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FINDINGS

INSIDE

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"Science affects the way we think together."
Lewis Thomas

MANAGING THE "OTHER" FOREST: COLLECTING AND PROTECTING NONTIMBER FOREST PRODUCTS

Photo credit: Nan Vance

Al Doerksen measures moss regrowth after harvest.

"When the demand for these plants exceeds supply, it reminds us of why we went into agriculture in the first place."
Nan Vance

Trees are obvious. A hike through a Pacific Northwest forest is a hike through the trees. You just can't miss them. Easier to miss is the understory—at least, easier to underestimate its part in a forest—easier to underestimate its value to people.

For beneath the trees is the "other" forest, whose values include lifegiving medicinal and herbal supplements traded in international markets, plant parts collected for craft and floral industries, collectibles for personal use, and traditional uses by indigenous and local communities.

Seven years ago in the introduction to the publication "Special Forest Products: Biodiversity Meets the Marketplace" Nan Vance wrote, "North American forests traditionally and almost exclusively have been viewed within the marketplace as a source of wood and paper products. But consumer forces, social climate, expanding global markets, and an increase in entrepreneurs are contributing to a new interest in developing other forest resources as viable economic options."

Uses continue to be discovered (or rediscovered) and products developed that are derived not only from trees but also from

IN SUMMARY

Wild harvest of nontimber forest products (NTFP) contributes to an international commercial trade in plant material—thought to be thousands of tons of raw product valued at billions of dollars. From 1991 through 1998, international trade in pharmaceutical plants alone was valued at over $1 billion, with the United States second only to China in value of export (United Nations Statistics Division, New York).

Perceptions of economic opportunity and plentiful resources have encouraged people to collect wild plants with relatively little inventory, monitoring, or effective oversight. When plant species are threatened by careless and destructive harvesting techniques, loss of habitat, and declines in populations and genetic diversity, efforts to sustain biodiversity are severely challenged.

Yet Forest Service land managers are charged with the task of making available to the public the uses and benefits of the forest while maintaining biological diversity, as well as forest health. Research needs to develop not only comprehensive knowledge on species useful to humans but also to create information that can be used to prevent their being at risk and to identify and protect those species that may already be at risk.

nonwoody plants, lichens, fungi, and algae. Think Pacific yew and taxol for cancer, think St. John's wort for depression, think valerian, beargrass, orchids, and moss.

Since the 1995 publication, Vance's professional life has been devoted, in large part, to developing a knowledge base for conserving those species affected by pressure from collection as well as habitat loss, and providing information that would lead to realistic strategies of sustainability. Having been team leader of the PNW Research Station's Biology and Culture of Forest Plants Team for 7 years, she has seen the interest in native plants and their value increase noticeably.

Perceptions of opportunity in these markets and plentiful biotic resources have encouraged people to collect wild plants and other organisms from public and private lands. But documentation is inadequate on many of the plant species for which there is a demand and for which appropriate management decisions need to be made.

KEY FINDINGS

- Up to 100 species of plants in the Pacific Northwest are being harvested and used for a variety of personal and commercial, educational, and personal purposes.
- Many species important as nontimber forest products also function ecologically and contribute to biodiversity. Many of them are sensitive and need conservation measures.
- A plant's life form, regenerative ability, the parts harvested, and harvest techniques contribute to determining to what degree the plant can be sustainably harvested. Frequently, information from traditional harvesters forms a useful starting point for understanding these factors.
- Most species harvested for commercial purposes are cultivable, offering strategies other than wild harvesting for sustainable production.

WILDCRAFTING AND SUSTAINABILITY

"Special forest products," as they are often called today, are defined as products derived from biological resources collected in forests, grasslands, and prairies, for personal, educational, commercial, and scientific use. The knowledge lacking about them includes distribution and abundance, nature and extent of their harvesting, processing, and utilization, and for commercial products, their markets, economic value, and pricing mechanisms. For Vance, the most critical lack in knowledge is to what extent collection and other disturbances are affecting the long-term survival of the species.

The process of collecting from the wild is termed wildcrafting by today's collectors, and is generally applied to the practice of collecting for sale or trade; the previously overlooked small entrepreneurial economies of forested communities are taking on a new importance. Wildcrafting for commercial or personal purposes is a widespread and, in many places, a multigenerational tradition.

But Vance notes that Native Americans regarded the use and often the maintenance of the many species found in forests and prairies as a fundamental part of their world and life, and would take exception to the idea that they are "special." "It is important to acknowledge that the species we are 'discovering' to be useful today have been intimately known and used by the people who lived on this continent for thousands of years," she says.

The apparent demand for herbal medicines, decorative floral products, and edible wild fruits and mushrooms, coupled with the increased value placed on native species and biodiversity has been behind the growing interest in more thoughtfully managing these often overlooked resources.

From what we know about the practices of aboriginal peoples, Vance explains, it appears that they were concerned about sustaining the plants growing in the wild.

"These wild plants afforded not only survival but were used by tribes to maintain a social connection with each other," she says. "It is unfortunate that we have been more interested in learning about the use of these plants than about how they

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were sustained, because the aboriginal had to understand these plants, how they grow, and how they are sustained. Their survival depended upon it and was based on generations of experience."

Vance points out that similar user practices may, to some degree, apply to traditional wildcrafting. In an assessment of over 70 floral and fungal species that supply many herbal and other commodities in the Pacific Northwest, most of the species harvested were found to be common and relatively abundant. Some of the most common and widely distributed understory plants of the Pacific Northwest coastal forests—salal, sword-fern, evergreen huckleberry—have supported "brush pickers" in that region for decades.

"Elsewhere in the United States, herbalists and wildcrafters have been collecting, using, and selling products from local populations of plant species for generations. Their livelihoods probably depended upon local trade and reliable markets," she says. But they also depended on the abundance, diversity, and availability of the local biota to provide a dependable resource without the expenditure of much capital. In addition, many of the products come from renewable portions of plants, or their fruits.

For public agencies seeking to achieve sustainable harvest, knowledge of how plants can be used yet protected, and for researchers providing the data, traditional knowledge can be a useful starting point.

LAND MANAGEMENT IMPLICATIONS

- Information on conservation, cultivation, and best management practices for harvest is important for assessing, inventorying, and managing the nontimber forest products resource.
- Management of nontimber forest products is best served by integration of use; markets; social, economic, and cultural concerns; biology; and forest ecology.
- The findings have implications for active overstory management, as many native plant species used for nontimber values depend on openings in the overstory. Reliable information on species can show a land manager how to manage for sustainable use of both overstory and understory species, thus increasing the value of his land.

DEMAND FOR AN INFORMATION GUIDE

By the mid-1990s, it became apparent to Vance that there was a marked need for information about special forest products. "I got my introduction to the world of special forest products with the Pacific yew in the early 1990s, and frankly, at that point the Forest Service did not have this issue very high on their agenda."

Five years of meeting with other advocates and seeking input far and wide for help in identifying and articulating the issues and goals for the agency followed. The resultant publication, "National Strategy for Special Forest Products," brought to the Forest Service for the first time a vision for sustainable management of nontimber forest products.

"The next step would be to develop an information base of the plant resources and what was known about them from a management and ecological perspective," Vance explains. "It was daunting, but within reach would be the task of developing an information guide for the Pacific Northwest that might provide a template or starting point for other regions.

After a further 5 years of collaborative effort, an information guide for managers, harvesters and users was published by the Station in 2001 ("Special Forest Products: Species Information Guide for the Pacific Northwest"). The information guide directly addressed the requests of managers and botanists for useful information on species harvested that included the conservation, cultivation, and best management practices for harvest that were then known.

An important outcome of the information guide was the integration of use, markets, cultural concerns, biology, and forest ecology. Collaboration across two Forest Service research programs—Ecosystem Processes and Resource Management and Productivity—and with people from two other institutions—Washington State University, and the Rogue Institute for Ecology and Economy in Ashland, Oregon—brought together research on the state of the biophysical knowledge as well as social and forest management knowledge.

A typical entry in the guide includes the species name and information regarding its range and distribution. The entry also includes habitat information and common names for the plant. For example, the native plant known as lovage, osha, or licorice root is moderately shade tolerant. Lovage is often called "bear medicine" because of recorded observations of sick bears eating it or rolling in patches of the plant.

The "Biology" section provides flowering and fruiting patterns, production, seed, cultivation, and transplant viability. "Collection" lists techniques and seasons of harvest, with a caution about regeneration. "Uses and products" list common and indigenous uses and international and domestic markets. "Comments and Areas of Concern" gets right down to the problems of harvest pressure, and "suggest finding alternatives" appears here as it does for several other species in the publication. National Forest System lands are not currently issuing permits for its harvest.

Oh, and "use caution when collecting; osha resembles poison hemlock."

WRITER'S PROFILE

Sally Duncan is a science communications consultant and writer specializing in forest resource issues. She lives in Corvallis, Oregon, and is a doctoral candidate in environmental sciences at Oregon State University.

NEEDED DIRECTIONS FOR RESEARCH

"The findings used for the guide also have implications for active overstory management, as many native plant species used for NTFP depend upon intermediate stand development, like the secondary compounds that develop with higher light exposure," Vance says. Information from the guide, she notes, can show a land manager how to manage for sustainable use of both overstory and understory species, thus increasing the overall value of his land.

But that is far from being Vance's primary emphasis in her research. "I feel that it is important to know how these plants serve the biosphere in other ways than for human consumption, because we do share them. For example, on rangelands, it wasn't really until the 1970s, when an ecologically based system for weed management began to gain acceptance, that any value was attributed to maintaining floristic complexity on these lands beyond a few preferred species for grazing."

The habitats where these species normally thrive can be drastically altered by human and natural disturbance, or by lack of it, Vance points out. Growth and reproductive capacity of plants may be affected, as well as genetic and population structure.

Take beargrass. The species is adapted to predation by insects and large four-legged mammals and more recently in its long history—two-legged ones. But it is designed so that if it loses some of its leaves, it will continually grow out more, like a mowed lawn, she explains. If it is heavily and repeatedly harvested, we want to determine if the leaves grow back to their former number and size; we have found that canopy closure can diminish the size of beargrass and cause it to cease flowering.

"The plant doesn't really distinguish between being 'disturbed' by fire, insects, disease, human, or animal predators. It just survives through years of adapting to the variations in the environment that define its niche, and if we can understand what the plant's basic limitations are to ensure its survival, we can better understand how to work sustainably with it," Vance says. "This kind of plant-centric thinking is very helpful when considering how plant systems work."

But it goes beyond just the species itself. There are also critical interactions with insect and animal pollinators, other symbiotic relations, and the provision of food and habitat for wildlife to be considered.

Photo credit: Nan Vance

Collaborating scientist Peter Bernhardt investigates the role pollination plays in the reproduction of beargrass.

Whether it is the study of plant communities, pollination systems, or human collection and use of plants, she says, research that analyzes interactions among species may help increase management options.

"The most conservative management often occurs when there is insufficient knowledge of how organisms respond to human activity, and flawed management may occur when the response is assessed too narrowly," she adds.

THE BIGGER PICTURE

Vance points out that to pharmaceutical companies, the exploration of tropical and temperate rain forests for unique and potentially useful genomes is called "biodiversity prospecting," and puts an obvious economic value on species richness and the inherent genetic diversity that can be tapped. It was through a large number of screenings of wild-sourced material that Bristol Myers Squibb discovered the compound taxol in the bark tissue of Pacific yew.

It is here that rural and community development questions come into the picture. The ecological stability of forests is fundamentally supported by biological diversity, but there needs to be more definitive evidence that biodiversity also can stabilize economies, particularly of communities that have a vital and dynamic relation with forests, Vance explains. In the global arena, there is evidence that for many people, the forests still provide a variety of uses and products besides the wood for timber.

"We need more integrated models that would include this kind of community/forest interaction because there is evidence that ecological theories of succession and widely used models of disturbance, developed for forest landscapes, do not necessarily apply well to herbs, small shrubs, and other forest-dwelling plant communities," she says.

A coherent inventory system for plants is needed, but is a challenging issue. There is the Forest Inventory and Analysis (FIA) Program which covers state and private lands, but a recent review of the data available from the FIA of western Oregon by the PNW Research Station found that while the FIA covered multiple nontimber

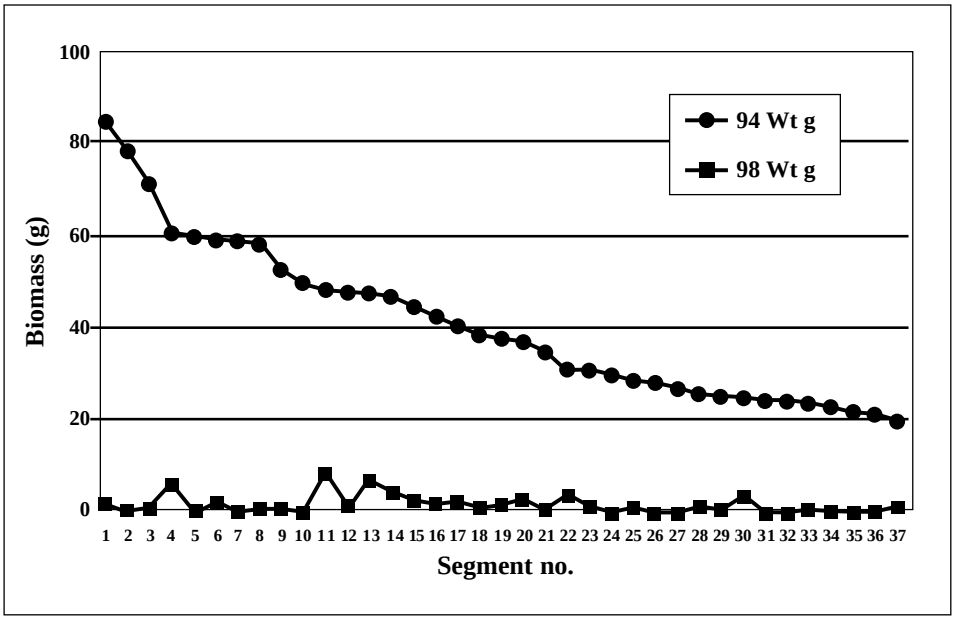
SFP Species PNW	Number	Percent
Total plant species	76	100
Weedy exotics	10	13
Native species	66	87
Cultivated	57	75
Vulnerable	22	29

The majority of native species harvested for special forest products (SPF) are commercially cultivated, or the seeds are commercially available. The species not cultivated are either weedy exotics or vulnerable species with highly specialized or unknown reproduction requirements. Additional species are listed as vulnerable because of sensitive habitats, harvest pressure, or both.

species, the sampling method tended to exclude less abundant and smaller plant species and may not be appropriate for narrowly distributed species.

But with the world's population tripling in the last century, the pressure to increasingly use, exploit, or convert forests continues unabated. And, the number of plant species heading toward extinction has grown into the hundreds.

Wildcrafting for mass markets probably is limited, according to Vance, given their size. "Many of these plants are cultivable, and where that is possible, it appears to be a preferable alternative. Wild harvest in the forest for personal, traditional, or very specialized commercial purposes may be viable for certain species, particularly if only a part of the plant that regenerates is harvested, but beyond that level, for most species, I don't think of it as a great economic option."



Moss biomass on vine maple measured by segment before harvest (1994) and remeasured (1998) four years after harvest.

To date in U.S. forestry, the ecological value of biodiversity has been far more understood and accepted than its economic value. Now, with the broadening commercial potential of a greater number of forest species, managing for biodiversity as a sound investment strategy may be another argument for diversity, Vance says. "But, how the Northwest forests' plant species richness and abundance can accommodate a range of economic, social, and environmental benefits is an issue that needs more analysis and debate before any conclusions can be drawn. It is a global issue and most urgent in impoverished nations that still rely directly on forests for their basic needs."

And the future of research in this area? Vance sums it up simply: "So much to learn, so little time!"

"I feel that it is important to know how these plants serve the biosphere in other ways than for human consumption, because we do share them."

Nan Vance

Photo credit: Nan Vance

Hoeun Hut, a research cooperator with Vance, shows how beargrass is harvested.

FOR FURTHER READING

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Her research interests include restoration with native plants, conservation biology of species at risk, reproductive ecology and study of basic plant processes in response to fire and invasive exotic plants. She served on the national core team that developed the national strategy for special forest products. She has been team leader of the Biology and Culture of Forest Plants Team for 7 years and is serving as a species expert on the Survey and Manage Vascular Plants Team. She is an active participant and committee chair in the Plant Conservation Alliance Medicinal Plant Working Group.

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