

More Than Trees

How Silviculture Intersects with Mushrooms,
Berries, and Other Botanical Products

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Conventional wisdom holds that timber represents the main economic value derived from forests. In Canada, economic profits derived from Canadian non-timber forest products (NTFPs) certainly represent only a fraction of the profits developed from timber harvests. Some estimates put the direct economic value of NTFPs in the Canadian forest sector at about \$240 million, annually. That's fairly small compared to the nearly \$40 billion annual export value of Canadian timber harvests. But if one takes a closer look at the NTFP figure, it's still a significant level of consumption. For example, if one converts mushrooms, berries, syrup, honey, etc. into a raw caloric value, and if it is assumed that an average North American consumes about 2,000 calories per day, it turns out that Canadian forests provide sufficient calories to support a population roughly equivalent to that of Ottawa for one year. Clearly, non-timber resources are an important dimension of the forest sector.

The harvest of NTFPs such as mushrooms, berries, and floral greens also provides various indirect economic benefits. For a small forest-dependent community, an influx of harvesters purchasing supplies, etc. can result in a significant infusion of cash. Earnings from NTFPs are usually quite low, but they can supplement incomes, and thereby stabilize employment. Northern Vancouver Island, for example, probably has about 100 harvesters actively searching for a mushroom known as the Pacific Golden Chanterelle every late summer and autumn; this level of activity is roughly the equivalent of a small mill.

Of course, NTFPs are much more than an economic resource. In many forest communities, the harvest of NTFPs is a part of the cultural DNA that links inhabitants to the land. In many rural areas, and particularly in First Nations communities, NTFPs are seen as an essential aspect of cultural identity, providing food, medicine, and spiritual significance to the landscape. Berry harvesting and mushroom collecting are typically important parts of the annual cycle, interspersed with fishing, hunting, and firewood cutting. For these communities, there is a concern that the harvest of NTFPs continues as a sustainable, reliable part of life in their forest-dependant economies. Internationally, most efforts to develop criteria and indicators for sustainable forestry include an NTFP component; these components contribute to the certification of

wood and paper products marketed by industry. NTFPs deserve serious consideration in the overall milieu of forest management.

Far from being a random outcome, the sustainability of NTFPs is inextricably linked to the decisions that we make as forest managers. The Pacific Golden Chanterelle, for example, is known to thrive in coastal forests of BC where Douglas-fir and western hemlock are the leading tree species, in stands that are between 60 and 80 years old. So, contrary to conventional wisdom, logging actually promotes the productivity of this mushroom, albeit over a span of decades. On the other hand, a decision to completely remove 60 to 80-year-old Douglas fir and hemlock from an area would also likely eliminate local chanterelle productivity until other stands achieve the same age. Sustainability of this mushroom resource is not then just a matter of managing certain sites, but of maintaining a steady mix of stand ages across the landscape. Tools such as GIS-based mapping and forest cover maps can assist forest managers in determining the level of potential chanterelle productivity across a given forest area.



Pacific golden chanterelle

Some NTFPs are ephemeral. While they may not currently thrive on a particular landscape, they might still be a consideration for forest managers concerned with longer time frames. Morels, for example, typically become productive after forest fires. These mushrooms are now thought to fruit in patterns that relate to both physical features of the landscape (e.g., strictly mesic soil moisture) as well as associated plant communities (e.g., the yellow glacier lily). In smaller community forests, parks, etc., preserving the mesic glacier lily habitat would also preserve habitat for the unseen morels.



A black morel fruiting after a forest fire

Some NTFP species are dominant components of forest sites. Salal is considered by some forest managers to be undesirable vegetation, often competing with newly planted conifer seedlings. However, it is also an NTFP that produces an excellent, durable floral green widely used by florists in preparing flower arrangements. The demand for this product fuels a multi-million dollar annual harvest in the Pacific Northwest. The quality of salal stems and leaves is very much linked to site characteristics. For the proper degree of healthy growth and elongation, the sprigs of this plant are most merchantable when shade is moderate and damage from leaf pathogens is minimal. Soil fertility can also affect the quality of the plant. Management practices that affect these stand characteristics can reasonably be expected to affect the merchantability of the salal.



Salal

Sometimes, the management of NTFPs can be deliberately synchronized with timber management. On Vancouver Island, examples include the extraction of cedar oils from pruned boughs, and the salvage of ferns from areas where logging roads are constructed. Cedar oils are used in a wide range of products (e.g. soaps, fragrances, polishes, and insecticides), while native ferns are in high demand for landscaping and ecosystem restoration projects.

NTFP habitat is occasionally managed in a more deliberate fashion. This is especially true where tenure holders can influence the possibilities for sustaining NTFP harvests. Pine mushrooms, also known as “matsutake”, are managed in some areas of BC. The *2003 Timber Supply Review* for the Kispiox TSA resulted in adjustments (reductions) to short-term timber supply, for example. Habitat mapped in the Cranberry TSA has also affected the timber supply analysis for that region. The government of the Nisga’a Lisims controls the harvest of NTFPs on their treaty lands through a land use plan that designates special areas for pine mushrooms and other NTFPs. The policy requires that the cumulative impacts of land use on NTFP habitat be taken into account in forest management decisions.

Active management to sustain wild berry production can also be compatible with timber production. Many berry-producing species, such as blueberries and huckleberries, are shrubs that thrive in a high-light environment. Traditionally harvested from areas burned by forest fires one or two decades previously, these delicious and healthy fruits (high in Vitamin C and anti-oxidants) are now gathered primarily from recent clearcuts. Fortunately, most berry-producing shrubs readily respout (and can even be invigorated) after mechanical damage, so the direct impacts of logging are usually short-lived. But with the reduced use of slash burning for silvicultural site preparation, there are concerns that wild huckleberry stands in today’s cutblocks are not as healthy as they had been in the past. Brush control, especially if achieved through broadcast applications of herbicides, also constrains berry production. If a regenerating stand is pushed to full stocking and free-growing status as rapidly as possible, shade from the rapidly growing trees drastically reduces shrub cover and leaves a window for berry plant recovery and fruit production that is very brief. Where berry harvesting has been identified as an important value (such as in the Suskwa River valley of north-western B.C.), guidelines can be implemented to minimize conflicts between the need for rapid reforestation and sustainable berry production. The deleterious effects noted above can be somewhat offset by setting low stocking levels (e.g., 600 stems/ha rather than 1200 stems/ha), avoiding the use of herbicides, or brushing only around individual crop trees. Such efforts might thereby facilitate 20 years of berry production (with peak yields 5 to 15 years after logging), with regional sustainability of berry crops incorporated into forest-level planning.



Black huckleberry

Another means of avoiding potential conflicts between berries, mushrooms, and other NTFPs and industrial forestry is the designation of resource emphasis zones. With more research on the ecology of fungi and berry-producing shrubs, it is often found that preferred habitats are often not the same as those that are most productive for trees, or coincide with locations preferred for wildlife or biodiversity protection. For example, the Saskatoon and the soapberry (still widely prized by First Nations people), are typically found in dry open habitats, often on south-facing slopes with minimal timber values. Pine mushrooms are typically found in the drier, lower-productivity timber types as well. And good huckleberry production is often noted at high elevations in the open subalpine forests that have minimal timber value and difficult access, or in the gaps of old-growth stands with multiple biodiversity, education, and recreation values.

It may be possible to enhance the level of NTFP harvests. While this has not been attempted on a large scale in BC, experience in other areas of the world provides positive examples. In South Korea, the harvest of native matsutake is increased by using irrigation and other methods to counter occasional dry weather. Where matsutake is abundant in North America, a similar modest boost in productivity would actually cause the cumulative value of the mushroom crop (over the span of one timber harvest) to rival the value of the pine trees hosting the mushroom. In eastern North America, the pruning, weeding, fertilization, and harvesting of low-bush blueberry, a natural invader of old fields and rocky ground, has resulted in the incorporation of this native species into the mainstream agricultural economy.



A pine mushroom (centre) with two look-alikes. Pine mushrooms have a complex cinnamon-and-mushroom-like odour. For novices, mushrooms are best identified with the assistance of someone who is knowledgeable and experienced.

Can we ensure the sustainability of NTFP harvests? It's a question that was foremost in the minds of those who established the Eastern Canada Ground Hemlock Working Group (ECGHWG). Ground hemlock or eastern yew is a species that produces taxol, a compound useful for treating certain cancers. Bringing together stakeholders that include the harvesters, tenure holders, end users, and others, the ECGHWG has established proactive guidelines to ensure the sustainability of the ground hemlock harvest. The guidelines (many of which might be applicable to NTFP management in general) promote several goals:

- adherence to applicable legislation;
- preventing diminishment of ground hemlock populations;
- ensuring that harvesting conserves biodiversity and habitats;
- ensuring that handling and transport of the NTFP maintains quality;
- assuring that harvesters and landowners have access to information and that harvesters are properly trained;
- assuring that the economic and social benefits are fairly distributed; and
- acknowledging that land use changes must be taken into account.

In the broader context, organizations such as the Centre for Non-Timber Resources at Royal Roads University in Victoria, and the National NTFP Network of Canada strive to promote the wise use of NTFP resources by coordinating and developing social and ecological research, by developing training and certification programs, and by providing various information resources. However, it's important to note that the information needed to guide the sustainable management of various NTFPs is often not yet available, especially if harvest levels are not reflected in the market economy. For example, devil's club, a member of the ginseng family, is considered to have curative properties similar to ginseng, and it continues to be valued as a medicine in many First Nations communities. There are concerns that logging irreparably damages old-growth stands of this species, and we know little about the requirements for its successful recovery after timber harvesting

Is it possible to mismanage NTFPs? Globally, there are some troubling stories. The impacts of overharvesting and poor reseedling lead some to declare the Brazil nut an endangered species. In Japan, destruction of habitat by the pinewood nematode has sharply reduced the availability of native matsutake, spurring imports of the mushroom from China and Korea (and imports of the related pine mushroom from North America). An understanding of the habitat needs and the biology of the plants and fungi generating our forest's NTFPs suggests a number of ways in which integrated forest management can protect, sustain, or even enhance NTFP production in the same forests as those managed for wood production. Forest management involves many trade-offs at various scales throughout time and across the landscape, yet the spatial and temporal arrangement of timber harvesting can sometimes be arranged so that the needs of both NTFPs and the forest products industry can be met. The challenge is to reduce the need for compromise where possible, or to manage these trade-offs where necessary, so that there will be an optimal outcome for all of the stakeholders relying on forest resources.



Devil's Club

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