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**Growing Aspen Fiber in Michigan:
*A rationale for producing this material in short rotation,
intensively cultured plantations on abandoned agricul-
tural land in Michigan's Upper Peninsula.***

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[The following constitutes the introduction to a proposal for research that is currently under way at Michigan State University's Upper Peninsula Tree Improvement Center in Escanaba, Michigan. It has been extracted and published here because of the requests for this information that have arisen in the last few months.]

Quaking and bigtooth aspen (*Populus tremuloides* and *P. grandidentata*) form the second largest forest type in Michigan¹. Wood harvested from these forests is worth 68 million dollars annually and ranks as the eighth most valuable agricultural crop in the state². Aspen pulpwood is worth at least twice as much as any non-apple fruit crop to Michigan's economy³. In the Upper Peninsula, annual aspen pulpwood sales total 33.6 million dollars which exceeds the value of all agricultural crops there⁴.

Some Michigan aspen is used for sawn products (about 8 million dollars per year⁵), but most is used as fiber in the manufacture of paper and oriented-strand-board. Consumption of aspen fiber has nearly tripled in the last twenty years, as a result of mill expansions and new mill construction, and stabilized at about one million cords annually⁶.

Thirty-six percent of Michigan's aspen forests have been lost in the last three decades, declining from 4.2 million acres in 1966⁷ to 2.7 million acres today⁸. A parallel loss occurred in the Upper Peninsula during that time where acreage declined from 1.8 million to 1.1 million. Of the remaining aspen stands in Michigan, only 28% are harvestable today. The rest are either too old and senescent or are too young and immature⁹. This limited supply has combined with the high demand for aspen pulpwood and is producing price increases at the mills that depend on this species.

Aspen stands senesce when they exceed approximately 60 to 70 years old, depending on site quality. About 25% of Michigan's aspen stands are in this condition. Old aspen trees begin to decay while associated species like red maple, ash, white birch, and balsam fir capture the site. These converted stands are no longer productive for aspen and produce different wildlife habitat conditions. Without disturbance, these areas will not produce aspen again, nor will they provide habitat for wildlife like the ruffed grouse¹⁰.

Aspen is regenerating well in disturbed (usually clearcut) stands. In fact, almost 50% of all the aspen stands in Michigan are less than 30 years old; most of these being less than 10 years old¹¹. It is encouraging to know that aspen is regenerating well when it is managed but because these stands are young, they will not contribute to the supply of fiber for decades to come.

Companies that use aspen fiber are looking for ways to reduce the price of this raw material now and to ensure a continuous supply for the future. Neither recovering senescent aspen stands nor continued management of existing aspen

stands will achieve these results in the near term. It may be possible, however, to grow hybrid poplars or aspens using short rotation intensive culture techniques to fill supply gaps and ease prices of native aspens over the next few decades.

The limited experience we have with short rotation intensive culture systems in Upper Michigan teaches us that this type of forestry should only be practiced on the best sites. Attempts to cut corners have always produced poor results. As fate would have it, demand for aspen fiber has been increasing and supply has been decreasing at the same time that Michigan farmers have been abandoning fertile land at frantic rates. Michigan has lost 41% of its farmland (7.3 million acres) during the second half of this century. About half of the farmland in the Upper Peninsula (500,000 acres) has been abandoned during that time¹². What we have now is an industry in search of a commodity and a land base waiting to produce it!

The only ingredient missing is an understanding of the best cultural systems and seed sources to use on this land for producing fiber on short rotations. Past experience in Michigan and current research elsewhere in the Lake States can provide some guidance, but trials need to be conducted locally to refine these techniques. Silvicultural systems for producing hybrid poplars have been under development since the 1940s but most of the trials in the U.P. have not met expectations. Three problems are central to improving the success of these plantings:

- (1) Clones that have shown promise elsewhere in the U.S. must be tested in this region where growing seasons are short and winters are severe.
- (2) Post-planting weed control methods must be made more efficient.
- (3) Soil nutrient management must be better understood in order to optimize growth.

[The proposal from which this text was extracted goes on to outline a project that begins to address these issues]

¹ According to the 1993 forest inventory of Michigan, the aspen forest type ranks second in area, number of trees, and net standing volume (after the maple-birch-beech forest type). Tables 8, 10, and 17 respectively, Leatherberry, E.C. and J.S. Spencer Jr. 1996. Michigan forest statistics, 1993. USDA For. Serv. N.C. Exp. Sta. Resour. Bull. NC-170. 144pp.

² This figure derives from using Upper Peninsula average pulpwood prices for aspen, based on personal interviews with three mills (\$60 per cord delivered to the mill) and expanding that based on the number of

cords of aspen harvested in the state in 1995 (1 million). Table 9, Piva, R.J. 1996. Pulpwood production in the North-Central Region, 1995. USDA For. Serv. N.C. Exp. Sta. Resour. Bull. NC-180. 39pp.

³ Based on statistics assembled, compiled, and published by the M.D.A. Michigan Agricultural Statistics Service, Lansing, MI. Apples produce 103 million dollars annually. Blueberries and cherries are next at about 30 million dollars annually each. Other fruit crops are worth much less. Corn, beans, soybeans, sugarbeets, wheat, potatoes, and hay all surpass aspen as commodity crops statewide.

⁴ Based on both sources listed in #2 and #3 above. Milk production in the Upper Peninsula is valued at 33.1 million dollars annually.

⁵ Based on statewide average aspen sawtimber prices for 1996 compiled by the M.D.N.R.'s statistician (Nemah Hussain) and Table 49. Leatherberry, E.C. and J.S. Spencer Jr. 1996. Michigan forest statistics, 1993. USDA For. Serv. N.C. Exp. Sta. Resour. Bull. NC-170. 144pp.

⁶ Based on information presented with Table 8. May, D.M. and J. Pilon. 1995. Michigan timber industry – an assessment of timber product output and use, 1992. USDA For. Serv. N.C. Exp. Sta. Resour. Bull. NC-162. 64pp.

⁷ Table 17. Chase, C.D., R.E. Pfeifer, and J.S. Spencer. 1970. The growing timber resource of Michigan, 1966. USDA For. Serv. N.C. Exp. Sta. Resour. Bull. NC-9. 62pp.

⁸ Table 8. Leatherberry, E.C. and J.S. Spencer Jr. 1996. Michigan forest statistics, 1993. USDA For. Serv. N.C. Exp. Sta. Resour. Bull. NC-170. 144pp.

⁹ Assembled from 1993 forest inventory age class data available through the USDA For. Serv. N.C. Exp. Sta. On CDROM disk entitled "Forest Inventory Tablemaker Ver. 1.0.

¹⁰ Perala, D.A. 1977. Manager's handbook for aspen in the North Central States. USDA For. Serv. N.C. Exp. Sta. General Technical Report NC-36. 30pp.

¹¹ Same source as #9 above.

¹² Derived from the 1964 and 1992 Census of Agriculture, as in Volume 1: Geographic Area Studies, Part 22 Michigan State and County Data. Available through the Michigan Department of Agriculture, Michigan Agricultural Statistics Service, P.O. Box 20008, Lansing, MI 48901.