

# **Managing National Forests for Non-Timber Forest Products**

## **Chapter 2**

### **Non-Timber Forest Products An Overview of the Products and Markets**

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## **2. Non-Timber Forest Products: An overview of the products and markets**

There are a great variety of products harvested from forests in the United States that are not timber-based. While often over-shadowed by timber products, non-timber forest products are receiving increased attention in the popular press, professional conferences, and state and federal policy dialogue. Major newspapers, including The New York Times (Goldberg 1996), Wall Street Journal (Petersen 1998), and San Francisco Examiner (Tanaka 1997), have covered these “other” forest products. At least five major meetings have been organized to examine issues that affect these “lesser-known” forest products. Non-timber forest products were included in the discussions of many statewide forestry roundtables, held in preparation for the 1996 Seventh American Forest Congress. In February of 1998, Senator Larry Craig of Idaho, and other members of the U.S. Congressional subcommittee on Forestry and Public Land Management, convened a hearing in Washington, D.C. to explore opportunities and constraints of increased harvesting of non-timber forest products on national forest lands in the Pacific Northwest. This heightened attention is the driving force for additional examination of the trade and use of these products.

Non-timber forest products have been described as secondary, minor, special or specialty products, non-wood forest products, as well as non-traditional. In many cases however, non-timber forest products are neither minor, nor secondary. Often they are not specialty products, but move through distribution channels as commodities. Many of the products have a tradition in human history as long as that of timber products. For example, hunters and gatherers collected non-timber forest products long before they had the technology to cut timber.

In this research, the term non-timber forest products is used to describe products generated from the forest that are not timber-based. Non-timber forest products (NTFPs) are plants and parts of plants that are harvested from within and on the edges of natural and disturbed forests. Unlike timber-based products, NTFPs come from a large variety of plant parts and are formed into a diverse set of products. They include leaves and twigs that may be components of decorative arrangements; fruits, fungi and juices as food; wood carved or woven into pieces of art or utilitarian objects; and roots, leaves and bark processed into herbal remedies or medicines. Like timber, NTFPs may be further processed into consumer-oriented products. But often, little secondary processing is required. In some cases, particularly with specialty wood products, determining whether a product should be classified as non-timber is difficult.

Perhaps the biggest problem in describing these products is the lack of information concerning the distribution systems used to get the products to final consumers. Non-timber forest products are found in a variety of outlets, atypical of timber-based forest products. In any health food store, pharmacy, convenience store, or mass merchandiser you are likely to find forest-harvested edible and herbal medicinal products. Visit a local craft shop or a weekend fair and you might find specialty wood products and edible forest products. Order a bouquet of fresh or dried flowers via the Internet and you may receive an arrangement complemented by forest-harvested botanicals.

We have benefited from these plants for many generations. In some cases, NTFPs contribute significantly to local and regional economies. If the current trends continue and projections are

achieved, the trade and use of NTFPs will grow substantially over the next decade. The purpose of this chapter is to inform professionals within the forest products community about the importance of the non-timber forest products industry in the United States. This chapter presents an overview of the products and product lines marketed by the industry, as well as an historical and a current perspective of the trade and use of these products. Finally, critical issues are identified that may affect the sustainability of the industry.

## **2.1 Products and Product Lines**

The number of products considered to be NTFPs is staggering. Emery (1998) identified 138 products from 80 forest species in Michigan's Upper Peninsula. Foster and Duke (1990) cataloged more than 500 medicinal plants, many of which are forest grown. More than 200 botanical forest products were identified in British Columbia (de Geus 1995). And, the United Nations, Food and Agriculture Organization claims that at least 150 non-wood products are found in international markets (Non-Wood News 1997).

Classifying products into similar categories is an important first step in understanding the NTFP industry. Non-timber forest products can be classified into four general product lines: edibles, specialty wood products, floral greens, and medicinal and dietary supplements (Hammett and Chamberlain 1998).

### **2.1.1 Edible Forest Products**

Fungi, particularly mushrooms, are perhaps the most well known and documented edible forest product. In a survey of the wild edible mushroom industry of Washington, Oregon, and Idaho, Schlosser and Blatner (1995) identified more than 25 species of commercial value. Large-scale commercial harvests have concentrated on six species: *Tricholoma magnivelare* (matsutake), *Morchella spp.* (morels), *Cantharellus cibarius* (chanterelles), *Boletus* (boletes), *Leucangium carthusiana* (truffles), and *Hydnum repandum* (hedgehogs) (Pilz and Molina 1994; Amaranthus and Pilz 1996).

Examples of other edible forest products include berries, nuts, saps and resins, ferns, and wild tubers and bulbs. In many parts of the United States, the marketing of edible forest products boosts local and regional economies. For example, the marketing of forest-harvested huckleberries in the Pacific Northwest is supporting a cottage industry that employs many recent immigrants to the United States. In Appalachia, blueberries and blackberries constitute a significant portion of the edible forest product line. The sale of maple syrup in Northeastern United States is a traditional industry and provides jobs for many rural people. Fiddlehead ferns, wild ramps, and wild harvested watercress are a few herbaceous plants that may appear in fine restaurants.

### **2.1.2 Specialty Wood Products**

Specialty wood products are considered non-timber if they are produced from trees or parts of trees, but not sawn wood. For example, burls, twigs, branches, and cypress knees are processed directly into specialty wood products and bypass intermediate processing into lumber. Specialty

wood products include handicrafts, carvings and turnings, utensils and containers. Also included in this product line are furniture made from branches, twigs and vines, as well as tools and musical instruments made from wood that is not sawn from logs.

### **2.1.3 Floral Greens**

Many forest plants and parts of plants are used in decorative arrangements, to complement and furnish the backdrop for flowers, as well as for the main component of dried ornaments. The end uses for many forest harvested floral decoratives include fresh/dried flowers, greenery, basket filler, wreaths, and roping. A recent study in British Columbia (de Geus 1995) identified 19 floral greenery products generated from more than 30 species of forest plants.

Examples of forest plants ([Table 2.1](#)) collected in the Pacific Northwest for the floral greenery industry include *Gaultheria shallon* (salal), *Caccinium ovatum* (evergreen huckleberry), *Berberis nervosa* (Oregon-grape), and *Xerophyllum tenax* (beargrass). *Tillandsia usneoides* (Spanish moss) is collected from the forests of Florida, Georgia, and Mississippi and exported for packaging of flower bulbs imported from Europe. In Southern Appalachia, *Vitis spp.* (grape vine) is collected from forests to make wreaths and other decorative products. Evergreen boughs cut from *Pinus strobus* (white pine), *Abies balsamea* (balsam fir), *Abies procera* (noble fir), and other coniferous species may be the largest segment of the floral green sector.

### **2.1.4 Medicinal and Dietary Supplements**

The use and trade of herbal medicines derived from forest products has a long history and may constitute the highest valued segment of the non-timber forest products industry. Forest harvested plants used for their therapeutic value are marketed either as medicines or as dietary supplements. Plants that have been tested for safety and efficacy and meet strict U.S. Food and Drug Administration (FDA) standards are marketed as medicines or drugs. According to Farnsworth and Morris (1976) 25 percent of all prescriptions dispensed in the United States over the last two decades contained active ingredients extracted from higher order plants. Some well-known examples of plant-derived medicines include Taxol from *Taxus canadensis* (Pacific yew), Digitalis from *Digitalis purpurea* (foxglove) and Lobeline from *Lobelia inflata* (Indian-tobacco).

Plants and plant products that do not meet the strictest FDA standards are marketed as dietary supplements in the United States ([Table 2.2](#)). These products are legally considered food items and product labels can make no claims about their medical benefits. Foster (1995) identifies more than 25 tree species, 65 herbaceous plants, and 29 shrubs that have been listed by the United States Pharmacopoeia for their medicinal value.

## **2.2 A Brief History**

Native Americans traditionally used forest plants for tools, food, medicine and religious ceremonies. They used bark for housing, branches and stems for utensils and tools, and wood for containers and other household products. The roots of white spruce were used to sew together “planks” of birch bark for canoes that were sealed with resin from balsam fir (Sloane 1965).

The first European settlers brought with them items essential to sustain their lives – a supply of food, tools to make shelters, seeds to start crops, and herbal medicines to cure ailments. When these stores were depleted the settlers looked to local resources and learned from the native Americans that the forests had value well beyond that of timber.

Much of the knowledge gained from Native Americans is the foundation of the herbal medicinal industry today in the United States (Ody 1993). According to Coon (1979), in the late 1600s John Jocelyn identified many herbal remedies used by Native Americans to cure their ailments. Another reporter listed 30 plant species of value to Native Americans, while an English observer of the Iroquois tribe listed 35 important medicinal plants (Coon 1979). Some of the plants identified as important to these tribes included *Sassafras albidum* (sassafras), *Althaea officinalis* (marshmallow), *Baptisia tinctoria* (wild indigo), *Polygonatum biflorum* (solomon's seal), *Agrimonia eupatoria* (agrimony), and *Spigelia marilandica* (snakeroot).

As interaction between Native Americans and early settlers increased, forest harvested plants became commonplace in households. Before long, forest harvested foods were served in the homes of settlers and household pharmacies became stocked with herbal remedies from Native American plants. Soon entrepreneurs were collecting, processing and shipping to England products harvested from the forests of the New World.

Historians suggest that one of the first exports from the New World to Europe was a cargo of sassafras (Coon 1979, Sloane 1965). In 1603, an Englishman explored and named the island of Martha's Vineyard, off the coast of Massachusetts. In reports to his homeland, the explorer discussed the abundance of sassafras and wondered of its market potential. According to Foster and Duke (1990), the financing of the Plymouth colonies was in part from the export of sassafras. Sassafras was widely used as a herbal medicine throughout the 1800s and into the mid-1900s until it was shown to have carcinogenic properties.

During the 1800s, the United States and the NTFP industry were changing rapidly. Prior to exploration and settlement of western parts of this country, the eastern forests were the source of domestic harvested NTFPs. This began to change after 1804 when Thomas Jefferson sent Meriwether Lewis and William Clark to explore the Pacific Northwest. Over the next forty years, new non-timber forest products were identified and absorbed into NTFP markets. By 1840, more than 200 years after the first colonies in the East were founded, migration across the great plains was well underway. By this time, the markets for NTFPs harvested from eastern forests were well established. Consequently, the East has a much longer history of trade and use of NTFPs by European settlers.

The political turmoil in the United States during the mid-1800s increased the need to explore the forests for new and substitute products. In the South, there was a particularly acute need to find substitutes for imported products. By 1863, due to port blockades, the South was in dire need of most medicinal products that had been purchased from abroad. A field surgeon was pulled from his duties to explore the forest resources of the Confederate States for plants that might be used instead of European imports (Porcher 1970, reprinted from 1863). The surgeon identified more than 400 substitutes. Porcher (1970) reports that species "to be collected by soldiers while in service in any part of the Confederate States" included: *Cornus spp.* (dogwood -- quinine



substitute), *Liriodendron tulipifera* (tulip poplar – for fevers), *Liquidambar styraciflua* (sweet gum – for diarrhea), and *Podophyllum peltatum* (mayapple – as a laxative).

The discovery of synthetic materials that could be substituted for natural products changed the NTFP industry in the early 1900s. In the beginning of this century, there was an almost total rejection of medicinal plant remedies and a shift to synthetic drugs. Peddlers of tonics, tinctures and cure-alls swarmed throughout the country and medical frauds were common. The Federal government responded by enacting The Food and Drug Act of 1906 (U.S. Code 34 Stat 768) and the subsequent 1912 Sherley Amendment (U.S. Code 37 Stat 416). These two pieces of legislation helped eliminate mislabeling and adulteration of herbal medicines (Foster 1995).

Federal legislation continued to restrict the trade and use of medicinal plants. The Food, Drug, and Cosmetic Act of 1938 (U.S. Code 52 Stat 1040) increased the restrictions on trade of herbal medicines by requiring that drugs be proven safe before entering interstate commerce. The Drug Amendments of 1962 (U.S. Code 52 Stat 780) required that drugs be proven safe and tested for their efficacy. As a result, in 1972 the Federal government initiated a comprehensive review of more than 300,000 over-the-counter (OTC) drugs. According to Foster (1995), of the 258 OTC ingredients the government considered ineffective, most were botanical.

In the early 1990s a series of major factors helped spark a renewed interest in non-timber forest products. Pressure from environmental groups concerning clear cutting, road construction, and the loss of critical wildlife habitat resulted in restricted timber harvesting on most national forests in the West. Because of this, unemployment in some areas soared. Approximately the same time, bumper crops of edible mushrooms appeared on many national forest lands in Oregon and Washington, as a result of major forest fires (Freed 1994). Displaced loggers and commercial pickers traveled to burnt over areas to collect highly valued NTFPs. Because of this surge in activities the U.S. Forest Service, Canadian Forest Service, several state forestry departments and private companies commissioned studies on the market potential of NTFPs (for example, Mater Engineering 1992, 1993, and 1994). Conferences and special seminar series were organized to help unite the many diverse factions involved in the trade and use of non-timber forest products (Schnepf 1994, Vance and Thomas 1997).

Also during the early 1990s, the findings of medical research were presented that helped to increase demand for NTFPs. The positive results of taxol on various cancers greatly increased demand for this drug and Pacific yew, the plant from which it was initially derived. By 1994 taxol was approved by the U.S. Food and Drug Administration for treatment of ovarian and some forms of breast cancer. Further interest in herbal medicinal products was spawned by a 1993 Harvard Medical School study (Eisenberg et al. 1993) showing that millions of Americans regularly used alternative medicines. Reports by the distinguished research journals, the Journal of the American Medical Association (Le Bars et al. 1997) and Scientific American (Stix 1998) on the benefits of Ginkgo biloba (slow dementia) and St. John's Wort (fight depression) further fueled the growing interest in botanical medicines.

## **2.3 The Industry Today**

The total value of the non-timber forest products industry is difficult to determine. Much of the industry is based on informal markets where transactions are made on a cash basis, and few if any records are kept. Some segments are widely fragmented with many small suppliers, while a few large companies dominate other segments. The few studies that have focused on NTFPs suggest an industry that adds a great deal of value to local, regional and even national economies.

The only figures that are available provide an overview of the entire industry, or segments thereof. At this time, it is impossible to determine the value of non-timber forest products that are collected from public or private forests. No assessment has been done to determine the value of NTFPs that are cultivated or forest-harvested. Though this information is critical to understanding the value of NTFPs, it is severely lacking.

### **2.3.1 Edible Forest Products**

Examining the mushroom industry in the Pacific Northwest illustrates the value of edible forest products to the United States. During 1992, an estimated 3.9 million pounds of mushrooms were harvested from the forests of Idaho, Oregon, and Washington (Schlosser and Blatner 1994, 1995). The total estimated economic contribution to these states from the sale and processing of these mushrooms was more than \$40 million. Although this analysis is limited to the Pacific Northwest, it illustrates the potential size of the wild harvested mushroom industry throughout the United States.

The value of other edible forest products also illustrates the size and importance of this product line. For example, according to Jim Jones (1998), Vice President of Hammons Product Company, more than 25 million pounds of wild-harvested black walnuts are processed each year, generating about \$2.5 million for the collectors. An additional example is maple syrup production, which is based in ten major producing states. In 1997, maple syrup production totaled almost 1.3 million gallons, valued at more than \$30 million (National Agricultural Statistics Service 1998).

### **2.3.2 Specialty Wood Products**

The size of the specialty wood products segment is difficult to determine mainly because differentiating between non-timber and timber-based specialty wood products is extremely complex. By some estimates, the handicraft market, which includes wood products, was projected to be approximately \$600 million in 1996 (United States Bureau of the Census 1993). One Indiana based veneer manufacturer uses more than 800,000 pounds of burls, annually (Mater 1994). Another firm in Missouri that concentrates on walnut specialty products has annual sales in excess of \$3 million (Thomas and Schumann 1993). These few examples illustrate the potential value of specialty wood products.

### **2.3.3 Floral Greens**

Conifer boughs are, perhaps, the most widely sold floral greenery product in the United States. A study of the floral greenery industry of the Pacific Northwest found that producers of floral products in the region purchased \$47.5 million worth of floral greens and conifer boughs. Sales of these products generated more than \$128.5 million to the region's economy and supported more than 10,000 seasonal and permanent positions (Schlosser et al. 1991). In Minnesota, the bough and wreath business exceeds \$10 million (Thomas and Schumann 1993). One pine roping company in Southwest Virginia uses more than 3.1 million pounds of pine boughs and generates annual sales in excess of \$1.5 million (Hauslohner 1997).

The sale of other floral greenery products contributes to local and regional economies, as well. In 1995, U.S. exports of commercial forest-harvested moss and lichens amounted to more than \$14 million (Goldberg 1996). Schlosser et al. (1991) found that sale of floral greens, other than conifer boughs, generated more than \$27.7 million to the economy of the Pacific Northwest. Harvesters were paid in excess of \$13 million for salal greens and \$11.5 million for beargrass. The regional sale of evergreen huckleberry amounted to more than \$1.7 million, while sword fern generated more than \$1.5 million in sales.

Forest harvested floral greens are integral components of many floriculture products. Therefore, examining the overall floriculture industry provides insight into the value of the forest products that compliment these products. The Economic Research Service (1998) estimates that retail expenditures for all floriculture crops (cut flowers, cultivated greens, potted flowering plants, potted foliage, and bedding and garden plants) reached \$16 billion in 1996. Overall expenditures on floriculture products has grown 5 percent annually since 1989. Cut flowers and greens constituted the largest share with retail expenditures valued at \$6.5 billion in 1996. Supplies of cut greens have paralleled the steady increase in demand for floral products. In 1996, an estimated 2.3 billion cut green stems were consumed. Non-timber forest products used as complements to floriculture products are likely to have experiences comparable growth.

### **2.3.4 Medicinal and Dietary Supplements**

By far the largest segment of the NTFP industry, in terms of value, is the medicinal and dietary supplements. By some estimates, the worldwide market for herbal medicines is valued at \$7.5 billion to \$8 billion, and is expected to grow to between \$12 billion and \$14 billion by 2000 (Medical and Healthcare Marketplace Guide 1997). Other studies suggest that this segment already exceeds \$14 billion (Genetic Engineering News 1997).

In 1996, Europe was, by far, the largest market for these products, representing one-half of the worldwide demand ([Table 2.3](#)). Within Europe, the top three markets are Germany (\$3.5 billion), France (\$1.8 billion), and Italy (\$0.7 billion). Asia and Japan, combined, constitute approximately one-third of the global market. The estimated value of herbal medicinal sales in North America varies between \$1.6 billion and \$2 billion (Genetic Engineering News 1997, Petersen 1998). According to Petersen (1998), U.S. sales of herbal medicines was approximately \$2 billion in 1997, almost double that of 1993.

Retail sales of specific dietary supplements provide insight into the value of this segment. For example, in 1997 sales of Ginko Biloba, produced from the leaves of the tree *Ginko biloba*, totaled \$90.2 million, while sales of *Hypericum perforatum* (St. John's wort), a weed in many parts of Western United States, exceeded \$47 million (Petersen 1998). Before the anti-cancer properties of *Podophyllum peltatum* (mayapple) were discovered, perhaps 100 tons of the plant was exported annually. In 1988, four years after the discovery, the sale of mayapple was valued at \$1.5 million (Mater 1993). Over the last decade, the sale of the mayapple has grown approximately 25 percent.

*Panax quinquefolium* (American ginseng) is an integral part of American folklore, and widely exported, particularly to Taiwan and China. It is perhaps the highest valued non-timber forest products on the market today. In a good year, ginseng diggers have received more than \$450 per pound of dried root (Hufford 1997). The volume of wild harvested ginseng exported from the United States between 1992 and 1996 is illustrative of the market growth in the NTFP industry (Figure 2.1). In 1993, the U.S. exported approximately 70 thousand kilograms of wild harvested ginseng, valued at almost \$22 million. Within three years, the U.S. was exporting more than 191.5 thousand kilograms worth more than \$32.4 million. In 1991, the state of Virginia exported approximately 6.5 tons of forest-harvested ginseng and realized more than \$1.8 million from these exports (O'Rourke 1993).

## 2.4 The NTFP Industry's Future

Undoubtedly, some segments of the NTFP industry are growing rapidly and have great potential to continue to grow. In many aspects, the NTFP industry may be growing faster than the timber industry. In a New York Times article (Goldberg 1996), Catherine Mater, Vice President of Mater Engineering, Ltd. stated that, "the market for forest products other than trees has mushroomed by nearly 20 percent annually over the last several years." As an example of the potential growth, sales of medicinal herbs in the United States is projected to reach \$5 billion in 2000, more than a three-fold increase from 1995, (Goldberg 1996, Tanaka 1997, Drug Topics 1997).

The demographic conditions and consumer preferences in the United States are encouraging for the continued growth in the trade and use of NTFPs. In general, there is a "changing belief that things organic and natural are inherently better" (Tyler 1997). Baby boomers are increasingly concerned with their health. Many are beginning to experience ailments typical of older age, and are looking for treatments that will enhance their lives. Frustrated with the high costs of western medicine, millions of Americans are looking for alternatives (Slezak 1998a, Eisenberg et al. 1993). Recent surveys of druggists found that nearly one-half of all patients using herbal products were over 50 years of age (Slezak 1998b, Felkey 1998). Other studies found that the use of herbal products was "significantly more common among people 25-49 than among younger or older" consumers (Astin 1998, Eisenberg et al. 1993). Interestingly, Eisenberg et al. (1993) found that a significant number of users of alternative medicines had an annual income greater than \$35,000 and lived in Western United States.

Understanding the demographics of the NTFP segments can lead to increased sales through improved marketing strategies. It also may lead to over-harvesting as demand for products

increases. For example, according to the Chain Drug Review (1998), “nearly 40 million male baby boomers will be turning 50 over the next decade, and more than one-half will likely experience normal prostate dysfunction.” Many of these men will choose alternative treatments, including *Serenoa repens* (saw palmetto) which has been shown effective against benign prostatic hyperplasia (Tyler 1993, Williamson and Wyandt 1997). This huge potential consumer base certainly is encouraging for increased sales of saw palmetto.

## **2.5 Critical Issues**

The NTFP industry contributes to local, regional, and national economies and has the potential to continue providing benefits to those involved. For the industry to function, three critical issues – resource management, regulation and consumer characteristics – must be addressed. For the industry to flourish and realize its greatest potential, environmental and social issues must be fully addressed and incorporated into management and marketing strategies.

### **2.5.1 Resource Management**

Most forest management strategies are focused on timber-based products. There is a wealth of knowledge on managing forests for wood products. The science of managing forest-based wildlife populations is well defined – the production and harvesting of many large game animals, such as deer, is understood throughout the United States. But, very little information exists on managing forests for edible, medicinal, or floral products. Silvicultural prescriptions, that include NTFPs, for natural forest ecosystems are severely lacking. Some agroforestry systems are available, such as windbreaks, and alley-cropping, that include an NTFP component. But, in general, much more work is needed to develop a comprehensive body of knowledge on how to manage forest resources for NTFPs.

### **2.5.2 Regulation**

The lack of regulation on the harvesting of non-timber forest products could negatively impact the NTFP industry. It could lead to over-harvesting, degradation of the resource, and increased tensions among stakeholders. The Federal and some state governments have initiated efforts to regulate the collection of many NTFPs on public lands. Several mechanisms are being evaluated, including long-term leases and harvest permits. The development, however, of appropriate and effective regulatory methods is still in its infancy. Models do exist for other products, particularly wildlife, that could prove helpful in developing appropriate regulatory schemes for NTFPs. Some existing models are designed to regulate harvest, generate revenues for the management agencies, and provide significant disincentives for over-harvesting. Undoubtedly, regulations can be developed and implemented that improve the management and marketing of NTFPs.

### **2.5.3 Consumer Characteristics**

Perhaps the most critical factor that will affect the future of the NTFP industry is the nature and temperament of the consumers. These characteristics include the demographics (age, income, etc.) and psychographics (preferences, aversions, opinions). The tremendous growth in the

industry is being driven by a segment of the population that shares similar demographics. In many cases, this segment constitutes the “baby-boomers” of America. As this group ages the demographics of the market will change. The psychographic characteristics of the consumers also affect product demand. Products that are preferred today may be rejected tomorrow! For example, products shown to come from endangered species may lose favor with consumers concerned about the environment. An herbal medicine that is shown to have dangerous side effects can disappear from the market quickly. On the other hand, herbal products that show enormous promise may increase in popularity. Monitoring and understanding the consumer characteristics is essential for the long-term sustainability of the NTFP industry as only by understanding the psychographic attributes of the consumer base can appropriate marketing strategies be developed.

#### **2.5.4 Environmental and Social**

Continued harvesting without sound management could lead to degradation of the forest and social ecosystems. Decline of the forests could result in loss of habitat and availability of products. Already, there are examples where habitat degradation has led to increased restrictions. Conflicts between groups of collectors are becoming more common, as well, as the demand for more products grows.

The habitats of *Panax quinquefolium* (American ginseng) and *Hydrastis canadensis* (goldenseal) have been notably reduced due to over-harvesting. Ginseng has been listed as threatened or endangered by the Convention for International Trade in Endangered Species (CITES), and monitored by the Fish and Wildlife Service for almost a decade. Goldenseal was recently added to the CITES list. The Convention allows for close monitoring of species, and can lead to severe restriction of trade if species are considered at extreme risk.

Without sound regulation of access and harvest rights, tensions between stakeholders will continue and could become more serious. Problems between ethnic groups of collectors have been reported in several Western locations. In some places, these tensions have resulted in violence, including bloodshed. These stresses are putting severe strain on local and regional agencies that are responsible for management of the resource. To help alleviate the social tensions, stakeholder participation in developing and implementing regulations is needed.

#### **2.6 Summary**

Non-timber forest products are important components to the overall forest products industry. They have a history longer than many timber-based products but have not been recognized for their contributions until just recently. There is tremendous potential for NTFPs to remain significant elements in the forest products industry, but a general lack of information is inhibiting this potential.

Much more is known about all aspects of medicinal and dietary supplements than the other product lines. Information on specialty wood products and edible forest products is particularly lacking. Additional basic and strategic research is needed in all aspects of non-timber forest products. At the same time, more information is available on the NTFP industry in Western

United States. For a comprehensive understanding of the industry, additional regional and product-line research is needed.

To ensure the sustainability of the NTFP industry much more research is needed on the consumer characteristics. By understanding these traits, marketing strategies can be developed that address the perceived needs and interests of the ultimate consumers. For example, if the market stakeholders are found to have strong concerns for social equity or environmental quality, appropriate programs could be developed to help improve the overall performance of the industry.

Finally, much more effort is needed to document and share the knowledge that does exist throughout the world on non-timber forest products. Because the importance of NTFPs has been recognized longer in developing countries, there may be more international knowledge of and expertise on the industry that could help domestic efforts. Within the United States, efforts to improve the management of forest resources for NTFPs are more advanced and organized in the Western states. Much of this international and regional expertise could help improve the management of NTFP resources throughout the United States.

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## 2.8 Tables

**Table 2.1 Plants commonly harvested for the floral decoratives.**

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|                 |                  |                 |                  |
|-----------------|------------------|-----------------|------------------|
| Agave stars     | Dogwood          | Mountain laurel | Smilax           |
| Alder tops      | Dragonwood trees | Ocotillo stems  | Spanish moss     |
| Baby's breath   | Evergreen        | Oregon-grape    | Sphagnum moss    |
| Beargrass       | Huckleberry      | Oregon boxwood  | Spruce boughs    |
| Birch tops      | Fir boughs       | Pachistima      | Sumac            |
| Bittersweet     | Galax            | Palmetto spears | Sword fern       |
| Blueberry       | Gopherwood       | Pepper berries  | Teasel           |
| Brittlebrush    | Hemlock          | Peppergrass     | Vine maple       |
| Cattails        | Holly            | Pine boughs     | Wax myrtle       |
| Cedar boughs    | Ironwood tops    | Princess pine   | White birch bark |
| Cedars          | Leucothoe        | Pussy willow    |                  |
| Chaparral stems | Lotus pods       | Rhododendron    |                  |
| Club moss       | Magnolia         | Salal           |                  |
| Deer tongue     | Manzanita        | Scotch broom    |                  |
|                 | Mistletoe        |                 |                  |

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Source: Thomas and Schumann 1993

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**Table 2.2 Forest harvested medicinal plants marketed as dietary supplements.<sup>1</sup>**

| Scientific Name                   | Common Name     | Plant Type | Part Used    | Reported Medicinal Value          |
|-----------------------------------|-----------------|------------|--------------|-----------------------------------|
| <i>Actaea racemosa</i>            | Black cohosh    | Herb       | Root         | Anti-rheumatic                    |
| <i>Caulophyllum thalictroides</i> | Blue cohosh     | Herb       | Root         | Anti-inflammatory                 |
| <i>Coptis groenlandica</i>        | Goldthread      | Herb       | Root         | Analgesic                         |
| <i>Crataegus monogyna</i>         | Hawthorne       | Shrub      | Berries      | Cardiac tonic                     |
| <i>Hamamelis virginiana</i>       | Witchhazel      | Shrub      | Bark, Leaves | Astringent                        |
| <i>Hydrastis canadensis</i>       | Goldenseal      | Herb       | Root         | Antiseptic                        |
| <i>Mahonia nervosa</i>            | Oregon grape    | Herb       | Root         | Antiseptic                        |
| <i>Panax quinquefolius</i>        | Ginseng         | Herb       | Root         | Improve health                    |
| <i>Podophyllum peltatum</i>       | Mayapple        | Herb       | Root         | Cathartic                         |
| <i>Prunus serotina</i>            | Wild cherry     | Tree       | Bark         | Expectorant, coughs               |
| <i>Quercus alba</i>               | White Oak       | Tree       | Bark         | Astringent                        |
| <i>Rhamnus purshiana</i>          | Cascara sagrada | Tree       | Bark         | Laxative                          |
| <i>Salix alba</i>                 | Willow          | Tree       | Bark         | Anti-rheumatic                    |
| <i>Sanguinaria canadensis</i>     | Bloodroot       | Herb       | Root         | Emetic, stimulant                 |
| <i>Serenoa repens</i>             | Saw palmetto    | Shrub      | Berries      | Combat enlarged prostate          |
| <i>Ulmus rubra</i>                | Slippery elm    | Tree       | Bark         | Demulcent, sore throats and colds |
| <i>Urtica dioica</i>              | Nettle          | Herb       | Root, Leaves | Astringent                        |
| <i>Valerian officinalis</i>       | Valerian        | Herb       | Root         | Tranquilizer                      |

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**Table 2.3 Estimated market for herbal medicines in 1996.<sup>2</sup>**

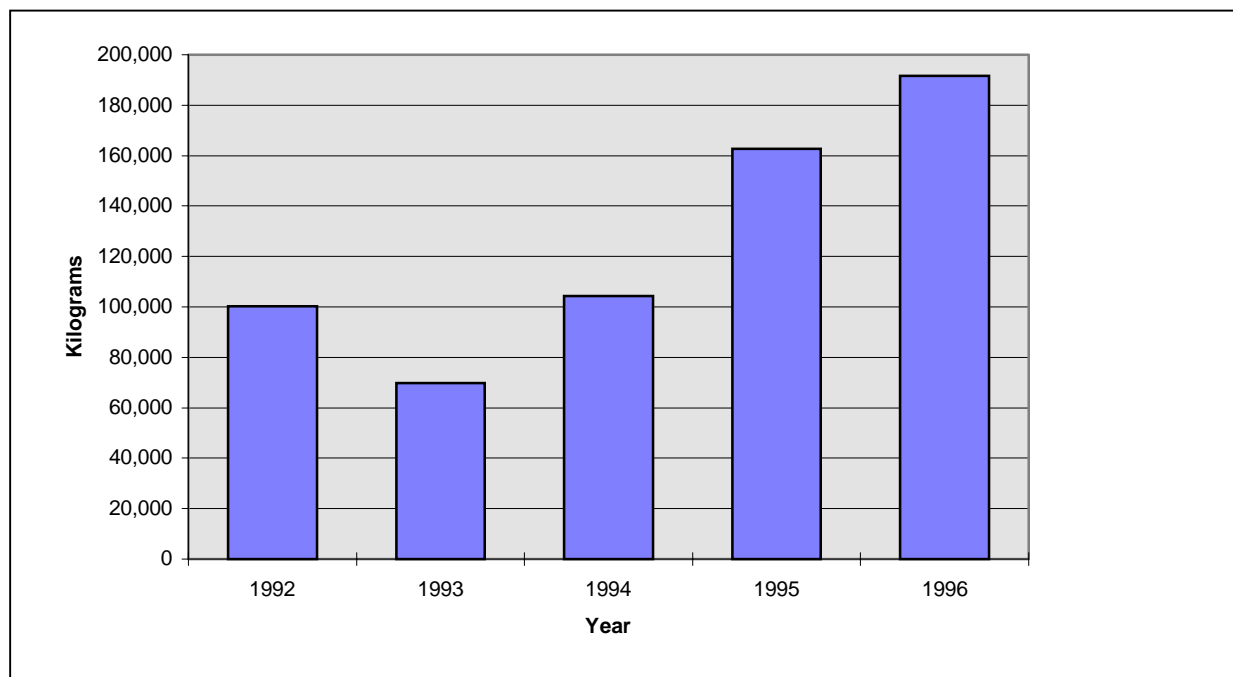
| Market Location            | Value (billion U.S. Dollars) |
|----------------------------|------------------------------|
| Europe                     | \$7.0                        |
| Asia                       | \$2.7                        |
| Japan                      | \$2.4                        |
| North America              | \$1.6                        |
| Rest of World              | \$0.3                        |
| <b>Total Global Market</b> | <b>\$14.0</b>                |

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<sup>1</sup> Source: Foster 1995.

<sup>2</sup> Source: Genetic Engineering News 1997.

## 2.9 Figures



**Figure 2.1 U.S. Exports of wild harvested ginseng (1992 – 1996)<sup>3</sup>.**

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<sup>3</sup> Source: USDA Foreign Agricultural Service 1998