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Paper Birch Update: Ecology, Management and Economic Development

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The birch in northern Idaho and other adjacent Inland Empire forests is on the fringe of the major population in boreal Canada extending northward into Alaska. Consequently, we seem to have greater incidence and severity of some major birch problems, including the bronze birch borer and its associated stem decays. However, I believe this situation is primarily driven by the excessive competition from over-dense, unmanaged birch and/or from shade-tolerant conifers succeeding and competing with birch. Birch is a shade intolerant, early successional species that depends on fire or other disturbance for reproduction on the good sites where it grows. In our region, birch usually self-thins by age 20 or 30 (on drier, boreal sites it does not do this) and then shade-tolerant fir, cedar, and hemlock reproduce underneath and gradually replace the birch. With nearly 100 years of fire suppression and more recent commercial discrimination and losses to pathogens the composition of birch has been drastically reduced in the Inland Empire.

In many areas of the west, nutrient-deficient soils have caused long-term, dramatic conifer health problems on what appear to be excellent growing sites. Several of these areas have paper birch not only thriving under these conditions, but reproducing underneath the conifers whose thin crowns had induced little competition for light and other competitive factors. The conifers closest to birch trees also seemed to have better color and growth than the general conifer population, especially the Douglas-fir.

This observation was shored up by a Canadian researcher/silviculturist that published her dissertation in the journal *Nature* (August 1997). She confirmed and described actual carbon transfer between paper birch and Douglas-fir and measured this transfer to show that the more Douglas-fir is stressed, the more it is supported by carbon (sugar) transfer from birch! She showed me her current work where mixed conifer/birch plantations are thriving under what would normally be overdense, growth-reducing competitive conditions. While the birch component is unlikely to mature unless the trees are vigorously thinned, they seem to provide a growth boost, help manage undesirable weed competition, and increase biological diversity and wildlife habitat during early plantation development. Her work, and that of other researchers, has also shown that birch has an "antibiotic" effect on conifer root-rot pathogens in laboratory studies, and may cause an observed decrease in the symptoms and incidence of Douglas-fir root rot in infested field situations where birch was growing in close proximity.

In Canada, I also met with genetic scientists that are in the early stages of a birch performance study to determine the best birch seed sources for several regions. They will follow-up with breeding experiments to improve form, growth, and other characteristics. They are simultaneously conducting nursery and planting experiments to obtain better information for producing and planting birch seedlings. They also have some impressive plantings of fast-growing silver birch from Finland and some Finnish selections of "wavy birch" that produce a highly-figured wood.

To further examine birch utilization opportunities, I met with large, industrial manufacturers, cottage crafters, and mid-sized producers of diverse birch wood products. Primary manufacturing included boards, beams, chips, veneer, and export cants. Secondary products included furniture grade plywood, finger-

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jointed furniture panels, OSB (oriented strand board or waferwood), bowls, solid-wood furniture, flooring, paneling, drums, table/chair legs, stairway spindles and other turnings. Waste management was a problem for some producers, but others either used or sold residues to make various eating utensils (salad tongs, chopsticks, spoons, etc.), flower planters, or mechanized firewood production. In Alaska, birch syrup is produced in commercial quantities, although it takes twice the sap to make syrup compared to maple trees. In the U.S. and Canada, birch extract is used in beverages (birch "root" beer), and in Russia, a straight birch sap beverage is produced that may have commercial potential here.

Several years ago, a substance found in paper birch bark was reported to shrink deadly human melanoma skin cancer tumors placed in mice. Additional current studies will determine if this curative compound will be effective in humans. Researchers caution against home concoctions or expectations beyond "cautious optimism" at this time.

Hardwood manufacture is generally much more labor-intensive than conifer-based enterprises, but I was really impressed with the jobs/unit of raw material of two enterprises. A bowl manufacturer in Alaska was employing 15 people, but using less than 200MBF (thousand board feet) per year of larger (>12" diameter) birch logs. Two partners in a remote British Columbian village started another small enterprise. They use about 5 log-truck loads (approximately 5MBF/load) annually of birch logs normally sold as firewood for about $800-$1100. They are making birch drum bodies that, when finished by two other local partners are marketed and sold internationally through the Internet. An average $1,000 load of firewood makes about $60,000 gross value in finished drums, and then about $300 worth of residue is sold as firewood. Five loads/year are supporting four families plus spinoffs in an economically depressed community.

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