

Specialty Forest Products in the Forest: Integrating Special Products Into Ecosystem and Landscape Management¹

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ABSTRACT: The increasing demand for an increasing array of special forest products is forcing forest landowners and managers to address special products within ongoing management and silvicultural activities. Strategies can vary from single species management in agricultural or near agricultural operations to complex forest management strategies which move special products across an ownership or landscape through time and space. The lack of information, institutional and legal restrictions and prohibitions, history and social concerns and constraints present problems and opportunities

Introduction

The harvest and utilization of a wide variety of so-called special forest products has been around for decades and even centuries in many countries of the world. Local populations harvested and used a variety of such products for food, clothing, shelter, medicines and other uses. Some were successfully moved into truly agricultural situations while others remained within the wildland environments in which they had been found. Management practices and techniques were developed that allowed "local" populations to establish and maintain conditions suitable for the development and harvest of desired products. Low populations coupled with large landscapes limited the extent and duration of harvest or management impacts. Local populations, whether nomadic, semi-permanent or permanent could move around the landscape creating and taking advantage of existing or created conditions to develop and harvest desired products. However, increasing populations with their increasing demands for a variety of products and amenities from forest and other wildlands have tended to result in declining product availability, increasing demand, declining access and reduced landbases from which products could be developed, managed and harvested. What had been a fairly open and free environment was now becoming increasingly regulated, restricted, prohibited, inaccessible and/or unavailable.

Interest in the harvest, utilization and sale of special products has mushroomed over the past 10 to 15 years. Up until that time, most of the formal, structured activity revolved around products that could generally be cultivated in an agricultural sense: Christmas trees, some floral greens, some foods such as nuts, berries and some mushrooms and at least some medicinal or botanical products. Others such as boughs, other floral greens, transplants, firewood, posts, poles, cedar products and the like were also harvested but

opportunistically with little or limited cultivation. Access was controlled, the harvesters known and knowledgeable and the quantity and quality usually known or predictable. But other products were and continued to be harvested or wildcrafted from the forest: mushrooms, medicinals, botanicals and an array of other products. Most of this additional harvest was unknown, unregulated and unseen. Landowners didn't know, didn't care, didn't recognize or didn't accept the value of those "other" products being removed from their lands. Much of the product was harvested from species considered by land managers to be worthless, weeds, competition or worse. The fact that someone was, pardon the expression, crazy enough to want it, was often enough to allow a land manager to turn a blind eye. In the West, this developed a very *laissez faire* type of attitude amongst the harvesters. That attitude coupled with landowner apathy, ignorance or avoidance has fueled much of the activity and trends we see today.

Fortunately, landowners are waking up to the value of their forest resource including the value of the other, so-called minor or special products. A number of harvesters, sheds and other buyers are beginning to question and rebel against many of the more blatant violations of property rights, harvesting ethics, mismanagement and other activities that are affecting their livelihoods. There is an increased willingness to discuss, impose and accept reasonable restrictions on access, to assess and collect reasonable fees for product harvested, to establish harvest and quality standards and to engage in open and honest discussion about costs, harvesting techniques, management practices and an array of other issues and concerns. Part of this emerging scene is the concept of including the development, management and harvest of special forest products within a larger forest management strategy.

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Strategies

There are any number of potential strategies for incorporating special forest products into a larger, integrated forest management strategy. They range from the relatively simple to the very complex. The simplest ones may target a single product or a group of related products from species that occur at the same time and in the same location and require or respond similarly to the same silvicultural and managerial strategies. In many respects, they approach or can become agricultural crops. Management can be quite intensive with the objective of optimizing both production and quality. Selected products can generate significant income streams on relatively small land bases but may be coupled with significant counterbalancing costs. The forest, if present, is subservient to the objective of producing the desired product or products. With their limited diversity, such operations are more likely to be highly susceptible to sudden and dramatic damage from natural damage agents and thereby affect both short and long term profitability. Establishing a new crop can disrupt income streams without a corresponding decrease in costs; in fact, costs may actually increase because of increased management needs. Ecological sustainability may also be highly suspect; repeated rotations without significant periods of rest with full and complete stand development (multiple rotations?), may result in productivity losses which may require additional inputs of money and/or other resources to maintain production. Such systems may best be suitable where legal and/or environmental concerns are minimal; on landownerships where landowners/managers can implement a form of restoration management and move product production in both space and time; or where other objectives limit, severely restrict or prohibit forest development.

Christmas tree farms are examples of a single product operation and perhaps best meet an agroforestry definition. Lands are commonly poorly adapted for most agricultural crops but suitable for forest cover and associated products and values. In Oregon, landowners with small acres often dedicate all or most of those areas to production. Operations are generally agricultural in nature and often very intensive. Most production is targeted to a small tree lot or a U-cut operation. As the size of the area increases, operations begin to focus more on large scale production and wholesale selling. These operations tend to be highly mechanized, very intensive in management and differ little from many other large scale agricultural operations. Regardless of the size or intent of the operation, a relatively small land area usually produces a large quantity of high quality product with a relatively high value.

But landownership size does affect the type of management and silviculture applied. A small landowner is commonly interested in a variety of objectives; economic return is not necessarily expected from all acres and at least some forest cover may be retained in areas deemed uneconomic or more valuable for attaining other objectives. Management and silvicultural intensities and strategies may vary from extensive to intensive depending upon the interest and desire of the landowner/manager and the portion of the ownership being managed. Such strategies can also vary from relatively simple to fairly complex, again depending upon what the landowner/manager is willing, able, interested and capable of doing.

On large ownerships where Christmas tree production is the focus, forest cover may or may not be established and maintained. Marginal sites – steep slopes, riparian areas, inaccessible sites – are most likely to retain cover; other objectives may or may not be identified and retained. Management and silvicultural activities are commonly limited or nonexistent. Production is focused on the better sites: management and silvicultural activities are highly mechanized and very intensive but also relatively simple. Product quantity, quality and availability can be predicted. Such operations are also susceptible to significant losses due to insect or disease outbreaks. On large ownerships where other resource objectives such as timber management are important and Christmas tree production subordinate to those objectives, operations are likely to be less intensive and more variable; production, quality and quantity are more likely to vary in both space and time. The Christmas tree crop is likely to be viewed as a temporary or transitory crop on a given site which may only be managed for Christmas trees for several cuttings of trees and then allowed or prescribed to be returned to timber production or to meet other resource objectives. A new site may or may not be prepared and ready prior to the previous one being "abandoned."

In Oregon, some forest landowners will allocate a portion of their ownership to Christmas tree production but retain the majority in timber production. However, for industrial forest landowners, Christmas tree production is incidental and opportunistic and little or nothing is planned or intended.

Increasing the number of products developed, managed and produced from a given acre of land or ownership can increase complexity. In the case of our Christmas tree farm, marginal or residual Christmas trees could be allowed to grow and then be managed for bough production without significantly changing

current management practices. Christmas trees could continue to be produced beneath such residuals or on adjacent areas. When the trees became too big to economically and practically manage and harvest boughs, the trees could be either pruned high and left as residual overstory, girdled and killed for wildlife or felled and sold as sawlogs, firewood or other products.

Perhaps the best opportunity and location for single product development and management on a long term basis is located within the limits of utility corridors, particularly high voltage transmission lines or gas lines. But even small scale operations of particular products may be possibly under or adjacent to local utility corridors - phone, power, gas, etc. Such corridors are maintained to limit tree establishment and stand development. It is important to identify and manage those species, which fit within the safety and management constraints of the corridor. Christmas trees are common products developed and managed in such areas but native grasses, transplants, berries, floral greens and possibly medicinals or botanicals are also possible. This is also one instance where the intelligent development and management of one or more special products can achieve multiple objectives which include not only keeping the vegetation controlled within the right-of-way and producing product but also potentially improving wildlife and riparian habitat, improving visual quality and maintaining species diversity. It should be noted that in these situations, the objective of producing a specific product or products or attempting to meet another resource objective such as transmission line safety precludes or severely restricts normal stand and forest development patterns. Management and silvicultural treatments would need to be regular and fairly intensive; they may also be mechanized. The resulting habitats tend to be relatively simple and favor species which favor more open environments.

A step up in complexity involves taking the same product or group of products and developing it or them as part of and during the normal process of stand development and management. This assumes that some other resource objective is of equal or greater importance to the landowner. For many, this may be timber production. In many instances, this is also likely to mean development and harvest of a number of different products over time. On very small ownerships and with some products, this may be at best difficult or impossible. On larger ownerships or with the right species and product, this may be much easier to accomplish than many think. The product or products to be managed are not generally associated with a specific location over time but rather with a particular stage of stand development.

For a landowner that regularly regenerates portions of the stand or forest, products favoring open stand conditions and early stand developmental stages will be present in varying quantities and quality across the ownership. In the most recent regeneration units, such products will just be beginning to regenerate and develop; in the oldest, they may be in decline or almost entirely gone. Initially, a new stand may be targeted to produce transplants, honey, medicinals, botanicals or small, tabletop Christmas trees. As the new stand develops, new products can be developed and managed; what had been a Christmas tree area may now be capable of producing boughs, posts, poles, small firewood, and the like but Christmas trees and small transplants may be gone. Older stands, assuming that the stem exclusion phase is limited or avoided by periodic thinning, may be expected to produce pulpwood, small sawtimber, large sawtimber, poles, piling and other similar products.

Regular and repeated thinning is likely to create conditions suitable for regeneration of additional trees; such recruits may be managed to produce additional transplants, posts, poles, firewood, pulp or other wood related products. One may even create conditions suitable for the development and management of Christmas trees and boughs. Periodically creating similar conditions across the ownership would maintain the production of specified products but across the stand, forest or ownership rather than on a specific site. There are several things to note under this scenario: 1.) special product harvest is complementary to meeting another objective; 2.) capturing the product and quality takes prior thought and planning but is still more opportunistic than intentional; 3.) products developed and harvested are associated with practices implemented to achieve other resource objectives; 4.) standard timber management and silvicultural practices are utilized; 5.) decisions made and activities prescribed and implemented affect future options and opportunities; 6.) although other products including foods, medicinals, botanicals, floral greens and even other wood products are commonly present, their development and enhancement is not considered; and 7.) even-age management is the silvicultural system and strategy selected and implemented.

This scenario may also be applied to management strategies where selection silvicultural systems are applied or preferred. The products desired and selected for development and management are likely to be different in at least some cases. But rather than concentrating the harvest of a given product in specified areas, management and harvest occurs across the ownership. Depending upon the product or products selected, quantities and quality may be higher

or lower than with a strategy that targets specific areas or stand conditions for product development and harvest. The complexity and potentially higher management and silvicultural costs associated with this type of system suggest that this approach may be better suited to landowners and ownerships where other resource objectives - visuals, wildlife habitat, riparian habitats, etc. - and species are in place and favored products have high per unit values.

Perhaps the greatest complexity in terms of developing and implementing a strategy expands the single product or related group of products to the full array of products potentially or currently existing within a stand or forest and attempting to develop a significant number of them over time and space. This essentially involves not only managing the trees but also the shrub, forb and even mycorrhizal components. Instead of one or several products being developed and harvested at the same stage of stand development, a half dozen or more may be developed, managed and harvested simultaneously while also maintaining the opportunity for future harvests and the establishment and management of new products. Species previously considered as serious competitors, weeds, undesirable or pests may be more valuable as a transplant, a floral green, food, botanical or medicinal. The landowner/manager is making a conscious decision to not only develop and harvest selected products but to also actually manage them within the selected management and silvicultural practices and strategies to meet the stated goals and objectives. One or more products now become desired and determined outputs rather than incidental ones.

It is biologically and ecologically impossible to develop, manage and harvest all potential products from a given piece of land at a given point in time. Any decision a landowner/manager makes will have positive effects on some species and negative ones on others. The best any landowner/manager can do is to develop the best possible plan with the best available knowledge, skill and experience and with clearly defined and focused goals and objectives. Ideally, all land managers would apply strategies and practices which would insure that the range of species and products would remain within the landscape but move both temporally and spatially across boundaries. Realistically, the best a single or small group of landowners/managers can do is to do intelligent tinkering, retain as many of the pieces as possible and pay attention to the results of management decisions and activities. Over time, a landowner/manager will be better able to plan and predict the impacts and costs of management decisions and activities on not only the tree component but also on the special product species. In doing so, future decisions made will be made with a

reasonable knowledge of the known and expected trade-offs and costs.

If one takes the same stand or forest and starts the regeneration and stand development process, it becomes apparently rather quickly that a wide range of tree, shrub and forb species are present. Many make the mistake of assuming that species bleed in over a long period of time; most are present within a year or two of disturbance and will remain until outcompeted or conditions change to favor other species. One of the objectives of the landowner/manager is to identify which species and what conditions will be targeted for retention then develop the plans and activities to do that.

In the Pacific Northwest many people view regeneration units as "dead" territory. Commonly they see only "weeds" and no trees. If they see trees, they commonly do not see much else. From that perspective, there is not much there; the key is to look beyond the obvious. There are opportunities almost from the time the last log is yarded or skidded and the site prepped and planted. Most landowners/managers essentially walk away from regenerating stands except to monitor seedling growth and survival, competition or the need for precommercial thinning or the control of competing vegetation. Because most view the first 30-50 years, or until the first commercial thinning, as an economic cost and black hole, they fail to see the range of income opportunities that may be present. They also fail to see the opportunity of reducing management and carrying costs, interest charges and related expenses.

As the new stand or forest develops, nature provides an array of species which shift and change but which can be incorporated into ongoing management activities to generate income or reduce costs or charges. Allowing a beekeeper to maintain hives in a plantation of trees benefits not only the beekeeper but also the local shopkeeper; the bees also increase the potential for pollination in other forest plants which require insects for pollination. If a plantation is overtopped by bracken fern, harvesting the emerging "fiddlehead" in the spring for food reduces the fern competition and provides a food to a local, or perhaps a foreign, market. Overstocked plantations or a plantation dominated by natural regeneration of a less preferred species? The owner/manager can utilize the sale of transplants or cuttings to lower stocking levels, change species composition or reduce competition from other species. The list is endless; it is dependant only the ingenuity of the owner/manager, availability of a market and a willingness to try.

It should be noted that nature is rather opportunistic;

given the right conditions, almost any species found in an area can be found within a forest or stand in that area at any time. The key is to identify which species and what conditions the landowner/manager wants and is willing to establish and maintain within the limits of the overstory forest being managed. This is really where the fun begins. In addition to the trees to be managed, the landowner/manager should probably select a few other species that are to be managed over the course of the life of the stand or forest. Depending upon their occurrence within the developmental path of the stand, perhaps one to five shrub and/or forb species could be designated for management at each stage of stand development. Some species may continue throughout the rotation; others will ebb and flow as conditions change while still others may quickly enter and leave at various times and differing rates. It is incumbent upon the landowner/manager to select species that are silviculturally compatible with not only each other but with the developing tree overstory. This does not preclude managing a more shade tolerant species in cohort with a more shade intolerant one under an overstory of lodgepole or western white pine; it does preclude managing huckleberries under a dense hemlock or silver fir overstory.

It is important to recognize and accept the idea that even though one or more species have been identified for management, they may not necessarily be managed in a traditional sense but rather they could be allowed to remain and ebb and flow as site conditions change over time. In this sense, this takes advantage of what nature provides and therefore is somewhat opportunistic. The landowner/manager needs to recognize and accept this and plan accordingly; income streams associated with single or small numbers of products are more likely to be more variable over longer time periods as species populations change with the changing conditions. Recognizing and incorporating this natural diversity within stands and forests, income flows could potentially be evened out by harvesting opportunistically other products which are present because conditions are suitable rather than being planned.

The landowner/manager can also develop and implement strategies which benefit both the overstory and understory species. This makes product development, management and harvest more predictable and deterministic. Trade-offs, both ecological and economic, would need to be made. The challenge will be to strike a balance between the objectives and returns from the overstory with those associated with the understory and how each fits within the framework of the landowner's goals and

objectives. For pioneers of these strategies, it will be more difficult given the dearth of knowledge and experience in the types and scope of tradeoffs. It will be further complicated by the fact that each landownership will be different.

As the stand or forest develops, the landowner/manager needs to be evaluating existing conditions and changes that are occurring. Generally, questions about thinning needs, control of competing vegetation, regeneration and the like will be asked and answered. To make sure that special product opportunities and needs are also addressed, those same questions need to be asked in terms of their effects on the product species that have been determined to be important. The answers may suggest a change or changes in one or more planned activities including but not limited to precommercial thinning requirements or timing, residual stocking or species preferences or the development and implementation of a pruning program. Instead of herbiciding a competing species, maybe the harvest of stems or sale as a transplant may accomplish the same objective. Management costs money. In Oregon, precommercial thinning may cost \$100 to over \$200 per acre; pruning, \$0.50 to \$2.00 per tree; fertilization, \$50-100 per acre. In contrast, precommercial thinning and/or pruning with the sale or salvage of boughs and/or Christmas trees can accomplish the thinning and/or pruning and produce an income of from \$0 to perhaps \$100-500/acre depending upon quantity, quality and species. But this only addresses the tree component. It is not unreasonable to expect the presence of other species of value. Within a given year, multiple products may be harvested at the same or different times of the year. These additional products may realize an income of up to perhaps \$100 or more per acre. If timed, planned and implemented properly, programmed silvicultural activities will not only benefit the residual or treated trees but also the existing understory vegetation.

For example; fertilization increases not only tree growth, health and vigor, it can also increase the growth, vigor and color of a floral green species. Trace amounts of boron in a forest fertilizer mix can improve tree growth on sites where boron is limiting; it can also increase the value of noble fir boughs by improving the blue color common to that species. Pruning reduces taper and improves wood quality; pruned trees maintain or increase the amount of light reaching the forest floor thereby retaining or enhancing understory species or fostering understory regeneration over longer time periods. If the landowner/manager has been paying attention to existing conditions and has selected understory and non-tree species properly, the net result should include not only an increase in tree growth and vigor and

overall stand health but also in an increase in the quantity, quality, growth and vigor of the desired non-tree understory species. This could and should also result in an increase in income.

With some modification, the same basic process can be followed throughout the life of the stand or forest. Prior to a commercial thinning or regeneration cut, a landowner/manager could harvest and sell the smaller wood material for posts, poles, rails, firewood or even pulp. Specialty markets such as bow makers, carvers, log home builders and furniture makers may also be interested in small diameter, slow growing material. A second or perhaps even a third small diameter wood sale could be made depending upon the markets and the segregation of diameter classes. The final sale would be conventional merchantable timber. But even at that stage, there are opportunities for additional product harvest. Bark of many species is desired by basket makers and weavers, Native Americans and others. Mosses and lichens in the canopy or tree bole may be sought by artists, medicinal or botanical companies and others. Basket weavers, Native Americans and others may desire various roots such as cedar or spruce. If the stand to be harvested has been managed to retain a significant shrub and forb understory, additional sales of the wide array of other products is also possible; complete harvest and removal would focus on new roads, skid trails or landing sites; thinning or partial removal on other sites. Scheduling, timing and preplanning are the primary ingredients to accomplishing this type of strategy.

Again, because this can be a more opportunistic type of strategy, income flows are less predictable or even. However, it can be somewhat less complex in terms of developing and implementing management and silvicultural strategies in that the overstory stand or forest is what the landowner or manager is ultimately managing for. The landowner/manager can increase the predictability of certain products and income by implementing strategies which favor them over others but the product development and management is still subservient to the larger stand or forest objectives.

Similar or the same strategies can also be utilized to emphasize the development and management of special products as the primary objective of the stand or forest. In contrast to dedicating a specific site to the exclusive development and management of a single product, the stand or forest is maintained and allowed to develop but would be managed to provide a range of products with timber being one of the products being produced. In contrast to developing and implementing management and silvicultural strategies focused on the overstory trees, such strategies would

focus on the plant species which produce those products. The overstory trees would be selected, regenerated and managed to establish or favor suitable habitats and environments to optimize the quality and quantity of product produced by those other species. Timber volume would be a secondary and more opportunistic result of efforts to maintain the productivity of the selected species. This is a much more deterministic system in that special products are being specifically favored and promoted. Conditions which inhibit any aspect of development, management or harvest are minimized. Production levels, quality and resultant income flows are more likely to be predictable and regular. The landowner/manager still has the flexibility to move production around the stand or forest over time but does not preclude maintaining and managing a particular species on a specific site or sites over the rotation of the overstory. This type of strategy requires information about the autecological and silvical characteristics of the species of interest. It also requires knowledge about their individual and collective responses to disturbance.

Regrettably, relatively little of this type of information is known or readily available. Although there is some effort being made to locate and/or develop such information, there is currently little coordination and cooperation between researchers, landowners/managers and harvesters. Unfortunately, this is not likely to change in the near future.

The last two strategies described really begin to illustrate the concept of multi-species management and product development. They are also more closely aligned to what I and many others consider ecosystem management. My experience suggests that such strategies are more acceptable to many who consider current forest management and silvicultural practices as being destructive and ecologically unacceptable. They recognize not only the diversity inherent within a forested landscape but also the dynamics of such landscapes and ecosystems. However, such strategies are inherently more complex and require greater knowledge, experience and ability to develop and implement. Given our current knowledge and practices, the chance of immediate and/or complete success in developing and implementing such strategies is limited. At the same time, perceived failures are in fact new opportunities and new knowledge which can and should be applied to future management and silvicultural plans and activities. Most foresters, particularly silviculturists, already have the basic knowledge, skill and ability to design and implement such strategies but they have never been asked to do so at this level.

My discussion to this point has focused largely on a

single landowner or manager. My experience suggests that most landowners and managers can develop and implement a special products strategy which can address and meet their specific objectives for their property. For very small landownerships and/or when markets for products are small or remote, it may be more difficult and require significant trade-offs and costs. These issues and problems may in part be addressed by developing local cooperatives or associations which could buy and sell on sufficient scale so as to make management effective and efficient while allowing the individual landowner/manager to tailor operations more closely to his/her specific objectives. Very large landowners/managers, although they face many of the same issues and problems, also have economies of scale. The volume of product that could potentially be available on a yearly basis would provide some incentive to bring the market closer to the supply. In between the two extremes are the majority of landownerships. Although variable in size, they commonly have a large enough land base to produce a significant quantity of product on a regular and consistent basis. Individually, these landowners may or may not have sufficient volume or generate enough activity to make individual impacts in the marketplace. But like very small landowners, if an association or cooperative were to be formed to provide economies of scale, they could collectively make an impact similar to a very large landowner.

Special Products in Ecosystem or Landscape Management

The discussion to this point has focused on possible strategies to develop and implement a successful special products program. Can some or all of these strategies be implemented within the concept of ecosystem and/or landscape management?

Theoretically, yes to both. I suggested that the development and implementation of multi-species and product strategies is ecosystem management; I also suggested that depending upon what the goals and objectives were and how those were met, many if not all of the strategies that could be developed could be considered as practicing ecosystem management. Depending upon the scale at which a landscape was described, such strategies could also be considered as being a form of landscape management.

But why would one want to do so? Is there something inherently better or more economically valuable in these systems. Depending upon ones perspective, the answer could be yes or no. Is your ability to manage your land to meet your objectives important? How important is public opinion? Are your practices considered to be sustainable and ecologically sound? Regardless of one's decision, there is a strong interest

by a variety of groups at insuring that forestry and forest management are more holistic and address more than just timber production. There is also an increasing interest in sustainability and "Green Certification" in local, national and international markets. My experience and perception suggests that a well crafted and implemented special product strategy incorporated with other well defined resource objectives will result in much better overall forest management by better addressing more if not all of the resources of the forest. Management is really a series of trade-offs made with at least some sense of the costs and benefits. Special products allows landowners and managers to look at the smallest components of their land and craft systems and strategies that not only meet their objectives but also retain most if not all of the pieces in the forest. Such strategies can also address many of the issues raised by groups and individuals concerned about current forest management practices. With the exception of very large landowners, a single landowner is generally not going have much influence on a large ecosystem or landscape such as a watershed; multiple landowners, especially if they make up the majority of the landscape, will have a significant impact. A single landowner can and often does have a significant impact on a smaller scale landscape or ecosystem. The type and intensity of management can have significant impacts on a variety of resources within the ownership and, if large and significant enough, can affect resources in the adjacent landscape. I am not suggesting that individual landowners must necessarily subordinate their goals and objectives to a larger goal or objective. I am suggesting that utilizing this type of approach is very likely to minimize conflicts and continue to produce the array of products, services and amenities that society and the individual landowners seek.

Ecosystem management suggests looking at and managing the entire system from the smallest to the largest components. Ecosystems can be very small, literally microns in size; to very large, hundreds of thousands of square miles or an entire plant. A landowner producing Christmas trees from 10 acres using intensive agricultural practices may or may not be practicing ecosystem management by conventional standards. If those practices sustain soil productivity, prevent sediment input into streams, avoid pesticide drift and contamination, provide habitat for native species and do all those other ecologically beneficial things while still producing a product or products, then I would submit that ecosystem management is being practiced on a small, local scale.

On the other end of the scale are the Weyerhaeusers, the Boise Cascades, the International Papers, the other

large industrial forest landowners, and the federal and state governments. If they follow similar paths, then they also can be considered to be doing ecosystem management. Unfortunately, we as of yet have no good definition of what ecosystem management is or how to do it and therein lies the crux of the problem. Yet I would submit that incorporating the development, management and harvesting of an array of special products into ongoing forest management programs would in fact result in ecosystem management regardless of the definition because all aspects of the system are considered and the potential for all is retained. The only difference between landowners/managers is one of scale; all other components are essentially the same. It can be done from the smallest ownership to the largest. Interestingly, such systems also closely approximate the idea of multiple use management that foresters have been taught so it is really something that most are already familiar with.

Perhaps the best example of how special products could be utilized to practice ecosystem management would be to manage a utility corridor with a high voltage transmission line or lines. The primary objective of these corridors is the safe and efficient transmission of electrical power. To accomplish this task, utility agencies and companies spend tremendous amounts of money to control or eliminate vegetation that will grow or fall into or onto lines or transmission towers or otherwise impede or prohibit access for repair, maintenance and other similar activities. In doing so, wildlife habitat, riparian habitat, visual quality and a variety of other resource values are impacted with little or no effort to mitigate.

Experience with a multi-line corridor on the Zigzag Ranger District suggests that a well conceived and designed management plan driven by the development, management and harvest of special products can assist in not only controlling much if not all of the potential competing and hazardous vegetation but reduce the cost of control, improve wildlife habitat, minimize impacts to water quality and stream and riparian habitats and reduce the need for pesticides. It will and does take a great deal of planning, time, effort and money to develop and implement such a strategy but the income generated could potentially exceed the costs of management. The added benefits of higher water quality, better stream and riparian habitat and health coupled with improved wildlife habitat could result in higher levels of public acceptance and utilization. It is important to remember that stand development is severely constrained to meet the safety objectives. In spite of this limitation, ecosystem management is being performed.

Things change somewhat when one moves up in scale. What may be difficult or impossible on a small ownership or small ecosystem may be easily attained at some larger scale such as a landscape. For this discussion, a landscape will include a number of ownerships of varying sizes and including a number of different ecosystems. Each landowner/manager has constraints, goals and objectives which may be the same, somewhat different or very different from that of his/her neighbors. At the same time, species do not recognize artificial boundaries. Different ownerships may have many of the same species and therefore the same opportunities to establish, manage and harvest the same products. As noted previously, the quantity and quality of a product or group of products may vary across boundaries making the sale of those products also more variable. But this also provides an opportunity, an opportunity for all landowners/managers to benefit.

Farmers formed cooperatives to pool resources, reduce costs, improve marketing and sales and realize economies of scale. Members could sell what they could produce without worrying about trying sell small quantities or receiving lower prices for inconsistent supplies or small quantities. The same opportunities are available for special products. A small landowner/manager can compete in the market because his volume is combined with others to provide a consistent quality and quantity over time. It is important to recognize that many if not most buyers and harvesters are far more concerned and interested in consistent supply regardless of quantity. A small landowner/manager is much more subject to the whims of nature, which will affect both quantity and quality. Selling as an individual increases the risk of the loss of market share; harvesters and buyers are not likely to harvest or buy from landowners/managers with irregular quantity or quality. The risk is reduced if there are several landowners/managers involved; there is less probability of great swings in either quantity or quality. The greater the number of participants, the lower the risk and the greater the probability of all achieving at least some level of return. If nothing else, the economies of scale realized should result in reduced costs and increased efficiencies in management practices and harvesting.

At the same time, there is a certain amount of suspicion and distrust that must be overcome. Property rights are very strong in the United States. I know of no landowner/manager who will willingly subordinate his/her goals and objectives to another much less provide perceived free advice or management practices or techniques to a neighbor and competitor. In part because of poor communication, many landowners/managers fail to realize that their

neighbors often have similar if not common goals and only differ in technique and practice. A bigger issue is the perception or reality of collusion. A successful collaboration will avoid even the appearance of collusion. This would also allay many of the fears and suspicions of landowners about cooperating with neighbors because each landowner/manager would still retain authority over his/her property and their specific goals and objectives. Successful collaboration would also be expected to reduce concerns by small landowners/managers about being overrun or shouldered out by larger landowners/managers.

There is another side to landscapes; the ecological. A landscape contains not only a variety of landownerships and management practices but also an array of plant and animal species. It is reasonable to assume that a given landscape will include the range of conditions in which those species are likely to be found. On a small scale, landscapes may appear to be, and in fact, may be relatively homogeneous. On larger scales, landscapes exhibit a diversity of conditions. In the ecological aspect of landscape management, land managers attempt to maintain this diversity by moving habitats and ecosystems in time and space. This permits stands and forests to develop and regenerate creating a range of conditions in which a variety of species can be found. Individual populations ebb and flow as conditions change; they may be regenerating in one location, in full development in another and either in decline or totally eliminated in others. In this context, the differing goals and objectives of individual landowners/managers may actually help to maintain this diversity. But this is also where things can get both interesting and difficult. No one at this point has succeeded in getting multiple landowners to agree on landscape objectives in part because each landowner/manager perceives that he/she will give up more than they receive. There is a certain amount of fear of the loss of control, subordination of goals and objectives as well as other personal, economic and legal reasons for this situation. Such fears may or may not be real when developing and implementing a landscape management strategy. Today, they are very real and will affect not only management decisions but also product availability, supply and quality.

On the interesting and positive side, landscape management can be basically a large scale rotation system. Many forest landowners/managers move stand developmental stages around their property to maintain a continuous supply of timber and, as was described in the strategies discussion, the same can be utilized with special products. Moving to the landscape scale, there are multiple landownerships rather than one but the basic scheme is the same; maintain a continuous supply of product from the

entire landscape without damaging or destroying the ecosystems that produce it. Encouraging landowners/managers to develop and implement management and silvicultural plans which include a well designed special products component which includes multiple product development and management would allow individual landowners/managers to establish and maintain diversity within their respective properties. When combined on a landscape level, the resultant diversity between ownerships should then result in landscape diversity. Even if some landowners/managers opt to target a single species for development and harvest, it is highly probable that landscape diversity will still be maintained at a level within the historic range for the area. In that context, maybe a solution can be found that would be acceptable to at least a majority of the landowners/managers.

A couple of final points to remember. First, nature does not recognize a right or a wrong way to do things. Right and wrong are human constructs and, in resource management, change as information changes. Second, special forest products include a range of products including those made from wood. Non-timber or other designations suggest that special products from wood such as poles, posts, rails, shakes, shingles, walking sticks and the like, are less important and should not be considered. Failure to recognize and consider such opportunities reduces the quality of management and limits options, opportunities and income.

Sustainability

If properly planned and implemented, special product management and harvest is sustainable. Landowners/managers must consider not only what products will be harvested but what the impacts of harvest and management will be on sustainability. Removing entire individuals eliminates future harvest options and opportunities and therefore regeneration requirements and needs considered. Partial removal may result in short term quantity or quality losses but future harvest options are retained. At the same time, sustainability can also be influenced by implementing or failing to implement silvicultural or management practices which affect the habitat or site conditions suitable for the selected species. A successful special products strategy will insure that harvest practices and levels do not adversely affect future harvest practices and levels. It will also insure that silvicultural and management practices do not result in the loss of existing suitable habitat without insuring comparable and suitable replacement sites.

Conclusion

Special products has a long history not only in the United States but also many other countries of the world. In many countries, many special products have been converted to agricultural crops or are currently grown and managed in agroforestry situations. But the vast majority of such products are still produced from forests, both natural and managed. The increasing demands for foods, botanicals, medicines, wood and other products from forests is increasing. Some products and the species from which they are harvested may ultimately be moving into an agricultural or horticultural production setting. But for many others, such options are neither likely nor reasonable.

It is becoming increasingly obvious that forest landowners and managers need to begin incorporating special product considerations and concerns into ongoing forest management activities. To do so will require not only a change in attitudes by landowners, land managers, harvesters, buyers and the public but also in the way forests are managed and utilized. Information needs to be developed and disseminated which identifies the needs and requirements of the various species as well as the effects and impacts of various management silvicultural strategies. Existing strategies and practices need to be analyzed and modified to better account for the development, enhancement and management of the variety and array of special products on an ownership, ecosystem and landscape scale. Finally, communication and information sharing between landowners, land managers, harvesters, buyers and the general public must improve.