Non-Timber Forest Products and Implications for Forest Managers

Birch and Birch Bark

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All species of trees that we most commonly think of as "timber species" have potential commodity values, often referred to as non-timber forest products (NTFP) or special forest products, that are not necessarily related to wood and fiber products. Some of these NTFP values are recognized and commercially important and others are secreted in the history of Native Americans and other people who at one time in their past depended on natural products for their physical and spiritual well-being. Paper birch is one example of a species that was an important part of Native American culture and has considerable potential for NTFP.

Before discussing NTFP from birch, we need to consider the potential for multiple products from this tree and from birch forests. The diagram below illustrates the potential product available from a birch stand as it develops through time.

Admittedly, this is an idealized view of the potential. However, there are examples of uses of birch for each of the products indicated in the diagram. There has never been a plan to attempt to harvest all of these products from birch trees and stands in the same geographic area. Northern Minnesota, Wisconsin, and Michigan would provide a good area to test these ideas.

The two main products harvested from birch without killing the tree are sap and bark and, to a very minor extent, the roots. The method of collecting birch sap is generally similar to that of maple. Birch sap differs significantly, however, from maple in that it has simple sugars (glucose and fructose) rather than the more complex sugars of maple (sucrose). There are also other differences in chemical composition.

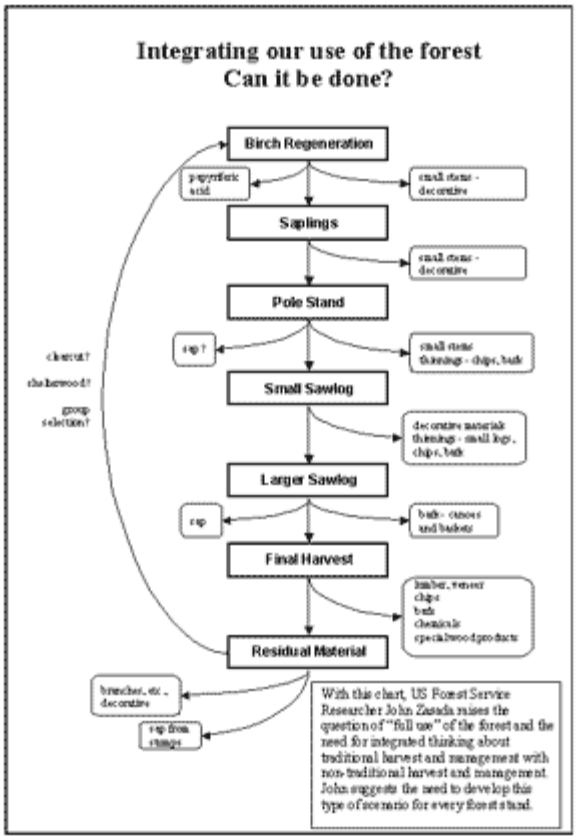
Roughly 100 gallons of sap are required to make a gallon of birch syrup. Maple syrup, on the other hand, requires about 40 to 50 gallons of sap per gallon of syrup.

The most serious efforts to commercialize the use of birch sap in North America is occurring in Alaska where a number of individuals are using sap and syrup to make various types of candies, salad dressings, marinades, and any other products that can be "enhanced" with some birch syrup (for example, ice cream).

Although tapping a tree for sap does not kill it, there is little information in North America on the

effects of the tap holes on wood quality and decay, and more generally tree vigor.

The value of NTFP from birch bark is diverse; value-added products are the key. Harvesting of birch bark for use in making canoes, baskets, and other containers is well known across the northern forest. Traditionally, birch bark was an essential part of the lives of Native American groups in Canada and the northern United States where it was used as a covering for wigwams, food preparation and storage, canoes, and other things.



Literature suggests that the only way food could be stored for long periods of time was in birch bark containers. Although not proven, it is easy to make the connection between the fungicidal properties attributed to betulin, a major chemical in the bark, and storage of food for long periods. One might suggest that birch bark was a forerunner of plastic food containers (and, much more effective!).

Today, bark is used mostly in the production of baskets and other objects sold as decorative items; some of these are truly works of art.

Birch bark baskets.
(photos by Don Breneman)

Although bark is usually harvested without cutting the tree down, the removal of large pieces of high quality bark, as used in canoes, is done more easily after the tree is felled. Bark will regrow after it has been removed, but there does not seem to be any quantitative information on rates of regrowth. There are reports of people making a second harvest of bark from the same tree 10-20 years after an initial harvest. Bark quality (e.g., bark thickness and flexibility, tendency to separate into layers, and lenticel density and size) can vary greatly among trees on the same site, with tree age, and among differing sites.

Bark Removal: Effects on the Tree

I encourage a sensitivity to the effects of bark removal. Although removal, when done correctly, does not kill the tree, there may be more subtle effects. For example, a change in resistance to infection by disease may occur, although I have no scientific data to show this. To minimize the effects of bark removal on the wood and more generally on tree health and vigor, the following guides seem to be important.

1. The distinction has to be made between the inner and outer bark. The outer bark is removed and

the inner bark should not be damaged, The inner bark is that portion of the tree (phloem) where sugars and other materials made in the leaves are transported to other parts of the tree for use in growth and respiration. Removal of the inner bark (girdling) interrupts this flow and kills the tree by "starving" the roots.

2. It is common to make a small test cut in the bark to determine if the bark is suitable for a particular use. One way of doing this is to make a right angle incision into the outer bark at a place on the tree that will not affect the larger piece of bark. Each side of the test flap should be long enough that the flap can be peeled back far enough to check for the qualities of the outer bark (flexibility, thickness, and tendency to separate into layers.)

Harvested birch bark.
(photo courtesy of Cloquet Forestry Center)

3. Remove the outer bark only when it comes off easily; this is usually in the first part of the growing season. At this time of the year, the bark literally "jumps off" the tree when the vertical incision is made.
4. When the outer bark peels readily, all that is required is a vertical incision through the outer bark, which is usually less than .25 inch thick. Bark incisions horizontal to the stem of the tree are not necessary if the bark is removed at the correct time of the year. It is sometimes recommended that the incision be made at an angle less than 90 degrees to the tree.

The Silviculture of Birch

There is no question that birch in pure or mixed species stands can be managed for multiple products. To my knowledge, the integrated management of birch for wood, bark, and sap has received little or no attention from foresters. In the short-term, wood production will drive silviculture and management of forests in which birch is a component. Under this scenario, it is possible to try to utilize the high value bark resource by identifying the stands to be harvested a year or more in advance and allowing birch bark to be gathered prior to felling of the stands.

In the long term, it is possible to conceive silvicultural systems that would actively manage for multiple values through the life of the stand. One important issue that needs to be addressed is the value of the bark and sap products. At present, there is no return to the landowner or management agency for the bark and sap collected from a stand. These are valuable products and people who use these raw materials for value-added forest products should expect to pay for them. In turn, these users should expect that these raw materials would receive proper consideration when silvicultural prescriptions and management plans are developed.

In the accompanying **diagram,** it is obvious there will likely be effects on the quality of wood products when removing bark or harvesting sap from living trees. These effects need to be understood and silvicultural and management systems designed to take them into account.

Birch has been referred to by some as the "giving tree." To me, it is quite obvious that birch has more values than those generally recognized. Land managers need to be more aware of these values and

make sure they are considered in developing silvicultural prescriptions and management plans for birch in the northern forests.

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