeastern Vermont). Our assessment of medicinal SFPs entering formal markets is based on interviews with herbalists in the GMNF and FLNF and previous research. Our assessment of craft/cultural materials is based on discussions with artisans, craft shops, and research on artisan gatherers (Diamond 2009).

Vascular Species

Vascular species traded in the GMNF and FLNF regions have markets as food, medicine, and craft or cultural materials.

Food. Edible SFPs enter the market through high-end restaurants and retail and wholesale food vendors. In some cases, data on these sales are included in standard commercial statistics, although generally they are aggregated with other items such that the true wild material cannot be separated out (e.g., total restaurant sales, "wild" blueberries produced through intensive monocultural management systems). Fiddleheads and wild leeks likely constitute the greatest volume of edible plant materials from the region to enter the market. We describe commodity chains for each below. With the current emphasis on local foods, including wild foods, other species occasionally are found on high-end restaurant menus. We are aware of chefs in Vermont who have served small quantities of the following species on our list when these are in season: cattail shoots, dandelion greens, daylily bulbs and flowers, elder flower and elderberry, Japanese knotweed, Jerusalem artichoke, lambs quarters, marsh marigolds, milkweed pods, nettle, oxeye daisy buds, purslane, sheep sorrel, watercress, and wild ginger. We note, however, that items described as "wild" on restaurant menus often prove to be cultivated.

Medicinals. Vascular species known to have significant national and international markets as medicinals include ginseng, goldenseal, and blue cohosh (American Herbal Products Association 2006). Volumes of ginseng sold at an annual state auction are tracked by the Vermont Department of Fish and Wildlife for reporting under terms of the Convention on International Trade in Threatened and Endangered Species (often referred to by the acronym CITES). We did not uncover any indication of significant harvest and trade of goldenseal or blue cohosh around the GMNF or FLNF.

Craft materials. Craft materials traded in the region for cash or other goods include birch bark, black ash, and sweetgrass. All of these species are especially, but not exclusively, important to Native American artisans. Trade in black ash is regional but modest in scale; much of it occurs through tribal connections (see, for example, Benedict and David 2000). We are aware of one individual in the Northeast Kingdom region of Vermont who harvests and sells black ash splints (Diamond 2009). Most birch bark basket makers likely seek to harvest their own materials. However, a forest contractor located in New Hampshire buys high quality birch bark from trees before timber harvests (Diamond 2009). Sweetgrass has spiritual as well as artisanal uses. The long, fragrant blades are commonly available for purchase at pow wows and may have been harvested far from the place of sale. Native American interviewees near the FLNF and GMNF express concern about availability of sweetgrass.

Fungal Species

Several species of fungi are sold for culinary use and there is a small but growing trend toward the use of mushroom species for medicinal purposes.

Edibles. We have observed chanterelles, hen of the woods, oysters, morels, and boletes featured on the menus of several high-end restaurants in Vermont and central New York. These may be harvested by the chefs themselves or purchased from regional produce distributors or from gatherers who show up at the kitchen door.

Medicinals. Mushrooms used for medicinal or nutraceutical purposes include reishi, chaga, and turkey tail. Some find their way into the inventories of area herbal shops. There is a small but growing number of microenterprises producing foodstuffs containing chaga, such as chocolates and beverages, which are sold through farmers markets and retail outlets.

Commodity Chains

The process through which an SFP that enters the market travels from the place of harvest to its final point of consumption is called a commodity chain. SFP commodity chains may be as short as two steps, from the forest to the kitchen of someone who pays the gatherer directly, or as long as six or more steps that include value-added processing and multiple middlepersons. In general, the shorter the commodity chain, the more local the market, the lower the volume of plant or fungal material involved, the greater the financial return to gatherers, and the greater the likelihood of knowledgeable attention to sustainability by all participants.

Based on information provided by study participants, we are confident that all GMNF and FLNF area SFPs that are sold have local markets. A small number of SFPs also are regional, national, or even international commodities. Ginseng has a long and well-studied history as an international commodity (Persons 1994). More recently, regional markets have developed for fiddleheads and wild leeks. Value-added fiddleheads also have a regional-to-national market, although it is not clear whether the GMNF and FLNF areas are a source for this commerce. Descriptions of the fiddlehead and wild leek commodity chains below are based on information provided by our interviewees, buyers at local restaurants and markets, and more than a decade of study of SFPs in the Northeast by Emery and others. Prices paid to gatherers are provided where they were available, because this is the point at which a forest manager would assess fair market value for a permitting or lease system.

Fiddleheads. These emerging fronds of the ostrich fern (*Matteuccia struthiopteris*) probably have the largest market of any edible SFP harvested on and around the GMNF and FLNF. Eating fiddleheads has long been a rite of spring in northern New England. Their centrality to local cultures and foodways is suggested by the inclusion of the distinctive spirals on the crest of the Houlton Band of Maliseet Indians, whose tribal headquarters is located in Littleton, Maine. Pickling and canning of fiddleheads extends the season in which they can be consumed and the reach of potential markets for them. Gathered by 19 out of 40 study participants for personal use, fiddleheads are a source of cash income for some gatherers and a product line for microenterprises and at least one larger business in northern New England. Fiddleheads reach consumers as both raw and value-added products. Table 3 shows basic commodity chains for these products.

Table 3.—Known fiddlehead commodity chains in Vermont. Fiddlehead commodity chains can be divided into two types: (1) sale of raw fiddleheads to consumers, and (2) sale of value-added fiddlehead products to consumers. A gatherer picks the fiddleheads and transports them to the entity at the first destination. The gatherer may also be the processor for small-scale value-added products.

Source	Destination 1	Destination 2	Destination 3	Market extent	Product	Price to gatherer (2009)
Raw						
Forest	Markets & food coops	Consumer		Local	Raw fiddleheads	$3.00–4.50/lb
Forest	Wholesaler	Markets	Consumer	Regional	Raw fiddleheads	$0.75–2.25/lb
Value-added						
Forest	Restaurant	Consumer		Local	Prepared meal	?
Forest	Home Kitchen	Consumer		Local	Pickled, canned fiddleheads	?
Forest	Home Kitchen	Retailer (storefront or Internet)	Consumer	Regional to national	Pickled, canned fiddleheads	?

Fiddleheads—raw product. Local grocery stores and food cooperatives offer raw fiddleheads in season. Most are purchased from gatherers who reside in the area and deliver directly to the store. Some are sold directly to consumers by gatherers through farmers markets or personal connections. In recent years, large supermarket chains have begun to sell raw fiddleheads in season. Wholesale managers for regional supermarket chains indicate that they obtain all their produce from a central distributing center, making the source of fiddleheads sold in these stores uncertain and likely to be farther from the point of sale.

Fiddleheads—value-added products. Fiddleheads also are the basis for value-added products. Several restaurants feature fiddleheads on their spring menus. In a few cases, chefs harvest wild plant materials themselves. More often, they buy fiddleheads from a gatherer who sells to them at the kitchen door or from a produce distributor specializing in local foods. Cottage businesses produce jars of dilled and canned fiddleheads that are sold through outlets featuring regional and handmade products. These include both storefronts and Internet sales. At the other end of the business spectrum, articles in the New York Times and Boston Globe indicate that Belle of Maine (located in Wilton, Maine) ships tons of fresh and canned fiddleheads nationwide. While the economics of producing such a commodity suggest that a majority of the fiddlehead supply probably originates in Maine, it is possible that some of these fiddleheads come from nearby states including Vermont. In the early 2000s, a north central Vermont family business with several seasonal employees indicated that they sell fiddleheads by the pickup truck load in Boston. The markets, restaurants, and produce distributor we contacted reported purchasing a total of approximately 6,500 pounds of fiddleheads in 2009, with the produce distributor accounting for more than 75 percent of that volume.

Wild leeks. *Allium tricoccum* is a traditional spring food throughout northern New England, where fresh greens are highly valued at the end of the long winters. However, wild leeks do not enjoy the same cultural significance in Vermont and central New York that they do in the southern Appalachians, where ramps (as they are known in the South) are the centerpiece of festivals and fundraisers (Hufford 2000). In recent years, however, wild leeks have been touted by celebrity chefs; they have appeared in articles in the food sections of newspapers and have even found their way onto the cover of Martha Stewart's magazine. This publicity has made wild leeks trendy and has increased demand for them. Commodity chains for wild leeks are illustrated below (Table 4).

Wild leeks—raw product. Harvested in spring, wild leeks are sold raw in small markets and food cooperatives throughout the GMNF and FLNF areas. A food distributor specializing in local produce also purchases wild leeks for sale throughout Vermont and bordering regions of New Hampshire, Massachusetts, and New

Table 4.—Known wild leek commodity chains in Vermont. A gatherer picks the wild leeks and transports them to the first destination. The only value-added processing appears to be restaurant preparation.

Source	Destination 1	Destination 2	Destination 3	Market extent	Product	Price to gatherer (2009)
Raw						
Forest	Markets & food coops	Consumer		Local	Raw leeks	$3.75–7.00./lb
Forest	Wholesaler	Markets	Consumer	Regional	Raw leeks	$2.75–4.50/lb
Value-added						
Forest	Restaurant	Consumer		Local	Prepared Meal	$9.00/lb
Forest	Wholesaler	Restaurant	Consumer	Regional	Prepared Meal	$2.75–4.50/lb

York. In contrast to fiddleheads, we have not observed wild leeks for sale in any of the large supermarket chains. We are aware of one instance in which several pounds harvested in Vermont were taken to a farmers market in New York City for a special demonstration. Aside from this, we have neither observed nor heard of any significant sale of GMNF- or FLNF-area wild leeks outside the region.

Wild leeks—value-added products. Wild leeks are featured on restaurant menus in season. Beyond restaurant preparation, there does not appear to be any value-added processing, which would increase the volume that could be absorbed by the market and the geographic reach of that market. Five markets and restaurants and the produce distributor we contacted reported purchasing approximately 620 pounds of wild leeks in 2009. The produce distributor accounts for two-thirds of that amount.

Social, Cultural, and Economic Values

SFPs that enter markets are a small subset of species gathered. Likewise, only a small percentage of gatherers sell any of the plant materials or mushrooms they pick. Rather, the greatest numbers of benefits and people benefiting from SFPs are derived outside markets. This portion of the report provides an overview of the social, cultural, and economic values of gathering on and around the GMNF and FLNF. These values are common to gathering throughout the Nation and, in good part, the world.

Social and Cultural Values

Study participants described a range of social and cultural values they associate with gathering SFPs.

Traditions. For many people, gathering SFPs is a family and local tradition. They learned in childhood from older family members and they have passed it on (or want to pass it on) to their children and grandchildren. One FLNF region resident described the tradition of gathering as providing "a sense of linkage to one's ancestors and to earlier people who would have lived in this community." A man who lives near the southern half of the GMNF said that picking SFPs creates "a connection to a simpler time." Several people noted traditions of access to local land for gathering; expressions of gathering as part of a sense of place are common. For many, gathering SFPs results in feelings of reciprocity, in which the gatherer feels the place belongs to him/her and s/he has a responsibility to that place. In addition to longstanding traditions, some of our interviewees described what might be termed new traditions around gathering and using SFPs. One couple looks forward to picking blueberries in a GMNF blueberry management area every year. Local organizations such as hiking clubs have outings on the forests, and picking berries or other SFPs is a regular and special accompaniment to the activity. Although we did not interview anyone active in local mycological societies, experience elsewhere suggests it would not be unusual for these organizations to conduct forays on or around the national forests (Barron and Emery 2009).

Social activities and sharing. Two interviewees in the FLNF region mentioned a local tradition of people getting together to pick apples from old farmsteads and press them to make cider. Some people pick more than they will use personally in order to share with others, particularly elderly people who can no longer gather for themselves. One of our interviewees indicated that she

was taught to gather by a Seneca clan mother and healer. She feels responsible for picking medicinal plants for her teacher and community. Another interviewee mentioned gathering in order to make holiday decorations for a nursing home with a group to which she belongs.

Enjoyment and passion. Many interviewees use words like "joy" and "fun" to describe what gathering means to them, with more than one person likening it to a treasure hunt. Several interviewees indicate that gathering is a passion for them, an activity about which they feel strongly and deeply. Others describe how they enjoy spending time in the forest, and how looking for SFPs provides a purpose for a walk in the woods. As one man who lives near the north half of the GMNF put it, "It's just a good reason to be out in the woods." For some, it is a way to mark special times of the year. In addition, some hunters and anglers enjoy combining gathering with those activities.

Flavors of wild food. Several interviewees simply like to eat wild-harvested foods. They appreciate the flavors and freshness. Others are motivated by the desire to know the source of their food and that it is free from chemical inputs. (Strikingly, no one specifically connected their gathering to the localvore movement or to personal efforts to eat locally.) In addition, some wild foods are special treats that people look forward to eating each year. Some of these foods are what might be thought of as feral cultivars, that is, domesticates such as old fruit trees that are no longer being tended. One couple indicates that the FLNF is a "good storehouse for old varieties of things" that they and others enjoy eating.

Survival, independence, and alternatives. People take pride and find reassurance in knowing that they can feed, heal, and otherwise provide for themselves if circumstances require it. They note that gathering has been important to their survival or that of others in the past and is still important for some people today. They want to retain the opportunity to gather in the future. Related to this, the fact that gathering has been free is mentioned as an important quality. Some view picking and using SFPs as an alternative to global markets and the homogeneity of commercial products.

Interdependence with nature. For several of our interviewees, perhaps the deepest significance of gathering SFPs is the relationship with nature they believe it creates and maintains. One couple living near the north half of the GMNF finds that gathering is a way of getting to know the surroundings, a way of "being literate about the landscape." Several interviewees view gathering as a fundamental aspect of being human and of living on Earth. In their experience, direct interactions with wild plants and mushrooms foster learning about nature and the relationship between nature and people. They believe gathering provides hands on experience of how our actions affect the Earth, and, by extension, promotes learning about how to care for the Earth. For another interviewee, gathering promotes learning to receive what nature has to give, in the way that nature offers it. For several interviewees, there is a spiritual dimension to this relationship. They believe gathering helps them practice and honor that relationship. A few interviewees feel a spiritual connection to specific plants. Gathering also provides materials for spiritual practices such as healing ceremonies and expressions of condolence. In particular, gathering is central to some Native American spiritual practices.

Health and well-being. More than 89 plants on our list are used for medicinal purposes and some interviewees value the healing power of both gathered materials and the process of gathering. They attribute their good or improved health to the use of one or more SFPs. At least two interviewees mention adverse side effects from pharmaceuticals and believe that plant medicines provide safer, more effective healing. Several individuals said they prefer to harvest their medicines personally so they know where they come from and that they have been properly harvested. Some herbalists feel they have a spiritual relationship with the plants they use, which is developed in part through the act of harvesting. They believe their respectful relationship with the plants they harvest contributes to the healing properties of the herbs and benefits their clients. As one midwife who practices near the southern half of the GMNF puts it, "Once people are healed by a plant they have a new respect and a new insight."

Many interviewees, including those who are not particularly interested in plants as medicine, indicate they experience a sense of well-being when they gather. For them, the act of gathering itself is a stress reliever. A woman in her seventies indicates that gathering gives her relief from fear that she would not be able to take care of herself if something catastrophic happened. Others indicate that knowing where SFPs are, and being able to reach out and pick them, gives them a feeling of things being right with the world.

Economic and Livelihood Values

Economic historian Karl Polanyi (1977) defined livelihood resources as any substance or practice that provides for material or cultural survival. We apply this broad understanding of economic activity because it reveals core values of SFPs that are invisible when market exchange is the sole focus. In addition, this concept is especially germane when considering the legal and ethical rights of indigenous peoples.

Many of our interviewees value SFPs as a safety net or a means of self-sufficiency, and one person labeled it a matter of food security. People state that it is important for them and others to have the skill, knowledge, and ability to find food and medicine in the woods should they ever need it to survive. Circumstances in which SFPs might make a difference to survival include getting lost, crop or garden failures, disruption of commercial food distribution, armed conflict, or a personal or more widespread financial crisis. For some interviewees this is not an abstract proposition; they remember times when they or their family members had to hunt, fish, and gather to eat. Some know people for whom this is true today. The economic downturn of 2008 made this possibility seem still more real and urgent for some of our interviewees.

In a few cases, wild plants and fungi are a major part of interviewees' livelihood strategies. The potential for access to SFPs contributed to at least two interviewee households' decisions about where to live. One small-scale commercial mushroom hunter indicates that for him and at least one couple he knows, the income they earn selling mushrooms, although very modest, is essential to their financial well-being. Several people in our sample are serious about self provisioning through a combination of gardening and gathering. Cultivated plants generally provide a larger share of their food, in good part because of the ease of access and generally larger return for the effort. However, wild foods provide variety and one individual notes that wild berries, maple syrup, and wild honey are sources of sweetness that he craves but does not get from his garden. Another individual, who relies extensively on wild medicines, regards cultivated plants as possibly less vigorous and potent than wild plants.

It is worth noting that the livelihood uses discussed below are not mutually exclusive. A single gathering foray may provide multiple livelihood values.

Personal use. Most personal use is motivated by the social and cultural values discussed above. However, in some cases, consumption of SFPs contributes to the material survival of gatherers, their families, and immediate social circles by providing goods that otherwise would have to be purchased or forgone. This benefit is important for individuals who lack the financial resources to purchase adequate food, medicine, or items to improve their quality of life. SFPs also provide goods and services that cannot be purchased and for which no substitute exists. The latter can be significant for cultural survival. This is particularly, but not exclusively, the case for Native Americans (Emery et al. 2004).

More than 75 percent of interviewees (31 individuals) discuss personal use of the things they pick and 70 percent (28 individuals) indicate they do not sell SFPs in any form. As noted elsewhere in this report, our sampling strategy cannot support statistical generalizations to the population as a whole. However, these findings are consistent with studies of SFP use elsewhere in the eastern United States (Emery 1998, 2002; Emery et al. 2003; Emery et al. 2006a) and Scotland (Emery et al. 2006b). A general population survey conducted in the states of Massachusetts, Maine, New Hampshire, and Vermont (Robbins et al. 2008) indicated that a very small subset of gatherers (approx. 4%) harvest SFPs for sale. Thus, it is likely that the vast majority of people who gather on the GMNF and FLNF and elsewhere do so for personal use only.

SFPs are used directly by gatherers as food, medicine, objects of beauty, and culturally significant materials. Contributions of edible plants and fungi to the diets of the people who pick them run the spectrum from nibbles during a hike, to complements to seasonal meals, to year-round sources of calories and nutrition. Much of this material is eaten on site or shortly after picking. However, when seasonal abundance permits, some people preserve a portion of their harvest for later use. In addition to the healthful properties of eating fresh produce, as noted above, SFPs also are used for therapeutic purposes. One Native American woman gathers plant medicines for her own use and that of the larger indigenous community near the FLNF. Two herbalists say they gather many of the herbs they use to heal themselves, their families, and friends but generally purchase the herbs they use with clients for reasons of volume, time, and efficiency. Personal use for aesthetic, functional, and cultural purposes is varied. A sample includes use of pine cones and greens for holiday decorations, wild plants for dyes, small pieces of birch bark for fishing flies, and cedar and other species for sweat lodges.

A few interviewees discuss use of SFPs as a safety net. One notes that access to wild plants and mushrooms for food can be an alternative to public assistance and, therefore, a source of self-respect and independence.

Gifts. More than half (22) of interviewees talked about sharing or making gifts of things they gather. This includes gifts to friends and neighbors, as well as civic institutions like local nursing homes and senior citizens' centers. Items shared or given in this way include wild mushrooms, berries, herbal tinctures, and holiday decorations. Sharing of food through outright gifts or shared meals is common. In general, people are moved to share things they consider special because they are tasty, beautiful, or have been beneficial to them. Gifts sometimes are opportunistic, as when a gatherer has or makes a bit more of something than she thinks she needs. At other times gifts are quite targeted and purposeful. One Native American interviewee gathers medicinal plants to share with an elder who has special tribal responsibilities. Several European Americans try to give gifts of species a friend or relative is known to be fond of, especially when the individual can no longer do their own harvesting.

Trade or barter. Our interviews provide little evidence of trade or barter for SFPs. To the extent trading or bartering takes place, it likely is small in scale. The few instances described by interviewees have the quality of gifts, sharing, or some other form of exchange in what might be thought of as the moral economy, that is, people engaging in reciprocal exchange of goods for knowledge, access, other services, etc.

Education and training income. Vermont and the greater Ithaca, New York, area have robust alternative medicine sectors, including many practicing herbalists. Not surprisingly, then, teaching about wild edibles and medicinals is a source of income for a number of people. Several schools and individuals provide such instruction near both forests. In some cases, these educational programs take place on the national forest.

Value-added sales. Ten interviewees sell or have sold something they made from SFPs through local farmers markets, craft fairs, etc. These items include pressed leaves and plant materials used in decoupage, maple syrup, and herbal remedies (the latter may incorporate wildcrafted, cultivated, and purchased plant material in a single product), boughs and other materials used for wreath making (sometimes as a fund raiser for civic organizations), and birch bark for crafts (earrings, boxes, baskets). Indirect sale of processed SFPs occurs when herbalists and midwives treat clients using herbal medicines they have prepared. However, those who have busy practices or are using a substantial quantity of a particular herb in their practice indicate they are more likely to cultivate or purchase the plant than to gather it due to time constraints and the comparative ease of access to the former.

Attempts to sell items created from SFPs are not always a success and money-losing efforts are likely to be abandoned. Even returns for successful efforts generally appear to be quite low. One woman reports that she has yet to make $500 in a year selling crafts. She also

reports that because her earnings are so low, if she had to purchase a permit to gather materials, she would stop making things that require SFPs. Another interviewee provided information about an elderly woman from whom she has purchased Christmas ornaments made from pine cones, hazelnuts, and other items the woman gathers on walks. The interviewee emphasized the small scale of what this woman was doing. Yet another interviewee mentioned observing a man collecting small branches to make into walking sticks, saying that it had little effect on the forest but appeared to be meaningful for the gatherer.

Sale raw (no value added). Seven interviewees in our sample sell SFPs without any value-added processing. One man supplements his income from other employment by selling mushrooms at a farmers market and on the Internet. The GMNF is central to his business of selling both cultivated and wild harvested mushrooms. In addition to wild harvesting on the forest, he has a permit through which he obtains wood that he inoculates with mushroom spore. He states that if he harvests more than he can sell fresh, he dries mushrooms for sale throughout the year (a form of value-added marketing). Another interviewee who harvests on and around the GMNF has sold wild mushrooms to restaurants. He has asked chefs about selling leeks and fiddleheads to them but says he usually has work that pays better and so he has not pursued this. This individual indicates that relying on mushroom sales for income is difficult because of the vagaries of mushroom fruiting and condition.

When asked about the amounts of items sold raw, interviewees generally mention small quantities, reporting sales of mushrooms, fiddleheads, and leeks on the order of a few pounds per season. One individual who may harvest as much as 30 to 50 pounds of fiddleheads in a year consumes some of that amount herself, shares some with others "who can't get out to pick for themselves," and sells the balance. Some people sell SFPs only intermittently (that is, not every year) and the amounts they sell vary substantially from year to year as a function of several factors including species abundance, prices, available time, and other income opportunities.

PLANNING FOR SFP MANAGEMENT

Understanding the panoply of plant materials and mushrooms being gathered and their values is fundamental to planning for SFP management. Other considerations central to the planning process include allocation of management resources, enforcement costs, equity, and public support. SFPs are just one of many demands on a forest and effective allocation of human and other resources is always a concern for managers. Thus, an early task for SFP management programs is sorting those species that merit active management from those that do not. In addition, approaches that increase the likelihood of voluntary compliance and minimize the need for expensive enforcement will benefit both managers and the resource. Programs that are viewed as fair and based in a solid understanding of local circumstances, as well as the best available scientific information, are more likely to be viewed as legitimate and may even enjoy the active cooperation of gatherers. Finally, finding socially and ecologically sustainable ways to make SFPs available can increase public enjoyment of and support for forests. As with the identification of SFP species and values, gatherers have much to contribute to this process.

Suggested SFP Species Management Categories and Actions

Clearly, it is not feasible to institute an active management program for each of the many species being gathered. Under the terms of the cost share agreement through which this study was conducted, we were asked to assign GMNF and FLNF SFP species to three categories of potential management effort: (1) those that might benefit from some active management to ensure long-term sustainability (red species). (2) those meriting further study to determine whether active management would be beneficial (yellow species), and (3) those not needing active management under present conditions (green species). We have added a fourth category, pale yellow species, to signal those that may merit further consideration in the future (Table 5).

We assign each species gathered on the GMNF and FLNF to one of these categories based on local ecological

Table 5.—Red, yellow, and pale yellow species. Common names of red, yellow, and pale yellow species, reasons for their rating, and possible management actions. Ratings are based on information including, but not limited to, data collected through this study.

Common name	Reason(s)	Possible actions
Red		
Ginseng[a]	High-value international market. Habitat loss. Severely reduced populations over historical levels.	Restoration plantings of Vermont seed in collaboration with VT Ginseng Association.
Lady's slippers[b]	Interviewee observations of reduced population levels.	Habitat management. Restoration plantings.
Yellow		
Fiddleheads	Significant regional and national market. Preservation of local food and cultural traditions. Habitat sensitivity.	Inventory and monitor populations. Develop and disseminate sustainable harvest guidelines.
Wild leeks	Regional market and media attention. Preservation of local food and cultural traditions.	Inventory and monitor populations. Develop and disseminate sustainable harvest guidelines.
Sweetgrass	Strong economic and cultural significance. Reports of reduced availability. Opportunity to manage for valued species.	Inventory and monitor populations. Habitat management. Restoration plantings. Develop and disseminate sustainable harvest guidelines.
Black ash	Strong economic and cultural significance. Scarcity of basket grade trees. Emerald ash borer. Opportunity to contribute to conservation of valued, threatened species.	Discourage transport of firewood from outside the respective areas of the GMNF and FLNF. Inventory and monitor populations, with special attention to individuals likely to have high quality basket wood. Collect seed and deposit with national seed bank in Ft. Collins, CO.
Pale yellow		
Species on United Plant Savers lists	See UpS criteria. Lists are not geographically specific.	Forest botanist judgment as to relevance to GMNF and FLNF.
Mature forest species	Perceived scarcity of habitat, especially on the FLNF	Forest botanist judgment.
Emerging fad and "herb of the hour" species	Heated national and international markets.	Monitor national and international herbal and culinary markets. Forest botanist judgment as to relevance to GMNF and FLNF.

[a] Currently, ginseng may not be harvested on the GMNF.
[b] We found no evidence of current harvest of Lady's slippers on and around the GMNF and FLNF. However, in the past, it has been used as a medicinal and horticultural transplant.

knowledge documented through this research and the ecological literature, triangulated with scholarship on U.S. SFPs (see, for example, Emery and McLain 2001; Jones et al. 2002). Human ecological considerations used in assigning species to one of these categories include likely harvest volumes, reported abundance, cultural importance, and commodity status (that is, whether a species enters commercial markets and, if so, at what spatial scale and volume). Our classifications of individual species are regional only and should not be assumed to apply outside the GMNF and FLNF areas. A plant that is rare at the edges of its range may be common where habitat is more favorable. Likewise, populations of SFPs traded commercially may experience little harvest pressure if they are located far from markets and prices paid to harvesters are not adequate to cover transportation costs. Nevertheless, this approach may offer a useful rubric for identifying which of the dozens to hundreds of SFPs gathered in a location merit the resource expenditures required for any level of active management. For the GMNF and FLNF, we identified two red species, four yellow species, and a suite of pale yellow species. The remainder of the plants on the SFP list belong in the green category.

Red Species

Based on our research results and the literature, ginseng and Lady's slippers merit consideration for active management such as efforts to restore populations. Should harvests be contemplated in the future, active management would be necessary to ensure their sustainable use.

Ginseng. Currently, harvest of ginseng is not allowed on the GMNF or FLNF. None of our interviewees said they harvest ginseng, although we suspect that at least one has done so in the past. Many expressed concern about the status of populations of this prized root, although opinion was divided as to whether harvest should be allowed under a permit system or banned altogether. There may be opportunities to increase the population of ginseng on the GMNF through restoration plantings using local seed. Local ginseng harvesters could be approached through the auspices of the Vermont Ginseng Association and similar organizations about serving as collaborators and stewards in such an effort. Deer exclosures could be necessary to protect such plantings (Furedi and McGraw 2004, McGraw and Furedi 2005).

Lady's slippers. Half a dozen interviewees expressed concern about Lady's slippers, and two lifetime residents indicated they personally have observed greatly reduced populations over those of 40 years ago. One individual who lives near the southern half of the GMNF attributes this in part to a past tradition of students from Williams College harvesting Lady's slippers in Vermont to adorn Williams, Massachusetts, churches each year. A professional herbalist states that Lady's slippers were used as a treatment for hysteria in the Victorian era. Habitat management and restoration plantings might be considered.

Yellow Species

Our research suggests four yellow species: fiddleheads, wild leeks, sweetgrass, and black ash. These species merit further study to determine whether active management is advisable or feasible. Inclusion on the yellow list is not a recommendation that harvest of these species be limited. Rather, it is a suggestion that they be early targets of inventory and monitoring efforts. Other actions that may be considered include harvest response studies and collaborative management partnerships with experienced harvesters and buyers.

Fiddleheads. On the list of yellow species, fiddleheads present the greatest cause for concern. This judgment stems from their significance to regional culture, the existence of substantial markets for the emerging fronds of *Matteucia struthiopteris*, the sensitivity of habitats in which they commonly occur, and anecdotal reports of destructive harvesting techniques. A pair of experienced small-scale commercial gatherers report they have observed beds where vehicles have entered and severely disturbed wetland soils. They indicate also that once they encountered a young man who had been picking fiddleheads for a buyer in north central Vermont. He stated that the buyer had instructed him to pick all the fiddleheads from root bases. Preliminary results from harvesting trials conducted by University of Maine Cooperative Extension indicate that such a practice can result in significantly reduced vigor (Fuller 2009). One action that could be considered is production of sustainable harvest guidelines for fiddleheads.

Wild leeks. This species is our second greatest concern. Although we see no evidence that sale of *Allium tricoccum* from the GMNF and FLNF area has a volume or market extent on the scale of that for fiddleheads, attention in popular media likely increases demand and may result in larger numbers of inexperienced gatherers harvesting them. See the commodity chain section for a description of known markets for wild leeks from the GMNF area. Currently, harvest of wild leeks is prohibited in the Province of Quebec (Ministère des Ressources Naturelles et de la Faune 2008). *Allium tricoccum* also is on the State of Maine's rare plant species list (Maine Natural Areas Program 2005). However, the species is not on the Vermont Natural Heritage Program watch list (Vermont Nongame and Natural Heritage Program 2009) nor do we have any indication it is in any way compromised in the state. Development of a plan for inventorying and monitoringing populations on the forests, should this be deemed necessary, and preparation of sustainable harvest guidelines seem to be sufficiently prudent actions at this time.

Sweetgrass. Concern for the status of sweetgrass is widespread throughout Native American communities of the Northeastern U.S. *Hierachloe odorata* is used in many Native spiritual and cultural practices as well as in basketmaking. Two of our interviewees, one who gathers on and around the FLNF and another near the north half of the GMNF, indicate that it is increasingly difficult for them to find sweetgrass. Habitat loss likely is the primary culprit. However, the market for sweetgrass appears to have burgeoned with the ongoing Native American cultural renaissance. In response to these trends, the Great Lakes Indian Fish and Wildlife Commission, which serves 11 tribes in the Upper Midwest, established a sweetgrass garden program in the mid-1990s. Biocultural restoration of the species in Upstate New York was the focus of a 2001 doctoral dissertation at the State University of New York's College of Environmental Science and Forestry and subsequent articles (Shebitz 2001, Shebitz and Kimmerer 2005). There may be opportunities to build on these efforts to increase populations of sweetgrass and serve tribes and Native peoples around both the FLNF and GMNF.

Black ash. This tree has always been a small component of the northeastern forest with large cultural and economic importance for Native Americans. Black ash is central to the creation story of the Wabanaki peoples of Maine and is an economic lifeline for tribes throughout its range. Black ash basketmaking is enjoying a resurgence after nearly dying out in the mid-20th century. Unfortunately, the species is threatened by the emerald ash borer (EAB). Identification of key populations and seed collection efforts offer some hope for protecting and restoring black ash.

Pale Yellow Species

We have identified several species or suites of species that may bear further consideration to determine whether yellow status would be warranted by conditions on the GMNF and FLNF. They are species with known or emerging markets or for which habitat may be scarce, but for which we do not have strong evidence of locally compromised populations. SFPs listed as species "at risk" or "to watch" by the member organization United Plant Savers(UpS), whose mission is to "protect native medicinal plants of the United States and Canada," also are included as pale yellow species, although we note that UpS lists are not geographically specific.

Green Species

All species that do not fall into the red, yellow, or pale yellow categories are considered green species, that is, not needing active management to sustain current populations under present conditions. If the context for use of a green species changes as a result of altered population levels, loss of access on surrounding lands, or development of a significant commercial market, particularly if that market is national or international in scale, it may be advisable to reconsider its category.

Sustainable Harvest Guidelines

Sustainable harvest guidelines can be divided into two types: (1) general and (2) species specific. General guidelines describe best practices that can be applied to the harvest of almost any plant material or mushroom. Given the large number of species that will be on green lists, developing and disseminating general harvest guidelines is a practical way to introduce new gatherers to best practices. It also would help to set standards and expectations for practices on a forest. General guidelines probably are not adequate to protect more sensitive species or species subject to special demand, such as those on red and yellow lists. In such cases, more specific guidelines may be necessary. We describe a suite of possible approaches to the development of general and species-specific guidelines in the remainder of this section. Collaborative approaches will increase the likelihood that guidelines are regarded as fair and grounded in local realities, increasing the likelihood of voluntary compliance.

Resources for development of general harvest guidelines include field guides and traditional and local ecological knowledge, including suggestions provided by interviewees. Several field guides to wild edible and medicinal plants include general harvest guidelines. With some adaptation, two field guides with roots in northern New England are appropriate starting places for the GMNF and FLNF. The Peterson Field Guide to Edible Wild Plants (Peterson 1977) was authored from a desk

on the University of Vermont campus, where the writer consulted with faculty who are experts in Vermont flora. Foraging New England (Seymour 2002) is grounded in the author's extensive experience gathering in Maine. Seymour's section on harvesting techniques provides detailed suggestions about what constitutes careful practice and its potential benefits.

Local and traditional ecological knowledge also can be a source for general guidelines. Many participants in this study articulate rules similar to those found in Peterson (1977) and Seymour (2002). A few add what might be thought of as a rule of ten or a rule of three. That is, only one-tenth or one-third of any group of plants should be harvested. Results of research with gatherers in Michigan's Upper Peninsula in the mid-1990s included seven norms that longtime gatherers there indicated are important for sustainability (Emery 1998). The Peterson (1977), Seymour (2002), and Emery (1998) guidelines are presented in Appendix 6.

Synthesizing these resources and mindful that, unaided, the human brain has difficulty keeping track of lists containing more than five to seven variables, we suggest the following five points as a starting point for general harvest guidelines:

- Gather where a plant is abundant.
- Gather selectively. Take just a few leaves, stems, flowers, or other parts from a single plant. Harvest from only a few plants in an area. Rotate sites from year to year.
- Steward gathering sites. Create as little disturbance as possible.
- Know what you are gathering. Take a field guide. Obtain a list of regionally threatened or endangered plants and avoid picking or trampling them.
- Take only what you will use, leaving plenty for wildlife and other people.

Species-specific guidelines may include prescription of harvest techniques, harvest limits, and rotation of harvest areas. For species with harvest of multiple plant parts, guidelines also may need to address details specific to leaves, roots, and other parts, as appropriate. The GMNF and FLNF may consider developing species-specific harvest guidelines for at least three of the four species on the yellow list—fiddleheads, wild leeks, and sweetgrass. Conditions that would warrant development of species-specific harvest guidelines for other plants and fungi include changes in population levels due to habitat loss, climate change, or development of a significant commercial market, especially if the latter were national or international in scope. When developing species-specific guidelines, it is important to avoid facile prescriptions. For example, harvest of roots and rhizomes often is prohibited. Such blanket approaches tend to lack credibility with knowledgeable gatherers and can be ecologically counterproductive. This is illustrated by the work of Turner and Kuhnlein (1983) on camas bulbs (*Camassia* spp.) in the Pacific Northwest, which demonstrates that traditional management practices were responsible for creating and maintaining many populations. Camas populations have declined since harvest was prohibited.

We suggest a multi-stage approach to establishing species-specific guidelines: (a) triangulating information sources, (b) monitoring, (c) conducting harvest trials, and (d) periodic review. This approach would conform to the pending U.S. Forest Service SFP rule as currently written and provide for relatively rapid response while allowing for adaptation as new information becomes available.

Information Sources

Triangulating the scientific literature, existing regulatory frameworks, and local ecological knowledge offers a robust basis for species-specific harvest guidelines. The scientific literature, where available, can provide objective, generalized, and generalizable information critical to developing and evaluating guidelines. Where results are based on field work in an ecologically distinct area or in a different portion of a species' range, it will be important to consider the potential for significant geographical differences.

It also may be useful to review guidelines developed elsewhere, where they exist. Here again, the foundation

for the guidelines should be assessed for applicability in the specific context, keeping in mind that social, economic, and ecological conditions can vary considerably.

Long-term gatherers often possess detailed experiential knowledge of a species and its response to harvesting, and it is not uncommon for them to augment this with information from digital and print resources. Gatherers bring extensive understanding of local social and ecological conditions that is different from and complementary to formal scientific literature. This study is an initial step toward including the local ecological knowledge of gatherers. The Collaborative Management section beginning on page 21 outlines ways to incorporate gatherers and their knowledge into the development of species-specific guidelines.

Monitoring

The proposed rule calls for monitoring to ensure the long-term sustainability of SFP harvests. In addition to biological and ecological considerations, monitoring also may address more social aspects of guidelines such as compliance with harvest techniques. Like harvest guidelines, monitoring protocols need to be species-specific. Monitoring fungi can be especially challenging. Pilz and colleagues developed and tested monitoring protocols for selected fungal species in the Pacific Northwest (Pilz and Molina 1996; Pilz et al. 2002, 2003) that offer useful models.

Programs such as the National Breeding Bird Survey[4] and the Bioblitz[5] demonstrate that involving the public can be an effective means of monitoring dispersed species over a large area. This approach could be adapted to monitoring SFPs. Pilz et al. (2006) provide step-by-step guidance on participatory monitoring from planning and implementation to followthrough.

Harvest Trials

Harvest trials are multi-year studies in which the effects of both best and worst practices are tested. They include multiple treatments reflecting actual practices, valid and reliable measures of harvest effects, a control, and the ability to exclude harvest that is not a part of the trial. To ensure validity of harvest trial design for management applications, gatherers should participate in the design of replications. Opportunities also may exist to involve gatherers in data collection and interpretation in a manner similar to that referenced in the monitoring section above.

The extended time horizons of harvest trials mean they rarely will be available as a basis for harvest guidelines when a need is first identified. But they can provide a strong, objective standard for subsequent assessment and adaptation. We suggest initiating harvest trials to coincide with implementation of initial guidelines. Occasionally, results of harvest trials conducted elsewhere may be available. Their applicability to other locations will depend upon trial design and comparability of ecological conditions.

Periodic Review

SFP markets rise and fall, monitoring and harvest trial results can produce new information, and the full implications of climate change are unknown. Consequently, it is important to review species-specific guidelines on a periodic basis and adapt them as necessary. The frequency with which guidelines should be reviewed by national forests may be dictated by U.S. Forest Service regulation. Where not prescribed, the review period should be set according to species biology, also taking into account the larger social and ecological context of use. At a minimum, guidelines for red (where harvesting of these is allowed) and yellow plants may be reviewed every 5 years. A shorter timeline could be triggered by changes such as substantial habitat alterations, reduced access to surrounding land, development of a new market, or intensification of an existing market. Given their extreme variability, the period for review of guidelines for fungal species, should any be needed, could be longer in the absence of a compelling socioeconomic reason for more frequent review.

[4] http://birds.audubon.org/partners/north-american-breeding-bird-survey

[5] http://www.nationalgeographic.com/field/projects/bioblitz/

Study Participant Suggestions for SFP Management

Study participants from all three units in the study recognize the need to protect vulnerable and sensitive plants. They are willing to see prohibitions on gathering of certain species such as ginseng and goldenseal and harvest limits on other species where species biology or harvest pressure warrant such limits, especially for plants and fungi that are commercially harvested. In general, participants believe SFPs that are abundant, such as berries or weedy species, should not be subject to harvest limits for personal use.

Noncommercial gatherers think large-scale commercial harvesting should not be allowed on the GMNF and FLNF. Respondents in Vermont were slightly more open to the idea of commercial harvesting than those in the Finger Lakes area. Interviewees in both New York and Vermont believe that if there must be commercial harvesting, it should benefit local gatherers first and provide jobs for local people before being opened to commercial operations from outside the state.

We asked interviewees a number of questions about how they would like to see the GMNF and FLNF design and administer permitting, regulation, or management of SFPs. Their responses focus on the design of a regulatory program, especially permits for personal versus commercial gathering, and the need for research and public education. Their ideas are broadly applicable to other locations.

Permits

If the GMNF and FLNF must implement an active regulatory program including permits, interviewees made a number of suggestions to make it easier for gatherers to comply (Fig. 2). Many of these suggestions came from Vermont interviewees and were inspired by their prior experience with licensing and reporting required by the Vermont Department of Fish and Wildlife.

Personal Use

Gatherers note that one of the challenges of assigning permits for personal use is that they never know when they will be picking SFPs. Says a Native American woman in her sixties:

> *"'Cause it would be hard if I had to go down [to get a permit] each time I was going to go for a walk. And I don't know what I'm going to find each time I go."*

While a twenty-something student notes:

> *"I do this as a side thing. If I'm going out hiking or going camping and then I see these, that's what I'll do. I don't plan to go out harvesting."*

One solution respondents propose for this dilemma is to use a model similar to that for hunting licenses, whereby hunters apply for a combination license that covers the game and fish they might go after for the whole year. A retired man living near the south half of the GMNF describes how it works for him:

> *"I can go on January 1st and buy everything for the entire year if I want. Usually I just buy a combination license because who knows. Maybe by the time that deer season gets here, I've got a broken leg and I don't want to spend the money to buy a muzzle loader tag 'cause I'm not going to use it."*

In this way a gatherer would apply for one permit at the beginning of the year that would cover any SFP they might pick. Such a permit could apply to species on the green list, with exceptions or special conditions for species classified as pale yellow, yellow, or red.

Another suggested approach was that used for shellfish in coastal Massachusetts. Residents are allowed to harvest pre-established quantities of shellfish in their own towns without a license (for example, one bushel of clams/family/day),[6] but non-residents and commercial harvesters must purchase licenses, which are limited in number, and comply with a harvest quota for individual species.

Interviewees suggested that to maximize compliance, permits should be available on-line and in places that local people frequent. Younger gatherers stated that

[6] We note that establishing appropriate harvest limits for personal consumption can be challenging where subsistence activities are a consideration—a particularly important issue in times of economic hardship.

Figure 2.—Participant suggestions for initiating an SFP management program

Personal Use

1. The GMNF and FLNF should not allow harvesting of "red category" species.
2. Permits should not be required for personal use of plants and mushrooms in the "green category."
3. If permits are required for personal use of species in the "yellow category," further research should be conducted and a pilot program established. Gatherers should be included in research and monitoring. Participation in pilot permitting should be voluntary and based on the honor system. Specific suggestions include
   a) Conduct focus groups with different types of gatherers to get their input prior to starting research and permit programs. Mushroom hunters, herbalists, commercial foragers, hunters, loggers, trappers, evergreen gatherers, and craftspeople should be included.
   b) Invite gatherers to voluntarily inform the GMNF and FLNF about how much they harvest as a way to establish baseline volumes, help with inventory and monitoring, and determine if permitting is necessary.
   c) Post boxes at trailheads for people to anonymously report how much they picked on a given walk, similar to honor system reporting boxes at fishing spots
   d) Share results of inventory and monitoring activities with the public, similar to the way fish and wildlife agencies share information about game populations and harvests
4. If permitting is required, the process should be as easy as possible to ensure maximum compliance. Specific suggestions include
   a) People gathering for personal use should only have to apply for one permit per year to cover all the potential plants they might harvest.
   b) Permit applications should be available on-line, as well as at general stores and town clerks

Commercial Use

5. Distinguish between commercial harvesters' scales of activity and between local and non-local commercial harvesters, giving preference to smaller scale and local harvesters
6. Consider a three-tier harvester scale system:
   a) Micro-scale
   b) Small- to mid-scale
   c) Large-scale
7. Set threshold limits for each scale of activity based on annual harvest volumes and dollar values.
8. For "green species":
   a) Micro-scale harvesters – no permit, no fee
   b) Small- to mid-scale harvesters – permit fee proportional to value of harvest
   c) Large-scale harvesters – must submit a harvesting plan; permit fee proportional to value of harvest plus administration costs
9. For "yellow species":
   a) Micro-scale and small- to mid-scale harvesters – permit fee proportional to value of harvest
   b) Large-scale harvesters – must submit a harvesting plan; permit fee proportional to value of harvest plus administration costs
   c) Large-scale commercial harvesters – must submit a harvesting plan, receive a permit, and pay a fee that is large enough to cover the cost of administering the permitting program

Note: Hunters were the most open to the concept of permits. Many participants believe large-scale commercial harvest, especially by non-locals, should not be allowed on public lands

on-line registration would work well for them. Other gatherers considered easy access to "neighborhood" permitting sites, such as town halls and general stores, to be important, especially for elders who might not have access to the internet, may be reluctant to travel long distances, or be uncomfortable going into unfamiliar establishments to get a permit.

Commercial Use. Respondents note that there are substantial differences in the scale of operations and locations of markets for commercial SFP harvests. SFPs are sold in local to international markets. SFP-based businesses can be locally or remotely owned. They use volumes of plant material or fungi that range from ounces to tons. In general, interviewees would like regulations to give priority to small-scale, locally owned and marketed operations over large scale, externally owned operations, especially if they export SFP material.

Most of the commercial gatherers interviewed for this study harvest on a small scale and are not reaping large profits from the SFPs they are gathering.[7] Often other factors, such as spending time in nature, are a primary motivation and any income is a bonus. Thus, they suggest that it would be helpful for any fees for commercial harvesting to reflect the scale of the operation, the quantity harvested, and the relative market value of the SFP. One interviewee who suggests this approach is a young woman who makes part of her living from herbal preparations:

> *"For me it [charging fees] would be pretty defeating because I do it on such a small scale. I mean, permits, hunting permits aren't very expensive. I can't imagine that it would be a terribly steep permit price. But I think it would make sense to have an income bracket that it would fall under. And some way more detailed than just commercial use. Because I think it's super different dealing with people who are harvesting something and then selling it like in a local market, than businesses that are distributing something maybe outside Vermont. Or like taking truckloads to Boston or whatever."*

Our interviewees identified timing of fee payments for permits for ephemeral species that vary significantly from year to year as another challenge. A commercial mushroom gatherer notes that paying a fee to collect at the beginning of the year could be detrimental to his business because mushroom yields vary so much from year to year, depending on weather and other conditions. Anticipating the problems that this might cause for him, he says:

> *"You might not harvest anything. And then you just bought a permit and paid, I don't know, a $50 fee, and you didn't even make that back."*

As a solution, another mushroom gatherer proposes that commercial gatherers could apply for a permit at the beginning of the season, but pay at the end of it, based on quantities of plants or fungi harvested.

Interviewees also suggest that if someone approaches the national forest to do a large commercial harvest, the company be required to submit a management plan demonstrating the sustainability of their operation and pay a fee to cover the cost of plan review. It was further proposed that forest administrators should call public meetings and have a comment period for any proposed large-scale commercial harvesting.

Research and Public Education

Although many gatherers are opposed to permitting or regulation of gathering for personal use, they draw a distinction between requiring personal gatherers to have a permit and requesting personal gatherers to share data on species and quantities gathered in order to help the GMNF and FLNF manage SFPs appropriately. A majority of interviewees are supportive of research to understand quantities of SFPs being harvested and the impact of those harvests on particular species and overall forest health. At least nine respondents suggested that the GMNF and FLNF conduct research in order to:

- identify locations of special SFP populations, especially those of commercial value (fiddleheads and leeks, in particular)
- identify which populations are being harvested
- understand how much is being harvested for personal and commercial use
- understand how harvesting is affecting regeneration of the population

Mushroom hunters in particular expressed a need for additional research to understand how mushroom

[7] Our research elsewhere shows that returns to gatherers rarely equal minimum wage (Emery 1998, Emery et al. 2006a).

populations are affected by harvesting and how they regenerate in order to develop guidelines for sustainable harvesting practices.

Participants also recognize that some parts of the forest might be under more harvesting pressure than others, with areas closest to roads and trails likely to experience the heaviest harvesting. One participant noted that because gathering occurs unevenly across the forest, it is important for forest ecologists to understand its spatial distribution in order to appropriately manage plant populations and set harvest limits for particular areas. Referring to a town in Vermont, one young woman noted:

> *"Well, yeah, maybe you can harvest X amount of leeks, but if they all come out of this one riverbed in Wallingford, then that probably is going to do something pretty harmful to that area."*

At least five gatherers suggested that gatherers could voluntarily self-report species and quantities harvested, perhaps using the types of surveys employed at fishing spots by the Vermont Fish and Wildlife Department. As one angler describes it:

> *"We do that with fishing on different rivers… Of course, nobody's forced to do it. But there's a little box there and you fill out your survey at the end of the day… how many fish caught, how many released, sizes, and all that."*

Gatherers would like to see this information shared back with them, perhaps as an annual on-line report, or in an annual handout that would be available with permits.

At least 10 interviewees suggested that sharing research data and educating the public on sensitive plants, fungi, and sustainable gathering strategies would support sustainable harvest practices. One interviewee suggests that an effective outreach and education program could replace or eliminate the need for regulation of personal gathering. Many people suggested that guidelines and information on sustainable gathering practices be provided in multiple places: on-line, through printed literature and posters, and through on-site workshops.

Collaborative Management

The SFP harvesters who participated in this study come from a variety of backgrounds. They and others like them throughout the country have considerable first-hand knowledge about the forest as well as professional and amateur expertise in related sectors. Their passion for gathering wild plants and fungi makes them natural collaborators in SFP management planning. Incorporating their knowledge of the species and places they gather, as well as their ideas about sustainable practices, would contribute to the effectiveness and perceived legitimacy of any changes in SFP policy. Further, many SFPs are ephemeral and highly dispersed. Engaging gatherers in inventory and monitoring activities would make aspects of effective management possible for which resources are otherwise likely to be limited.

At least half of interviewees expressed enthusiasm and willingness to collaborate with forest staff on managing for SFPs. Interest in participating in collaborative efforts varied depending on the interviewee's available time, past experiences with the national forest, their perception of the collaboration as a learning opportunity, and possible compensation for their time, energy, and knowledge.

Gatherers' time constraints suggest the need for a range of outreach and public involvement opportunities (Fig. 3). Interviewees suggested a number of ways gatherers might contribute to GMNF and FLNF management of SFPs. Arranged from low time commitment to higher time commitment, their suggestions include:

- Notify the Forest Service if gatherers notice problems related to SFPs.
- Voluntarily record SFPs and quantities harvested. At least five people from Vermont mentioned that one way for gatherers to be involved in inventory and monitoring of SFPs would be to record the SFPs and quantities they harvested at trailhead recording boxes or by going on-line. Two of the people mentioning this are hunters or anglers who note that the Vermont Fish and Wildlife Department currently uses such voluntary reporting methods.

Figure 3.—Outreach and public involvement opportunities

1. Conduct focus groups, where gatherers can participate as expert consultants on:
   a) Content of public education materials, including ethics and guidelines for sustainable harvesting
   b) Locations of "red" plant populations that should be protected
   c) Design of inventory and monitoring programs that include gatherers
   d) Development of a pilot permitting process for yellow category species, if deemed necessary
   e) Fair and reasonable fees and permitting process for commercial harvesters
   f) Consultation on management plans for individual species, especially those that are the most heavily collected or have commercial value
2. Create educational brochures and posters on different categories of NTFPs, (Mushrooms; Edible plants; Medicinal plants; Craft plants, Mosses, and Evergreens), including information on poisonous plants and fungi. Each brochure and poster also would provide instructions on sustainable harvesting methods and ethics, developed in consultation with gatherers. These can be made available on-line, at Ranger Stations, and in poster format at trailheads.
3. Post new regulations in several digital and physical public places including town clerks' offices in towns within national forest boundaries, places frequented by gatherers such as general stores, food cooperatives, and hunting stores, and links from Web sites with which gatherers may have an affinity (e.g., herbalist associations).
4. Work with local herbalists, mushroom collectors, and naturalists to offer public workshops and nature walks on sustainable harvesting. Compensate these experts for their services.
5. Conduct a Bioblitz, making an effort to recruit community members who live within the forest as well as local naturalists.
6. Create a program for high school or college students (similar to Youth Conservation Corps). Train youth to clear and maintain old farmsteads to promote useful species for human use and wildlife habitat, especially fruit and nut trees.

- Participate in one-time focus groups to provide input on guidelines, regulations, permitting processes, and educational materials. Several people who initially said they could not participate because of limited time were more willing to agree to a one-time focus group event if it meant they would interact with more experienced gatherers or visit new sites in the forest. The statements of two interviewees illustrate the enthusiasm generated by this possibility. A young man who sells wild plants and fungi said that he would be especially interested if it provided an opportunity to

  "get out there with somebody that was really knowledgeable on it. Also just to see new places."

  A professional man in his fifties who gathers strictly for personal use said,

  "Oh sure. I would love to. And then that would introduce me to other people that are picking things that I don't know about that I should know about. So we could share that information. That would be really cool."

- Participate in a one-time SFP-focused "Bioblitz." In our study area, this type of project would be especially easy to organize for the FLNF unit given its small size and the number of amateur and professional natural history buffs in the region.

- Conduct workshops and classes for the public on their area of expertise (fungi, medicinal herbs, edibles, for example). Gatherers feel strongly that educational programs are important tools for teaching people how to gather SFPs sustainably. At least three gatherers offered to help provide workshops and classes for that purpose. Two of these individuals propose workshops on how to cultivate useful and economically valuable plants such as ginseng and mushrooms in order to take pressure off wild populations. A number of interviewees suggested that the forests offer classes for school children. One retiree said,

  "…if you get the right people out there, they can do a lot of your policing and a lot of your teaching about what to pick and how much to pick and where to pick and proper management."

- Serve on an ongoing advisory committee to help develop guidelines, regulations, permitting processes, and educational material for sustainable harvest practices.
- Participate in ongoing monitoring of specific SFP populations. There was not a great deal of interest among gatherers in systematic, long-term monitoring on a volunteer basis. One participant noted that while he would be happy to participate in a one-time focus group,

  "…the time I get to be out in the woods is my time…. I think taking notes when I go out in the woods is a little beyond what I'm willing to do."

  However, if funding were available, inventory and monitoring programs would be excellent opportunities to employ gatherers and benefit more extensively from their expertise.
- "Adopt" and manage old farmsteads and other special sites. Many old farmsteads contain fruit and nut trees and herbs, such as comfrey, that local residents enjoy picking. These areas can have significant emotional and historical value for residents. Many study participants place a high priority on such areas and the SFPs on them and would be willing to help manage them through arrangements similar to volunteer trail maintenance programs.

Although there was considerable interest and even excitement about the possibility of collaborating with the GMNF and FLNF on SFP management, there also was some ambivalence on the part of interviewees. Individuals who had engaged with the forest planning process or other such efforts mentioned some dissatisfaction with their experiences. In some cases, they thought the agency had an unstated agenda. In others, the bureaucratic and logistical prerequisites to participation were felt to be onerous.[8] Some interviewees voice reluctance to reveal the location of plant populations or to be involved in collaborative efforts because they feel their concerns have not been adequately incorporated into forest management in the past. At least three interviewees expressed strong concerns about whether the Forest Service's efforts to collaborate with communities would be genuine and backed up with sufficient funding to implement their suggestions in a meaningful way.

These comments and the life circumstances of our interviewees point to some elements that could increase the success of collaborative management efforts. Even the most dissatisfied of our interviewees recognize that an institution as large as the Forest Service must satisfy multiple interest groups and faces considerable challenges in working with surrounding communities. Their enthusiasm about SFPs is more likely to overcome their skepticism if they receive reassurance that their efforts will result in incorporation of their input. Gatherer participation also would be increased by providing recognition of their expertise and, where possible, financial support for participation in collaborative efforts and consultation. Many of our interviewees are self-employed and six stated that while they are very interested in collaborating with forest managers, some sort of compensation for their knowledge and time would greatly facilitate their participation. Others suggested that efforts to manage SFPs might result in income and (green) jobs creation for local people, especially those who already are actively involved with SFPs.

[8] For example, being required to have and maintain CPR certification in order to prune old apple trees on the GMNF.

DISCUSSION

This study was conducted in the context of pending requirements that national forests institute a program for management and regulation of SFPs. The rule as currently written has five main components: provide for free personal use, institute a program of permits and fees, inventory and monitor SFPs, set sustainable harvest limits, and honor the U.S. government's treaty obligations. Our conversations with people who gather SFPs on and around the GMNF and FLNF, combined with public comments on the proposed rule (Emery 2008), highlight considerations in each of these areas. We discuss them here in reverse order.

Treaty Obligations

Gathering is critical to the material and cultural survival of indigenous peoples throughout the United States, including the GMNF and FLNF regions. As currently written, the rule stipulates that national forests must honor treaty obligations in implementing SFP regulations and permits. The U.S. government has several treaties with the Haudenosaunee/Iroquois Nations. In Vermont, the Abenaki are recognized by the state, but federal recognition is under review. A substantial portion of public comments on the proposed rule addressed the sections on provisions for tribes with treaty rights. These comments included reminders that other laws, such as the American Indian Religious Freedom Act, also are germane, as well as discussion of tribes without treaties or federal recognition. As a result, regulation provisions related to gathering by Native Americans may be modified. Many species with importance to indigenous peoples occur on the GMNF and FLNF and other public and private lands and, as such, offer opportunities to support Native practices and biocultural diversity in the region.

Sustainable Harvest Limits

Sustainable harvest limits are context sensitive. Factors affecting sustainable harvest levels include location within the species range (that is, whether the place of harvest is squarely within the species' range or at its limits), species biology and ecology, harvest technique being used, plant part being harvested (for vascular species), demand for the species, and landscape-scale factors such as changes in land use. Forests are large, most SFPs are small, and gathering is a dispersed activity. Thus, voluntary compliance is essential to the effectiveness of harvest limits without extensive expenditures on enforcement. Limits that are considered to be fair and grounded in accurate information are most likely to result in voluntary compliance. As noted in the section on developing sustainable harvest guidelines, one way to achieve this is by triangulating between the scientific literature, experience (if any) with regulatory frameworks elsewhere, and local ecological knowledge contributed by gatherers through collaborative processes.

Inventory and Monitoring

The proposed rule directs national forests to inventory and monitor SFPs. Clearly, it would not be feasible to inventory and monitor all of the species gathered on the GMNF and FLNF or any forest. The most logical place to concentrate initial efforts is on red and yellow species, also considering pale yellow species should that be deemed necessary and feasible. Whether a baseline inventory should be required before permits are issued for harvest of an SFP was the subject of several public comments on the rule. Although a U.S. Forest Service decision on this question likely will rest with national headquarters, it seems reasonable that a baseline would be of value for species that might be subject to substantial commercial harvest or have special cultural value. Based on study findings and our research elsewhere, the four yellow species on the GMNF and FLNF seem to fit these criteria: fiddleheads, sweetgrass, black ash, and, to a lesser extent, wild leeks.

Permits and Fees

The devil is always in the detail and that would be true for the effectiveness and acceptability of a permit program. We address potential requirements for a free personal use permit in the section immediately below. On the subject of permits and fees for commercial harvest, business scale and location were mentioned frequently by study participants. In general, interviewees would like to see any permitting system favor local businesses and the creation of what one interviewee called "green jobs" for local people. The possibility of a sliding scale fee for small businesses was also suggested. Public comments on the proposed rule and

micro-business people in our sample noted the potential for fees set too high to drive them out of business. Comments on the proposed rule by the American Herbal Products Association underscore the importance of setting fees based on the rate of return to gatherers, as opposed to wholesale or retail values, and of reassessing those returns on a regular basis. The commodity chain information in this report provides a snapshot of prices paid to gatherers for fiddleheads and wild leeks.

Free Personal Use

Participants in this study were divided about whether permits should be required for personal use. Those who have experience with hunting and fishing licenses were most comfortable with the notion that permits might be required. Our results and public comments on the proposed rule suggest at least three challenges to consider in establishing a program for free personal use:

1. It is common for people who gather for small-scale commercial purposes also to gather for personal use in the same outing. One approach may be to establish a threshold volume, beyond which gatherers would have to pay a fee. Such a strategy would have to be implemented carefully. Limits set to accommodate immediate consumption by one person will not be adequate to provide for a family or larger social network for whom a single individual may be gathering. It would almost certainly be inadequate to support subsistence practices, the preservation of which is a goal under the International Convention on Temperate and Boreal Forests to which the United States is a signatory.
2. Several individuals mention timing and specificity as potentially problematic; people often do not know if or what they will be gathering when they go out on any given day. A hunter suggested that if permits are required for personal use, annual permits for multiple species be made available.
3. Concerns about ease of obtaining a permit also were common to public comments and our interviewees. In this regard, study participants suggested that permits be made available through multiple outlets that are comfortable for gatherers including general stores, town clerks' offices, and the Internet.

CONCLUSIONS

Patterns on the GMNF and FLNF appear to be typical of those throughout the United States and, thus, offer a useful model for forest managers contemplating SFP management elsewhere. More than 200 SFPs are gathered on and around the GMNF and FLNF, most in small quantities. A few are gathered in greater volumes. Of these, most present no need for concern and some may constitute opportunities to expand the benefits the forest provides, as do the existing blueberry management areas on the FLNF and northern unit of the GMNF. A small number would be targets for further examination under the proposed U.S. Forest Service rule.

Two species on the GMNF and FLNF yellow list stand out in this regard. Fiddleheads and wild leeks are among the SFPs gathered by the greatest number of gatherers in our sample, and we suspect this is indicative of patterns in the region. Moreover, these species find their way into local and regional markets (at least), with fiddleheads doing so in substantial amounts. Levels of concern about fiddleheads and wild leeks vary among participants. However, prudence would suggest that if there are resources and interest in following up on this study, these two species would be appropriate initial targets, with fiddleheads receiving first priority.

Participants in the study reported on here, like gatherers elsewhere in the United States, enjoy gathering SFPs and want to continue doing so. Gatherers also care about the species they harvest and want those species and the ecosystems they are a part of to flourish into the future. Although there is some skepticism about the ability of the U.S. Forest Service to manage SFPs sustainably, many of our interviewees indicate that they would be supportive of some forms of active SFP management and regulation. Many also indicate they would be willing to collaborate in the development of such a program. We hope the results reported here and the information we have gathered over the course of this study will contribute to the initiation of such collaborative processes for managing SFPs.

REFERENCES CITED

American Herbal Products Association. 2006. **2004-2005 Tonnage survey of select North American wild-harvested plants**. Washington, DC: American Herbal Products Association.

Arnason, T.; Hebda, R.J.; Johns, T. 1981. **Use of plants for food and medicine by Native peoples of Eastern Canada**. Canadian Journal of Botany. 59: 2189-2325.

Barron, E.S.; Emery, M.R. 2009. **Protecting resources: assessing visitor harvesting of wild morel mushrooms in two National Capital Region parks.** Natural Resources Technical Report NPS/NCR/NCRO/NRTR--009/002. Washington, DC: U.S. Department of the Interior, National Park Service.

Baumflek, M.J.; Emery, M.R.; Ginger, C. 2010. **Culturally and economically important nontimber forest products of northern Maine.** Gen. Tech. Rep. NRS-68. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northern Research Station. 74 p.

Benedict, L.; David, R. 2000. **Handbook for black ash preservation, reforestation/regeneration**. Hogansburg, NY: Mohawk Council of Akwesasne, Department of Environment.

Diamond, A.K. 2009. **The art of finding what's needed: ethnoecological knowledge of basket and dye species in New England**. Burlington, VT: University of Vermont. Master's thesis.

Emery, M.R. 1998. **Invisible livelihoods: non-timber forest products in Michigan's Upper Peninsula**. Ann Arbor, MI: UMI Dissertation Services.

Emery, M.R. 2002. **Space outside the market: implications of NTFP certification for subsistence use**. In: Shanley, P.; Pierce, A.; Laird, S.; Guillen, A., eds. Tapping the green market: management and certification of NTFPs. London: Earthscan: 302-312.

Emery, M.R. 2008. **Summary report: public comments on proposed USFS regulations for special forest products and forest botanical products**. Unpublished analysis of public comments in response to Federal Register Notice Vol 73, No. 249, p. 79367, Monday, December 29, 2008, Rules and Regulations, 36 CFR Parts 223 and 261 RIN 0596-AB81 Sale and Disposal of National Forest System Timber: Special Forest Products and Forest Botanical Products. U.S. Forest Service, Northern Research Station. Burlington, VT.

Emery, M.R.; Ginger, C.; Chamberlain, J. 2006a. **Migrants, markets, and management of natural resources in western North Carolina**. In: Furuseth, O.J.; Smith, H., eds. The New South: Latinos and the transformation of place. Burlington, VT: Ashgate Publishing.

Emery, M.R.; Ginger, C.; Newman, S.; Giammusso, M.R.B. 2003. **Special forest products in context: gatherers and gathering in the eastern United States.** Gen. Tech. Rep. NE-306. Newtown Square, PA: U.S. Department of Agriculture, Forest Service, Northeastern Research Station. 59 p.

Emery, M.R.; Ginger, C.; Roberts, J.; Baumflek, M. 2005. **20th century uses of nontimber forest products on and around the Green Mountain National Forest**. Unpublished data. University of Vermont and U.S. Forest Service, Northeastern Research Station. Burlington, VT.

Emery, M.R.; Martin, S.; Dyke, A. 2006b. **Wild harvests from Scottish woodlands: social, cultural and economic values of contemporary nontimber forest products**. Edinburgh: Forestry Commission.

Emery, M.R.; McLain, R.J. 2001. **Non-timber forest products: Medicinal herbs, fungi, edible fruits and nuts, and other natural products from the forest.** Binghamton, NY: The Haworth Press (A monograph published simultaneously as the Journal of Sustainable Forestry, Vol. 13, Nos. 3/4).

Emery, M.R.; Pierce, A.R.; Schroeder, R. 2004. **Criterion 6, Indicator 47: Area and Per Cent of Forest Land Used for Subsistence Purposes. Data Report: A Supplement to the National Report on Sustainable Forests -- 2003, Analyses of the Indicators** http://www.fs.fed.us/research/sustain/contents.htm. [Accessed December 30, 2004].

Fuller, D. 2009. Personal communication. June 15, 2009.

Furedi, M.A.; McGraw, J.B. 2004. **White-tailed deer: dispersers or predators of American ginseng seeds?** American Midland Naturalist. 152: 268-276.

Herrick, J.W.; Snow, D.R. 1995. **Iroquois medical botany**. Syracuse, NY: Syracuse University Press.

Hufford, M. 2000. **Tending the commons: folklife and landscape in southern West Virginia** http://memory.loc.gov/ammem/cmnshtml/cmnshome.html. [Accessed February 20, 2001].

Jones, E.T.; McLain, R.J.; Weigand, J.F. 2002. **Non-timber forest products in the United States**. Lawrence, KS: University Press of Kansas.

Maine Natural Areas Program. 2005. **Maine rare plant list.** http://www.maine.gov/doc/nrimc/mnap/features/plantlist.htm. [Accessed August 1, 2009].

McGraw, J.B.; Furedi, M.A. 2005. **Deer browsing and population viability of a forest understory plant.** Science. 307(11 February 2005): 920-921.

Ministère des Ressources Naturelles et de la Faune, Q. 2008. **Plantes menacées ou vulnérables au Québec**. http://www.mddep.gouv.qc.ca/biodiversite/especes/#vulnerables.[Accessed August 1, 2009].

Persons, W.S. 1994. **American Ginseng: Green Gold**. Asheville, NC: Bright Mountain Books.

Peterson, L.A. 1977. **A field guide to edible wild plants of eastern and central North America**. New York: Houghton Mifflin.

Pierce, A.R. 2014. **The distance from necessity: a Bourdieusian analysis of gathering practices in Vermont.** Keene, NH: Antioch University New England. Doctoral dissertation.

Pilz, D.; Ballard, H.L.; Jones, E.T. 2006. **Broadening participation in biological monitoring: handbook for scientists and managers**. Gen. Tech. Rep. PNW-680. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 131 p.

Pilz, D.; Molina, R., eds. 1996. **Managing forest ecosystems to conserve fungus diversity and sustain wild mushroom harvests**. Gen. Tech. Rep. PNW-371. Portland, OR: Pacific Northwest Research Station. 104 p.

Pilz, D.; Molina, R.; Danell, E.; Waring, R.; Rose, C.; Alexander, S.; Lefevre, C. 2002. **Silvishrooms: predicting edible ectomycorrhizal mushroom productivity**. In: Johnson, A.C.; Haynes, R.W.; Monserud, R.A., eds.. Congruent management of multiple resources: Proceedings from the Wood Compatibility Iniative Workshop. Gen Tech. Rep. PNW-563. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station: 199-207.

Pilz, D.; Norvell, L.; Danell, E.; Molina, R. 2003. **Ecology and management of commercially harvested chanterell mushrooms**. Gen. Tech. Rep. PNW-576. Portland, OR: U.S. Department of Agriculture, Forest Service, Pacific Northwest Research Station. 83 p.

Polanyi, K. 1977. **The livelihood of man**. New York: Academic Press.

Robbins, P.; Emery, M.R.; Rice, J. 2008. **Gathering in Thoreau's backyard: non-timber forest product harvesting as practice and tactics**. Area. 40(2): 265-277.

Seymour, T. 2002. **Foraging New England**. Guilford, CT: Globe Pequot Press.

Shebitz, D. 2001. **Population trends and ecological requirements of sweetgrass, *Hierochloe odorata* (L.) Beauv.: integration of traditional and scientific ecological knowledge**. Syracuse, NY: State University of New York, College of Environmental Science and Forestry. Doctoral dissertation.

Shebitz, D.J.; Kimmerer, R.W. 2005. **Reestablishing roots of a Mohawk community and a culturally significant plant: sweetgrass**. Restoration Ecology. 13(2): 257-264.

Thompson, Z. 1853/1971. **Natural history of Vermont**. Rutland, VT: Charles E. Tuttle Company.

Turner, N J.; Kuhnlein, H.V. 1983. **Camas (*Camassia spp.*) and riceroot (*Fritillaria spp.*): two liliaceous "root" foods of the northwest Coast Indians**. Ecology of Food and Nutrition. 13: 199-219.

Vermont Nongame and Natural Heritage Program. 2009. **Rare and uncommon vascular plants of Vermont.** http://www.vtfishandwildlife.com/library/Reports_and_Documents/NonGame_and_Natural_Heritage/Rare_Threatened_and_Endangered_Species%20%20---%20lists/Rare_and_Uncommon_Vascular_Plant_%20of_Vermont.pdf. [Accessed August 1, 2009].

Wiseman, F.M. 1995a. **The Abenaki people and the bounty of the land**. Burlington, VT: Ethan Allen Homestead Trust.

Wiseman, F.M. 1995b. **Gift of the forest: the Abenaki, bark and root**. Burlington, VT: Ethan Allen Homestead Trust.

APPENDIX 1. Study Methods

The data for this study are based on semi-structured interviews conducted between August 2008 and March 2009 with people who gather special forest products (SFPs) on or around the GMNF and FLNF. Occasionally interviews were conducted with more than one person at a time. Nine interviews were conducted with 10 people in the Finger Lakes region, 12 interviews were conducted with 14 people within or near the northern unit of the GMNF, and 11 interviews were conducted with 16 people in the southern GMNF unit. In total, 32 formal interviews were conducted with 40 individuals. Interviewees include people with degrees in botany, a forester, a journalist, a retired surveyor, a retired ornithologist, a sawyer, a town clerk, loggers, professional herbalists, and educators. Interviewees generally lived inside the forest boundary or within 10 miles of it.

Additional information about commodity chains[9] was gathered through informal telephone conversations or email correspondence with a regional produce wholesaler, produce buyers from grocery cooperatives and natural foods stores near the national forests, produce managers at two supermarket chains, managers of Vermont farmers markets, and managers at craft stores and places selling crafts, evergreen wreaths, and garlands.

Study participants were recruited primarily through snowball sampling. In New York, interviewees were identified and recruited at an FLNF Open House Day, a community gathering, farmstands, farmers markets, and local craft stores. A local journalist and a forester also were helpful in identifying potential interviewees. Potential Vermont interviewees were initially identified through GMNF personnel, and other local experts such as restaurateurs, county foresters, game wardens, regional localvore organizers, and town clerks from jurisdictions within the national forest. In both New York and Vermont, Forest Service personnel and researchers posted flyers about the project in frequently traveled public places such as libraries, grocery cooperatives, and general stores (see "Calling all Woodspeople" on page 31).

Once identified, potential interviewees were contacted by phone, email, or in person and asked to participate in the study. The purpose of the study was explained to them, including a brief description of the proposed rule and a request for their help identifying plants in the "red, yellow and green" management categories. Potential interviewees were assured that they could remain anonymous and that they would not be asked to reveal their specific gathering spots.

In all three sites, care was taken to ensure that the interviewee sample covered a range of geographic locations, types of SFPs gathered, characteristics of gatherers (age, gender, and ethnicity), and purpose of gathering (personal or commercial use). After each interview, demographic information was entered into a sampling matrix and efforts were made to address any demographic imbalances. The age group with the least representation is that of gatherers in the 30- to 50-year-old range.

Except for a pilot interview conducted jointly by the first author and a research specialist, all of the interviews were conducted by the research specialist and transcribed by an employee of the Northern Research Station. Interviews were conducted in homes, workplaces, and public locations chosen by interviewees. Interviews were digitally recorded and notes were taken as a backup in case of equipment failure.

A semi-structured interview protocol (see pages 32-33) designed by the research team was used. Interviews lasted between 45 minutes and 3 hours. The first half of the interview consisted of questions about the variety of plants and mushrooms harvested, the reasons why people harvest, and harvesting practices, while the second half asked interviewees to reflect on the proposed rule and share their thoughts about permitting and collaborative management.

The study used a consent form approved by the University of Vermont's Human Subjects Review Board (see pages 34-35). The consent form and options for

[9] The process through which an NTFP that enters the market travels from the place of harvest to its final point of consumption is called a commodity chain.

disposal of materials were explained before the interview began. Interviewees were given the option of signing the consent form at the conclusion of the interview or reviewing it at their convenience and mailing it to the research specialist in a self-addressed stamped envelope. Unless they requested that their name be used, all interviewees were assigned a code and introduced by this code in the recorded interview. At the conclusion of the interview, interviewees were provided with a background sheet that included contact information for the research team (see page 36). All interviewees were given the options of receiving updates on the status of the rule, a copy of the final report, and an audio CD of the interview.

Interviewees were given the choice as to whether they wished their study materials (audio files, field notes, and images) destroyed at the end of the study or deposited in the archives of the Vermont Folklife Center. Part way through the fieldwork, four participants from the Finger Lakes region requested that their materials be deposited locally at the Schyuler County Historical Society in Montour Falls, the Elizabeth Beattie Pert Library in Hector, and the Ulysses Philomathic Library in Trumansburg. Once this request was made, we modified the consent forms to include this as an option. People who had already signed the consent form were sent an addendum to the form including these archives as an option.




CALLING ALL WOODSPEOPLE!

DO YOU PICK WILD PLANTS OR MUSHROOMS?

Please help us understand the importance of wild plants!

Fiddleheads, berries, mushrooms, evergreens and other wild plants (also known as Special Forest Products) have always been an important part of life in northern New England and New York. The Green Mountain/Finger Lakes National Forests are interested in understanding how to best manage these Special Forest Products for their long term sustainability.

We are interested in learning:

- What plants, mushrooms, and plant products are gathered
- What people use them for
- How important these plants are to people and why
- Your thoughts on sustainable harvesting and your hopes and concerns about gathering forest plants in this region for future generations

Interested?

Anyone who gathers wild plants for food, medicine, crafts or other reasons in this part of the state has something important to contribute. You will *not* be asked to reveal your favorite collecting spots. All information will be treated in strict confidence, and you can remain anonymous if you wish. If you would be willing to share your knowledge of the plants you use, or know someone else we should talk to, please contact Ginger Nickerson. Thank you!

To Participate:
Ginger Nickerson, Research Specialist
802-223-6979
vnic@umich.edu
Address 1
Address 2

For More Information:
Marla Emery, Research Geographer
802-951-6771 x1060
memery@fs.fed.us
Northern Research Station, 705 Spear St
South Burlington, VT 05403

This study is sponsored by the Green Mountain and Finger Lakes National Forests, the U.S. Forest Service's Northern Research Station, and the University of Vermont.

Interview Protocol

Introduction

Study purpose:
The purpose of this study is to understand what plants and mushrooms people are picking[10] on and around the Green Mountain (Finger Lakes) National Forest.

- How picking these plants is a part of their lives, why it is important to them.
- Currently, regulations on gathering have been *proposed* that the GM (FL) NF *may* be required to implement. If so, we want to know how the Forest could do that and still provide what is important to you. I would like to start by talking about the things that you actually do and how they are important to you and then shift to talking more about the proposed regulations and get your ideas on them about half way through the interview, if that's okay with you.

Boundaries of study interest:

- I'm interested in any plants, mushrooms or parts of plants that you pick, whether you eat it, use it for medicine, make something with it, use it to bring beauty into your life, or for spiritual ceremonies, whether you use it yourself, give it as gifts, trade it, or sell it.
- These can be things you pick around the national forest as well as on the national forest, because those boundaries are pretty fuzzy and most likely, whether you pick it on the forest or not, it *could* be picked on the forest.

Confidentiality and interviewee rights:

- I would like to record the interview, if that's okay with you. If at any point, you want to stop recording, please let me know or you can hit this button. I'd also like to take notes as we talk, just in case something goes wrong with the recorder.
- It is important to me to keep your identity confidential. Unless you want your name attached to the information you share, the only identification that will go on my notes and in the recording are today's date, the town we're in, and that you're a (wo)man. (Record that identifying information while with the person and play it back so that you both hear it and check that the recorder is working.)
- The University of Vermont requires us to get your signed consent to use the information from this interview. When we get to the end of the interview, we'll go over that form and you can decide whether you want to sign it.

What do you do and how is it important to you?

Using the gathering wheel

1. What do you pick?

   a. If short list (5-10 items) ask questions below for each item

   b. If longer list, have them go through whole list, then ask if they can make generalizations on the questions 2-6 (using my judgement)
2. How do you use it? (food, medicine, craft, etc.)
3. What kinds of places do you look for it? (habitat characteristics)
4. How do you pick it? In your opinion, is there a right way and a wrong way? Do you use any special tools?
5. Have you noticed any change in your ability to find or get any of these things? If so, why do you think that happened?
6. Do you make anything to sell from the things you pick? Sell anything just as you pick it? If so, what and to whom?
7. How much do you pick? Do you use any special bags, baskets or containers? How big are they?
8. Have you taught anyone else to gather? If so, whom?
9. Why do you gather? How is it important to you? How big a part of your life is it?

[10] "Gathering" may not be the most appropriate word to use with some people. Listen for their preferred word ("pick," "forage," "wildcraft") and use that.

Regulations

Introduction

Congress has passed a law requiring the US Forest Service to regulate gathering. Right now, the exact regulations are still just a proposal and we don't know exactly when national forests might be required to implement them. But we do know something about the general requirements in the law. The law says the Forest Service has to manage for sustainable use of wild plants and mushrooms. Specifically, it directs the Forest Service to:

1. Provide for free personal use, but probably/possibly with a permit required (for some plants)
2. Require permits and fees for commercial harvesting.
3. Set sustainable harvest limits.
4. Inventory and monitor wild plants and mushrooms that are being gathered.
5. Honor treaty obligations with Native Americans.

Part of the purpose behind doing this study is that we want to document how important gathering of wild plants is to folks and how these proposed regulations could potentially affect people who currently gather in and near National Forest lands.

- If you had to have a permit to pick for your own use on the GM (FL) NF, how would that affect you?
- If you sell anything that you pick, how would it affect you to have to buy a permit? Is there a cost you think might be reasonable?
- Is there anything you pick that you're concerned about? That it would be a good idea to put time and special effort into keeping an eye on to make sure it's there for you in the future? If so, why? Do you have any ideas about ways to do that?
- Is there anything you pick that it might be a good idea to set a harvest limit on? If so, why? Do you have any thoughts on how an amount could be set that would make sense and seem reasonable?
- Would you be interested in helping identify sustainable harvest limits and/or inventory and monitor wild plants and mushrooms? What would help make that possible and/or interesting for you?
- Let's imagine a hypothetical but possible scenario. Suddenly, a big commercial market develops for a plant and a company approaches the GM (FL) NF for a permit to gather a large amount of it. This is something you also pick. Do you have any thoughts about how you would want the forest to handle that?
- Is there anything the GM (FL) NF could do to manage for things you pick? To support sustainable gathering in general?
- Is there anything else you would like to share or add to this study that we haven't talked about?
- Would you like us to let you know if we learn about any changes in the status of the proposed regulations? (If so, we will keep your name on a separate list that will not have any information connecting it to this interview.)

We're trying to be sure we get input from a broad variety of people. I hope you won't mind if I ask:

- What year were you born?
- How long have you lived in Vermont (New York)?
- How do you put together a living? (Only if this information hasn't already been offered and the question can be asked without embarrassing or otherwise making the person uncomfortable.)
- Can I have your mailing address so I can send you a CD of the interview or updates on information on the regulations?

Closing

- Go over consent form.
- Point out that your contact information is at the bottom of the flyer, if they think of anything else and/or want to get in touch with you for any reason.
- Thanks!

Informed Consent Form

Special Forest Products in and around the Green Mountain and Finger Lakes National Forests

Marla Emery, USDA Forest Service, Northern Research Station
Clare Ginger, University of Vermont
Ginger Nickerson, University of Vermont

You are being invited to take part in a study that seeks to identify the culturally and economically important wild plants and mushrooms[11] used by people in and around the Green Mountain and Finger Lakes National Forests in order to assure their continued availability. We expect that products of this study will include recommendations for managing them in a sustainable, collaborative manner. The study is carried out through a partnership between the University of Vermont and the U.S. Forest Service Green Mountain and Finger Lakes National Forests.

To understand this topic, we will conduct individual interviews, which typically last from one to two hours. You have been identified as someone with valuable knowledge about wild foods, medicines, and/or craft materials, etc. and we would be grateful for the opportunity to interview you for the project. Should you agree to do so, with your permission, we would like to take notes and record the interview for later analysis. If you agree to a recorded interview, at its conclusion you will be asked how you would like us to dispose of the recording at the end of the study. With your consent, the recording will be deposited in the Vermont Folklife Center Archives, where it will be available to citizens, scholars and others. Should you prefer, we will destroy the recording. We may also ask to photograph you to create a visual account of special forest product harvesting and processing. With your permission only, your photograph might be used in our report and/or Forest Service publications about special forest product use in Vermont and New York. Original photographs will be stored indefinitely in a file cabinet in a locked room at the Vermont Folklife Center Archives.

We recognize that some study participants may prefer to remain anonymous, while others may wish future generations to identify them as the source of information contained within the study. For that reason, all information that could reveal your identity will be kept confidential unless you give express written consent to use your name or image. Your interview will be identified with a code rather than your name and stored in a locked cabinet in a locked office. The potential risk of breach in confidentiality is low. Should you wish your name to be associated with the information that you contribute, we will be happy to work out a mutually satisfactory means of doing so.

If you choose to participate in the study, you are free to withdraw at any time. If you have any further questions or concerns about the study itself, please feel free to contact Marla Emery by phone at 802-951-6771, or by email at memery@fs.fed.us. If at any time during this study you have questions about your right as a research participant, you may contact Nancy Stalnaker, the Director of the Research Protections Office at the University of Vermont, 245 South Park, Suite 900, Colchester, Vermont, 05405 (phone: 802-656-5040).

[11] Wild foods, medicines, craft materials, etc. are sometimes referred to as special forest products or non-timber forest products.

Please indicate whether you wish to participate in this project by initialing the appropriate statement(s) below and signing your name. You will receive a signed copy of this form.

_____I wish to participate in this research project and agree to be audio recorded.
(Initials)

_____I wish to participate in this research project but DO NOT agree to be audio taped.
(Initials)

_____I wish to participate in this project and give permission for the use of my name or image.
(Initials)

_____I agree to deposit recordings, photographs and notes from this interview in the Vermont
(Initials) Folklife Center Archive where they will be available to researchers and the public for scholarly or educational purposes under the discretion of the archivist. By signing this I retain rights to any profit making endeavor related to my words.

_____I agree to deposit the materials in the Vermont Folklife Center Archive EXCEPT for the (Initials)
following restrictions: _____
_____
_____ These restrictions will remain in effect until the following date:
_____

_____I request that the recordings of this interview be destroyed at the conclusion of this project.

_____ _____
Signature of Prospective Participant Date Print Name

_____ _____
Signature of Principal Investigator or Research Specialist Date

_____Printed Name of Principal Investigator or Research Specialist

Marla Emery, Northern Research Station, 705 Spear St., Burlington, VT 05403, 802-951-6771, memery@fs.fed.us

Clare Ginger, 350 Aiken Center, UVM, Burlington, VT, Clare.Ginger@uvm.edu

Ginger Nickerson, P.O. Box 331, Worcester, VT 05682 (802) 223-6979, vnic@umich.edu

BACKGROUND INFORMATION: Special Forest Products in and around the Green Mountain/Finger Lakes National Forest (August 2008)

Thank you for your interest in the Special Forest Products study. Wild plants such as fiddleheads, elderberries, birch bark, and mushrooms have been providing residents of Vermont and New York with food, medicines, and materials for crafts for centuries, but pressures on some of these plants may be changing due to forces such as increased interest in foraging and global climate change. This study seeks to:

1. Identify the wild plants, plant parts and mushrooms gathered on and around the Green Mountain/ Finger Lakes National Forest
2. Document the knowledge and practices of the people who gather them
3. Understand the role of gathering in their lives
4. Understand the role of the Green Mountain/Finger Lakes National Forest in local and regional gathering.

Your experience gathering wild plants and mushrooms in the area would be invaluable to the study. If you agree to participate, you will not be asked to reveal the specific places that you gather and we fully respect your right to divulge only the information you feel comfortable sharing.

A possible change in the rules governing gathering on national forests throughout the United States is the backdrop for this study. In response to a law passed by the U.S. Congress in 2000 and renewed in 2004, the US Forest Service has proposed regulations to govern gathering on national forests. These regulations are still under review. If approved and enacted, they will require the Green Mountain/Finger Lakes National Forest to develop a program to actively manage wild plant and mushroom gathering, including issuing permits and ensuring sustainable harvest levels.

The goal of this study is to provide information to the Green Mountain/Finger Lakes National Forest so that forest managers can devise a program that is socially and culturally sensitive, ecologically sustainable, and administratively feasible if it is required to implement these regulations.

This project is carried out in collaboration between the University of Vermont and the Green Mountain/ Finger Lakes National Forests, with assistance from the U.S. Forest Service's Northern Research Station.

If you have any questions or concerns, please feel free to contact:

Marla Emery, Research Geographer, US Forest Service Northern Research Station, 802-951-6771, ext. 1060, memery@fs.fed.us

Diane Harlow Burbank, Ecologist, Green Mountain & Finger Lakes National Forests, (802) 388-4362 x116, dburbank@fs.fed.us

Ginger Nickerson, Research Specialist
802-249-6701 (cell) vnic@umich.edu

APPENDIX 2. SFP Species List: Vascular

Special forest products mentioned by interviewees, number of interviewees mentioning, and interviewee area of residence. Common names are those used by study participants. We are indebted to Diane Harlow Burbank for providing Latin names.

Common Name[a]	Genus[b]	Species	Frequency[c, d]	FLNF	GMNF N.	GMNF S.
Agrimony	*Agrimonia*	*gryposepala (most likely)*	3	X		X
Angelica	*Angelica*	*atropurpurea*	2		X	X
Apples	*Malus*	spp.	21	X	X	X
Ash, black/brown	*Fraxinus*	*nigra*	1			X
Asparagus, wild	*Asparagus*	*officinalis*	2		X	X
Asters (var.)	*Aster*	spp.	1	X		
Balsam fir	*Abies*	*balsamea*	2		X	
Balsam poplar	*Populus*	*balsamifera*	1		X	
Banana fern[e]	*?*	*?*	3		X	
Barberry	*Berberis*	*vulgaris or thunbergii*	1		X	
Basswood	*Tilia*	*americana*	2		X	
Bearberry	*Arctostaphylos*	*uva-ursi*	1		X	
Bee balm/Bergamot	*Monarda*	spp.	2			X
Beechnuts	*Fagus*	*grandifolia*	11		X	X
Birch, black	*Betula*	*lenta*	3		X	X
Birch, paper/white	*Betula*	*papyrifera*	4		X	X
Birch, yellow	*Betula*	*allegheniensis*	3		X	
Bittersweet	*Celastris*	*scandens or orbiculatus*	1		X	
Black walnut	*Juglans*	*nigra*	8	X	X	X
Blackberry	*Rubus*	*allegheniensis*	23	X	X	X
Bloodroot	*Sanguinaria*	*canadensis*	3	X		X
Bluebead	*Clintonia*	*borealis*	2		X	
Blueberry	*Vaccinium*	*angustifolium or corymbosum*	24	X	X	X
Boneset	*Eupatorium*	*perfoliatum & others*	1			X
Bugleweed	*Lycopus*	*uniflorus*	1			X
Bunchberry	*Cornus*	*canadensis*	2		X	
Burdock	*Arctium*	*minus or lappa*	9	X	X	X
Butternut	*Juglans*	*cinerea*	8	X	X	X
Calamus/Sweetflag	*Acorus*	*americanus*	3		X	X
Caraway	*Carum*	*carvi*	3			X
Cardinal flower	*Lobelia*	*cardinalis*	2	X		
Cattail	*Typha*	*angustifolia or latifolia*	8	X	X	X
Cedar (sp.)	*Thuja Juniperus*	*occidentalis OR* sp.	3	X	X	X
Cedar, white	*Thuja*	*occidentalis*	2		X	
Celandine	*Chelidonium*	*majus*	1	X		

continued

SFP Species List: Vascular—continued

Common Name[a]	Genus[b]	Species	Frequency[c, d]	FLNF	GMNF N.	GMNF S.
Cherry, sweet	*Prunus*	*avium*	1	X		
Cherry, wild/black	*Prunus*	*serotina*	5	X		X
Chickory	*Cichorium*	*intybus*	6		X	X
Chickweed	*Cerastium or Stellaria*	spp.	2	X		X
Chickweed, giant/field	*Cerastium*	*arvense*	1			X
Chokecherry	*Prunus*	*virginiana*	6		X	X
Cleavers	*Galium*	*aparine*	1			X
Clover, red	*Trifolium*	*pratense*	5	X	X	X
Clover, sweet yellow	*Melilotus*	*officinalis*	1			X
Cohosh, blue	*Caulophyllum*	*thalictroides*	6	X	X	X
Coltsfoot	*Tussilago*	*farfara*	8	X	X	X
Comfrey	*Symphytum*	*officinale*	8	X	X	X
Conifer / Evergreen (sp. not identified)	*VARIOUS*		4		X	X
Cow parsnip	*Heracleum*	*maximum*	1			X
Crab apples	*Malus*	spp.	2	X		
Cranberry	*Vaccinium*	*macrocarpon*	2		X	X
Cranberry, highbush/ Crampbark	*Viburnum*	*opulus var. americanum*	4		X	X
Cress (spp.)	*VARIOUS*		1	X		
Dandelion	*Taraxacum*	*officinale*	21	X	X	X
Daylilies	*Hemerocallis*	spp.	8	X	X	X
Dock, curly/yellow	*Rumex*	*crispus*	4	X	X	X
Elderberry	*Sambucus*	*canadensis*	14	X	X	X
Elecampane	*Inula*	*helenium*	4	X	X	X
Epipactis orchid	*Epipactis*	*helleborine*	1			X
Evening primrose	*Oenothera*	*biennis*	2		X	
Eyebright	*Euphrasia*	*nemorosa*	1			X
Fiddleheads	*Matteuccia*	*struthiopteris*	19	X	X	X
Garlic mustard	*Alliaria*	*petiolata*	2	X		
Goldenrod	*Solidago*	spp.	8	X	X	X
Goldthread	*Coptis*	*trifolia*	4		X	X
Grapes, wild/fox	*Vitis*	*labrusca*	12	X	X	X
Grasses (spp.)	*VARIOUS*		2		X	
Hawthorne	*Crataegus*	spp.	4	X		X
Hazelnut, beaked	*Corylus*	*cornuta*	3		X	
Heal all/Self-heal	*Prunella*	*vulgaris*	1		X	
Hickory (sp.)	*Carya*	*ovata or cordiformis*	3	X	X	
Hickory, shagbark	*Carya*	*ovata*	3	X		X
Honeysuckle	*Lonicera*	*spp.*	1			X
Horse mint	*Monarda*	*punctata*	2		X	
Horseradish	*Armoracia*	*rusticana*	4	X	X	X
Horsetail	*Equisetum*	spp.	2	X		X

continued

SFP Species List: Vascular—continued

Common Name[a]	Genus[b]	Species	Frequency[c, d]	FLNF	GMNF N.	GMNF S.
Huckleberries	*Gaylussacia*	spp.	2	X	X	
Indian cucumber	*Medeola*	*virginiana*	4		X	X
Indian pipe	*Monotropa*	*uniflora*	1			X
Indian tobacco	*Lobelia*	*inflata*	1			X
Jack in the Pulpit	*Arisaema*	*triphyllum*	1			X
Jackpine	*Pinus*	*banksiana*	1	X		
Japanese knotweed	*Polygonum*	*cuspidatum*	1		X	
Jeruselum artichoke	*Helianthus*	*tuberosus*	2			X
Jewelweed	*Impatiens*	*capensis*	5			X
Joe Pye weed/Gravel root	*Eupatoriadelphus*	*maculatus*	2			X
Lambsquarter	*Chenopodium*	*album*	5	X	X	X
Leeks, wild/Ramps/Wild onions	*Allium*	*tricoccum*	22	X	X	X
Lichens (spp.)	*VARIOUS*		1		X	
Little people's squeaky voice plant[f]	*?*	*?*	1		X	
Live forever sedum/Orpine	*Hylotelephium (Sedum)*	*telephium (purpureum)*	3		X	
Maple, sugar	*Acer*	*saccharum*	4	X	X	X
Marsh marigold/Cowslip	*Caltha*	*palustris*	3	X	X	
Mayapples	*Podophyllum*	*peltatum*	1	X		
Milkweed	*Asclepias*	*syriaca*	6	X	X	
Mint (no sp. Identified)	*Mentha*	spp.	8	X	X	X
Mosses (sp. not identified)	*VARIOUS*		1		X	
Motherwort	*Leonurus*	*cardiaca*	1		X	
Mountain ash	*Sorbus*	*decora or americana*	1		X	
Mugwort	*Artemisia*	*vulgaris*	1			X
Mullein	*Verbascum*	*thapsus*	6	X	X	X
Mustard, wild	*Sinapis*	*arvensis*	3	X		X
Nanny berry	*Viburnum*	*lentago*	2		X	
Nettle, dead	*Lamium*	spp.	1	X		
Nettle, stinging	*Urtica*	*dioica*	11	X	X	X
Nettle, wood	*Laportea*	*canadensis*	4	X	X	X
Nutlets from Fern-like plant	*Comptonia*	*peregrina*	1		X	
Oak (spp.)	*Quercus*	spp.	6	X	X	X
Orchis spectabilis	*Orchis*	*spectabilis*	1			X
Oxeye daisy	*Chrysanthemum*	*leucanthemum*	2		X	
Partridge berry	*Mitchella*	*repens*	7		X	X
Pears (spp.)	*Pyrus*	spp.	3	X		
Pennyroyal	*Hedeoma*	*pulegioides*	1			X
Peppermint	*Mentha*	*piperita*	1	X		
Pigweed	*Chenopodium*	*album*	2	X		X
Pine (sp.)	*Pinus*	spp.	4	X	X	X
Pine, red	*Pinus*	*resinosa*	1			X

continued

SFP Species List: Vascular—continued

Common Name[a]	Genus[b]	Species	Frequency[c, d]	FLNF	GMNF N.	GMNF S.
Pine, white	*Pinus*	*strobus*	7	X	X	X
Plaintain	*Plantago*	*major*	8	X	X	X
Plantain, narrow leaved	*Plantago*	*lanceolata*	2		X	
Plum, wild	*Prunus*	*americana*	3	X		
Pokeweed	*Phytolacca*	*americana*	1	X		
Poplar (sp.)	*Populus*	spp.	1			X
Princess pine/Ground pine	*Lycopodium*	*obscurum*	9	X		X
Purple berried poisonous vine	*Solanum*	*dulcamara??*	1	X		
Purslane	*Portulaca*	*oleracea*	1		X	
Queen Anne's Lace	*Daucus*	*carota*	1	X		
Ragwort, golden	*Senecio*	*aureus*	1			X
Raspberries, black	*Rubus*	*occidentalis*	7	X	X	
Raspberries, red	*Rubus*	*idaeus*	20	X	X	X
Rose	*Rosa*	spp.	4	X	X	
Running pine	*Lycopodium*	*complanatum*	2			X
Sage-like plant	*Artemisia*	spp.	1		X	
Saplings (spp.)	*VARIOUS*		2	X		X
Sasparilla	*Aralia*	*nudicaulis*	1			X
Sassafras	*Sassafras*	*albidum*	1	X		
Service berries/Shadbush/ Mountain shad	*Amelanchier*	spp.	7	X	X	X
Shepherd's purse	*Capsella*	*bursa-pastoris*	1		X	
Skullcap	*Scutellaria*	spp.	3	X		X
Skunk cabbage	*Symplocarpus*	*foetidus*	1			X
Solomon's seal	*Polygonatum*	spp.	4	X	X	X
Sorrel, sheep	*Rumex*	*acetosella*	2		X	
Sorrel, wood	*Oxalis*	*acetosella*	3	X	X	
Spearmint	*Mentha*	*spicata*	1		X	
Sphagnum moss	*Sphagnum*	spp.	1		X	
Spikenard	*Aralia*	*racemosa*	2		X	
Spring beauty	*Claytonia*	*virginica*	1			X
Spruce	*Picea*	spp.	7	X	X	X
St. Johnswort	*Hypericum*	spp.	7	X	X	X
Staghorn moss	*Lycopodium*	*clavatum*	3			X
Strawberries, wild	*Fragaria*	*virginiana*	6	X	X	X
Sumac	*Rhus*	*Most likely typhina*	9	X	X	X
Swamp saxifrage	*Saxifraga*	*pensylvanica*	2		X	
Sweetgrass	*Hierochloe*	*odorata*	1		X	
Thimble berries	*Rubus*	*occidentalis*	3		X	X
Thistles	*Cirsium*	spp.	1	X		
Trailing arbutus	*Epigaea*	*repens*	2		X	
Trillium	*Trillium*	spp.	2	X		X
Trout lily	*Erythronium*	*americanum*	3		X	X

continued

SFP Species List: Vascular—continued

Common Name[a]	Genus[b]	Species	Frequency[c, d]	FLNF	GMNF N.	GMNF S.
Twisted stalk, rose	*Streptopus*	*roseus*	2		X	
Valerian	*Valeriana*	*officinalis or uliginosa*	2	X		X
Vervain, blue	*Verbena*	*hastata*	1	X		
Violet	*Violeta*	*oderata*	1			X
Violet, wild (spp.)	*Viola*	spp.	5		X	X
Water lily (sp.)	*Nymphaea*	*odorata or tuberosa*	1	X		
Watercress	*Nasturtium*	*officinale*	2	X		
Wild ginger	*Asarum*	*canadense*	7	X	X	X
Wild lettuce	*Lactuca*	*canadensis*	1	X		
Wild raisin	*Viburnum*	*cassanoides*	2		X	
Willow (spp.)	*Salix*	spp.	7		X	X
Wintergreen/Teaberry	*Gaultheria*	*procumbens*	9	X	X	X
Witch hazel	*Hamamelis*	*virginiana*	4			X
Yarrow	*Achillea*	*millefolium*	6	X	X	X

[a] Note: Ginseng is not on the list because no interviewees discussed harvesting it themselves. However, several did express concern about ginseng populations.

[b] We are indebted to Diane Harlow Burbank for providing Latin names.

[c] Our sampling technique cannot support generalization to the larger population. Rather, these frequencies should be regarded as suggestive of those species that are most commonly gathered.

[d] Interviewees generally gather close to home but some may travel considerable distances to obtain special materials.

[e] "The roots often taste like banana."

[f] A translation of a Native name. The interviewee indicates that she has found this plant in the Dakotas, also. It grows in the spring in shaded, mossy areas, has a thick leaf somewhat like wintergreen, and is chewed for sore throats. We are unable to suggest any identification for this species.

APPENDIX 3. Vascular Species Uses

Parts used: A = Aerial, FL = Flower, FR = Fruit, R=Root, WP=Whole Plant, OP=Other Parts
Material Uses: C=Craft, E=Edible, M=Medicinal, S=Spiritual, OM=Other Material
Livelihood Uses: B=Barter, G=Gift, P=Personal, SP=Sale Processed, SR=Sale Raw, OL= Other Livelihood

Common Name	Latin Name	Part(s) used	Material uses	Livelihood uses
Agrimony	*Agrimonia gryposepala*	A, FL	E, M, OM	G, P, SP
Angelica	*Angelica atropurpurea*	A, R	E, M	S, SP
Apples	*Malus* spp.	FL, FR	E, M	P
Ash, black/brown	*Fraxinus nigra*	A	C	P
Asparagus, wild	*Asparagus officinalis*	A,WP	E, OM	P
Asters (various)	*Aster* spp.	A, FL	C	P
Balsam fir	*Abies balsamea*	A	C, E	G,P,SP
Balsam poplar	*Populus balsamifera*	A	M	P
Banana fern	*?*	R	E	P
Barberry	*Berberis vulgaris or thunbergii*	A, FR	E, M	P, SR
Basswood	*Tilia americana*	A, FL	E, OM	P, OL
Bearberry	*Arctostaphylos uva-ursi*	A	OM	P
Bee balm/Bergamot	*Monarda spp.*	A, FL	E, M	P,SP
Beechnuts	*Fagus grandifolia*	FR	E, OM	G, P, OL
Birch, black	*Betula lenta*	OP	E	P
Birch, paper/white	*Betula papyrifera*	A, OP	C, E, OM	P, SP
Birch, yellow	*Betula allegheniensis*	A, OP	E, S, OM	P, OL
Bittersweet	*Celastris scandens or orbiculatus*	A, FR	C	G, P
Black walnut	*Juglans nigra*	FR, OP	C, E, M	P, SP
Blackberry	*Rubus allegheniensis*	A, FR, R	E, M, OM	G, P, OL
Bloodroot	*Sanguinaria canadensis*	R	M	P, SP
Bluebead	*Clintonia borealis*	A	E, OM	P, OL
Blueberry	*Vaccinium angustifolium or corymbosum*	FR	E, OM	G, P, OL
Boneset	*Eupatorium perfoliatum & others*	A	M	P, SP
Bugleweed	*Lycopus uniflorus*	WP	M	P, SP
Bunchberry	*Cornus canadensis*	FR	E, OM	P, OL
Burdock	*Arctium minus or lappa*	A, R, WP	E, M, OM	G, P, SP, OL
Butternut	*Juglans cinerea*	FR	E	P
Calamus/Sweetflag	*Acorus americanus*	R	E, M	P
Caraway	*Carum carvi*	FR	E	P
Cardinal flower	*Lobelia cardinalis*	FL	M	P
Cattail	*Typha angustifolia or latifolia*	A, FL, R	C, E, OM	P, OL
Cedar (sp.)	*Thuja occidentalis or Juniperus* sp.	A	M, S	P
Cedar, white	*Thuja occidentalis*	A	C, E, M, S, OM	P, OL
Celandine	*Chelidonium majus*	A	M	P
Cherry, sweet	*Prunus avium*	FR	E	P
Cherry, wild/black	*Prunus serotina*	A, FR	E, M	B, G ,P ,SP
Chickory	*Cichorium intybus*	A, R	E	P

continued

Vascular Species Uses—continued

Common Name	Latin Name	Part(s) used	Material uses	Livelihood uses
Chickweed	*Cerastium or Stellaria* spp.	A	M	P
Chickweed, giant/field	*Cerastium arvense*	A	E	P
Chokecherry	*Prunus virginiana*	A, FR	E, M, S, OM	G, P ,OL
Cleavers	*Galium aparine*	A	M	P, SP
Clover, red	*Trifolium pratense*	A, FL	E, M	P
Clover, sweet yellow	*Melilotus officinalis*	A	S	P
Cohosh, blue	*Caulophyllum thalictroides*	R	M, OM	P, SP, OL
Coltsfoot	*Tussilago farfara*	A, FL	E, M, OM	B, G, P, SP, OL
Comfrey	*Symphytum officinale*	A, FL, WP	E, M, OM	P, SP, OL
Conifer/Evergreen (sp. not identified)	*VARIOUS*	A	E, M, S, OM	P, OL
Cow parsnip	*Heracleum maximum*	R	M	P
Crab apples	*Malus* spp.	FR	E	P
Cranberry	*Vaccinium macrocarpon*	FR	E	P
Cranberry, highbush/Crampbark	*Viburnum opulus var. americanum*	A, FR	E, M, OM	P, SP, OL
Cress (spp.)	*VARIOUS*	A	E	P
Dandelion	*Taraxacum officinale*	A, FL R, WP	E, M, OM	P, SP, OL
Daylilies	*Hemerocallis* spp.	A, FL, R	E, OM	P, OL
Dock, curly/yellow	*Rumex crispus*	A, R	E, M	G, P
Elderberry	*Sambucus canadensis*	A, FL, FR	E, M, OM	G, P, SP
Elecampane	*Inula helenium*	R	M	P, SP
Epipactis orchid	*Epipactis helleborine*	R	M	P
Evening primrose	*Oenothera biennis*	A, R	E, OM	P, OL
Eyebright	*Euphrasia nemorosa*	A, FL	M	P
Fiddleheads	*Matteuccia struthiopteris*	A	E	G, P, SR
Garlic mustard	*Alliaria petiolata*	A, WP	E, OM	P
Goldenrod	*Solidago* spp.	A, FL	C, E, M, OM	P, SP, OL
Goldthread	*Coptis trifolia*	A, R	M, OM	P, SP, OL
Grapes, wild/fox	*Vitis labrusca*	A, FR	C, E, M, OM	G, P
Grasses (spp.)	*VARIOUS*	A, R	E, OM	P, OL
Hawthorne	*Crataegus* spp.	A, FL, FR	E, M, OM	G, P, SP
Hazelnut, beaked	*Corylus cornuta*	FR	E, OM	P, OL
Heal all/Self-heal	*Prunella vulgaris*	A, FL	M	P
Hickory (sp.)	*Carya ovata or cordiformis*	FR	E, OM	P
Hickory, shagbark	*Carya ovata*	FR	E	P
Honeysuckle	*Lonicera* spp.	FR	E	P
Horse mint	*Monarda punctata*	A	E, OM	P, OL
Horseradish	*Armoracia rusticana*	A, R	E	P
Horsetail	*Equisetum* spp.	A	M, OM	G, P, SP
Huckleberries	*Gaylussacia* spp.	FR	E	P
Indian cucumber	*Medeola virginiana*	R	E, OM	P
Indian pipe	*Monotropa uniflora*	R, WP	M	P
Indian tobacco	*Lobelia inflata*	A, FL, FR	M, OM	P, SP
Jack in the Pulpit	*Arisaema triphyllum*	R	E	P

continued

Vascular Species Uses—continued

Common Name	Latin Name	Part(s) used	Material uses	Livelihood uses
Jackpine	*Pinus banksiana*	A	C	G, P
Japanese knotweed	*Polygonum cuspidatum*	A	E	P
Jeruselum artichoke	*Helianthus tuberosus*	R	E	P
Jewelweed	*Impatiens capensis*	A, FL	E	P, SP
Joe Pye weed/Gravel root	*Eupatoriadelphus maculatus*	R	M	P, SP
Lambsquarter	*Chenopodium album*	A	E, OM	P, OL
Leeks, wild/Ramps/Wild onions	*Allium tricoccum*	A, WP	E	G, P, SR
Lichens (spp.)	*VARIOUS*	A	C	P
Little people's squeaky voice plant	*?*		M	P
Live forever sedum/ Orpine	*Hylotelephium telephium (Sedum purpureum)*	A, R	E, OM	P, OL
Maple, sugar	*Acer saccharum*	OP	E	G, P
Marsh marigold/Cowslip	*Caltha palustris*	A	E, OM	P, OL
Mayapples	*Podophyllum peltatum*	FR	E	P
Milkweed	*Asclepias syriaca*	A, FL, FR	E, OM	P, OL
Mint (no sp. Identified)	*Mentha* spp.	A	E, M, OM	G, P, OL
Mosses (sp. not identified)	*VARIOUS*	A, WP	C	P
Motherwort	*Leonurus cardiaca*	A	M, OM	P
Mountain ash	*Sorbus decora or americana*	WP	OM	P
Mugwort	*Artemisia vulgaris*	A	M, S	P, SP
Mullein	*Verbascum thapsus*	A, FL, R	M, OM	G, P, SP, OL
Mustard, wild	*Sinapis arvensis*	A	E	P
Nanny berry	*Viburnum lentago*	FR	E, OM	P, OL
Nettle, dead	*Lamium* spp.	A	M	P
Nettle, stinging	*Urtica dioica*	A	E, M, OM	P, SP, OL
Nettle, wood	*Laportea canadensis*	A	E	P, OL
Nutlets from Fern-like plant	*Comptonia peregrina*	FR	E	P, OL
Oak (spp.)	*Quercus* spp.	A, FR	C, E, M, OM	P, SP, OL
Orchis spectabilis	*Orchis spectabilis*	FL	M	P, SP
Oxeye daisy	*Chrysanthemum leucanthemum*	A	E, OM	P, OL
Partridge berry	*Mitchella repens*	A, FR, WP	C, E, M, OM	P, SP, OL
Pears (spp.)	*Pyrus* spp.	FR	E	P
Pennyroyal	*Hedeoma pulegioides*	A	M	P, SP
Peppermint	*Mentha piperita*	A	E, M	P
Pigweed	*Chenopodium album*	A	E	P
Pine (sp.)	*Pinus* spp.	A, FR	C, E, M, OM	P, OL
Pine, red	*Pinus resinosa*	A	C	P
Pine, white	*Pinus strobus*	A, FR	C, E, M	P
Plaintain	*Plantago major*	A	E, M, OM	G, P, SP, OL
Plantain, Narrow leaved	*Plantago lanceolata*	A	E, M, OM	P, OL
Plum, wild	*Prunus americana*	FR	E	P
Pokeweed	*Phytolacca americana*	A, FR	C, E	P
Poplar (sp.)	*Populus* spp.	A	M	P, SP

continued

Vascular Species Uses—continued

Common Name	Latin Name	Part(s) used	Material uses	Livelihood uses
Princess pine/Ground pine	*Lycopodium obscurum*	A	C	P
Purple berried poisonous vine	*Solanum dulcamara?*	FR	C, OM	P
Purslane	*Portulaca oleracea*	A	E	P
Queen Anne's Lace	*Daucus carota*	FL	C	P
Ragwort, golden	*Senecio aureus*	A	M	P, SP
Raspberries, black	*Rubus occidentalis*	FR	E	G, P
Raspberries, red	*Rubus idaeus*	A, FR, R	E, M, OM	G, P, SP, OL
Rose	*Rosa* spp.	FL, FR	E, M, OM	G, P, OL
Running pine	*Lycopodium complanatum*	A	C	P
Sage-like plant	*Artemisia* spp.	A	S	P
Saplings (spp.)	*VARIOUS*	A	C	P
Sasparilla	*Aralia nudicaulis*	R	M	P
Sassafras	*Sassafras albidum*	A, R	E, M	P
Service berries/Shadbush/ Mountain shad	*Amelanchier* spp.	FR	E, OM	P, OL
Shepherd's purse	*Capsella bursa-pastoris*	A, FR	E	P
Skullcap	*Scutellaria* spp.	A	M	P, SP
Skunk cabbage	*Symplocarpus foetidus*	R	M	P, SP
Solomon's seal	*Polygonatum* spp.	R	M, OM	P, SP
Sorrel, sheep	*Rumex acetosella*	A	E, OM	P, OL
Sorrel, wood	*Oxalis acetosella*	A	E, OM	P, OL
Spearmint	*Mentha spicata*	A	E, M, S	P
Sphagnum moss	*Sphagnum* spp.	A	OM	P
Spikenard	*Aralia racemosa*	R	E, OM	P, OL
Spring beauty	*Claytonia virginica*	R	E	P
Spruce	*Picea* spp.	A, OP	E	P
St. Johnswort	*Hypericum* spp.	A, FL	M	P, SP
Staghorn moss	*Lycopodium clavatum*	A	C	P
Strawberries, wild	*Fragaria virginiana*	A, FR	E, M	G, P
Sumac	*Rhus (most likely typhina)*	A, FR	E, M, OM	P, OL
Swamp saxifrage	*Saxifraga pensylvanica*	A	E, OM	P, OL
Sweetgrass	*Hierochloe odorata*	A	S	P
Thimble berries	*Rubus occidentalis*	FR	E	P
Thistles	*Cirsium* spp.	FL	C	P
Trailing arbutus	*Epigaea repens*	A, FL	C, E	P, OL
Trillium	*Trillium* spp.	FL, R	M	P
Trout lily	*Erythronium americanum*	A, R	E, OM	P, OL
Twisted stalk, rose	*Streptopus roseus*	A	E, OM	P, OL
Valerian	*Valeriana officinalis or uliginosa*	R	M	P, SP
Vervain, blue	*Verbena hastata*	A, R	M	P
Violet	*Violeta oderata*	FL	E	P
Violet, wild (spp.)	*Viola* spp.	A, FL	E, M, OM	P, SP, OL
Water lily (sp.)	*Nymphaea odorata or tuberosa*	R	E	P
Watercress	*Nasturtium officinale*	A	E	P

continued

Vascular Species Uses—continued

Common Name	Latin Name	Part(s) used	Material uses	Livelihood uses
Wild ginger	*Asarum canadense*	R	E, M, OM	P, OL
Wild lettuce	*Lactuca canadensis*	A	M	P
Wild raisin	*Viburnum cassanoides*	FR	E, OM	P, OL
Willow (spp.)	*Salix* spp.	A	C, M	G, P, SP
Wintergreen/Teaberry	*Gaultheria procumbens*	A, FR	E, M, OM	P, OL
Witch hazel	*Hamamelis virginiana*	A	M	P, SP
Yarrow	*Achillea millefolium*	A, FL, WP	E, M, OM	P, SP

APPENDIX 4. SFP Species List: Fungi

Fungi mentioned by interviewees, number of interviewees mentioning them, and interviewee area of residence. Common names are those used by study participants. Question marks indicate where information is insufficient to support expert judgement of the likely species. We are indebted to Erik Lilleskov for providing Latin names.

Common Name	Genus	Species	Frequency	FLNF[a]	GMNF N.[b]	GMNF S.[c]
Beech mushrooms	?	?	2			X
Maple mushrooms	?	?	2			X
Red tops	?	?	1			X
Stumpers	?	?	2			X
Purple tops	?	?	1			X
Big white coral ones	?	?	2			X
Funnel conch	?	?	1	X		
Angel wings	Pleurotus	porrigens	1		X	
Artist conch	Ganoderma	applanatum	3	X		
Bearstooth comb	Hericium	likely ramosum	2			X
Black trumpets	Craterellus	?	5		X	X
Boletes	Boletaceae spp.[d]		2			X
Brick cap	Suillus	pictus	1		X	
Chaga	Inonotus	obliquus	1			1
Chanterelle (sp.)	Cantharellus	spp.	14	X	X	X
Chanterelle, black	Cantharellus	cinereus	1	X		
Chanterelle, cinnebar red/ flaming/pepper	Cantharellus	cinnabarinus	4		X	X
Chanterelle, yellow/golden	Cantharellus	likely cibarius	2	X	X	
Chicken of the woods	Laetiporous	sulphureus	7		X	X
Dryads saddle/Pheasant back	Polyporus	squamosus	4		X	X
Field mushrooms/Meadow mushrooms (spp.)	Agaricus	spp.	2	X		X
Ganoderma	Ganoderma	sp.	2	X	X	
Hedgehog/Bearshead/ Monkeyshead	Hericium	erinaceus	3	X		X
Hemlock varnish conch	Ganoderma	tsugae	1	X		
Hen of the woods	Grifola	frondosa	9	X	X	X
Honey mushrooms	Armillaria	mellea and others	1			X
Horn of plenty/Trumpet mushrooms	Craterellus	cornucopioides	1		X	
Lactarius	Lacterius	sp. or spp.	1			X
Lobster mushroom	Hypomyces	lactifluorum	2			X
Morels	Morchella	sp. or spp.	17	X	X	X
Oyster	Pleurotus	sp. or spp.	8	X	X	X
Puffballs	Lycoperdales[e]		4	X	X	X
Puffballs, giant	Calvatia	spp.	5	X	X	X
Puffball, purple spored	Calvatia	cyanthiformis	1			X
Red belted polypore	Fomitopsis	pinicola	1		X	
Reishi	Ganoderma	lucidum or tsugae	1		X	

continued

SFP Species List: Fungi—continued

Common Name	Genus	Species	Frequency	FLNF[a]	GMNF N.[b]	GMNF S.[c]
Shaggy manes	Coprinus	comatus	5	X	X	X
Tree ears	Auricularia	auricula	1		X	
Turkeytails	Trametes	versicolor	4	X	X	X

[a] On or around the Finger Lakes National Forest.
[b] On or around the north half of the Green Mountain National Forest.
[c] On or around the southern half of the Green Mountain National Forest.
[d] Family or order, not genus.
[e] Family or order, not genus.

APPENDIX 5. Fungal Species Uses

Material Uses: C=Craft, E=Edible, M=Medicinal, S=Spiritual, OM=Other Material
Livelihood Uses: B=Barter, G=Gift, P=Personal, SP=Sale Processed, SR=Sale Raw, OL= Other Livelihood
Question marks indicate where information is insufficient to support expert judgement of the likely species.

Common Name	Latin Name	Material uses	Livelihood uses
Beech mushrooms	?	E	G, P
Maple mushrooms	?	E	G, P
Red tops	?	E	G, P
Stumpers	?	E	G, P
Purple tops	?	E	G, P
Big white coral ones	?	E	G, P
Funnel conch	?	C	P
Angel wings	*Pleurotus porrigens*	E	P
Artist conch	*Ganoderma applanatum*	C	P
Bearstooth comb	*Hericium ramosum*	E	P
Black trumpets	*Craterellus*	E	P
Boletes	*Boletaceae* spp[a].	OM	P
Brick cap	*Suillus pictus*	E	P
Chaga	*Inonotus obliquus*	M	P
Chanterelle (sp.)	*Cantharellus* spp.	E	P, SR
Chanterelle, black	*Cantharellus cinereus*	E	P
Chanterelle, cinnebar red/flaming/pepper	*Cantharellus cinnabarinus*	E	P
Chanterelle, yellow/golden	*Cantharellus cibarius*	E	P
Chicken of the woods	*Laetiporous sulphureus*	E	P
Dryads saddle/Pheasant back	*Polyporus squamosus*	E	P
Field mushrooms/Meadow mushrooms (spp.)	*Agaricus* spp.	E	P
Ganoderma	*Ganoderma* sp.	M	P
Hedgehog/Bearshead/Monkeyshead	*Hericium erinaceus*	E	P
Hemlock varnish conch	*Ganoderma tsugae*	M	P
Hen of the woods	*Grifola frondosa*	E	P
Honey mushrooms	*Armillaria mellea and others*	E	P
Horn of plenty/Trumpet mushrooms	*Craterellus cornucopioides*	E	P
Lactarius	*Lacterius* sp. or spp.	E	P
Lobster mushroom	*Hypomyces lactifluorum*	E	P, OL
Morels	*Morchella* spp.	E	P
Oyster	*Pleurotus* sp. or spp.	E	P, SR
Puffballs	*Lycoperdales*[b]	E	P
Puffballs, giant	*Calvatia spp.*	E	P
Puffball, purple spored	*Calvatia cyanthiformis*	E	P
Red belted polypore	*Fomitopsis pinicola*	C	P
Reishi	*Ganoderma lucidum or tsugae*	M	P
Shaggy manes	*Coprinus comatus*	E	P
Tree ears	*Auricularia auricula*	E	P
Turkeytails	*Trametes versicolor*	M	P

[a] Family or order, not genus.
[b] Family or order, not genus.

APPENDIX 6. General Harvest Guidelines and Sources

Peterson Field Guide to Edible Wild Plants (Peterson 1977)

"Preservation does not mean that no plant should be picked. It does mean, however, that no plant that is rare or endangered should be picked, and even common plants should be picked in such a way as to insure their survival. The following are some thoughts to keep in mind as you are using this book.

1. A few of the species discussed are relatively uncommon and should be used only in emergencies (see text on individual species).
2. Some species are common in certain parts of their range and rare in others. These are usually indicated in the text by the words "locally abundant" or "use only when found in abundance."
3. Do not collect more than you will use.
4. Always leave enough for the next person and to insure the plant's survival the next year.
5. When collecting any part other than the root, leave the root in place and intact.
6. When collecting leaves from perennials, do not completely denude the plant; leaves are needed so that the plant can manufacture enough food to survive the winter.
7. When picking a plant, create as little disturbance to the surrounding vegetation as possible.
8. Fragile habitats such as bogs, alpine tundra, and dune communities are particularly susceptible to disturbance and should be entered only infrequently.

Before collecting any plant, obtain, if possible, a list of the threatened or endangered species in your state. Lists can usually be obtained from a state chapter of the American Federation of Garden Clubs. By avoiding the species listed, following the guidelines above, and using your own common sense, you should be able to enjoy edible wild plants without appreciably affecting either their numbers or their surroundings." (pp. 11-12)

Foraging New England (Seymour 2002)

"To harvest wild plants, always gather from a substantial group of plants, not from a small group of only a few individuals. Leaves, tender tips, and even stems can be snipped individually from one plant here, another plant there. This method actually encourages growth, just as pruning stimulates hearty growth on domestic plants.

Harvesting roots, tubers, or rhizomes is much the same. Concentrating only upon extensive plant colonies will, rather than harm the plants, stimulate lush growth." (pp. xv-xvi)

Invisible Livelihoods: Non-Timber Forest Products in Michigan's Upper Peninsula (Emery 1998)

- "Minimize harvest and impacts, taking only what is needed/will be used and/or leave no damage or visible sign of gathering activity.
- Gather selectively at nesting scales from individual plants to landscapes, never take everything.
- Protect sites from over-harvesting by closely guarding knowledge of their locations.
- Maximize utilization, creating and leaving no waste.
- Rotate gathering over multiple years on same area and/or individual plants.
- Time gathering in accordance with plant biology.
- Promote growth through harvest technique or other intentional propagation." (p. 68)

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Any errors or oversights are the responsibility of the authors.

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Special forest products (SFPs) are gathered from more than 200 vascular and fungal species on the Green Mountain National Forest (GMNF) and Finger Lakes National Forest (FLNF). This report documents those SFPs and proposes an approach to managing them in the context of legislation directing the U.S. Forest Service to institute a program of active SFP management. Based on the literature and primary research conducted on and around the GMNF and FLNF, we offer a system for classifying SFPs according to the likely sustainability of harvesting practices and present a suite of possible management strategies for each category. The report also includes suggestions for development of sustainable harvest guidelines, design of permit programs and fees, and opportunities for collaborative management. These suggestions incorporate insights from 40 individuals interviewed for the research. We dedicate a section to discussing results in terms of five key provisions of the U.S. Forest Service rule pending at the time of press. Objectives of the approach recommended here include effectively allocating scarce management resources, fostering voluntary compliance, and broadening the benefits and beneficiaries of forest management.

KEY WORDS: special forest products, inventory and monitoring, permits and fees, commodity chains, social and cultural values

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