AN INDUSTRIAL FORESTER'S PERSPECTIVE OF VARIOUS
ISSUES AND IMPLICATIONS SURROUNDING THE SELECTION OF A
TIMBER MANAGEMENT SYSTEM 1/

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Abstract.—Environmental activists are determined to regulate forest practices on all U.S. forest lands. The wood products industry is working on resolving environmental issues to public satisfaction. Wood availability and price determine if the industry will maintain a competitive position in the global market. There are already more efficient fiber producers in the world than in the South. Even-aged management is the most productive method in the southern forest. The growth/drain situation will worsen in the South and prices will rise if more intensive even-aged management is not done on larger acreages. An expanded research program is needed, but funding shortages hamper this need. This research is even more critical now in order to understand how intensive management affects other forest values. Hopefully, such research will show that the forest can supply industrial wood needs while also maintaining non-commodity values. The not-for-profit organizations could best serve the nation by supporting such research.

HISTORICAL PERSPECTIVE

Divergent opinions over forest management systems are not a 1990 phenomenon. Concerns over clearcutting have existed since scientific forestry began in Germany 200 years ago. Likewise, the current controversies over clearcutting systems are not new to the United States or the South. Numerous attempts have been made in this country since the early 1900's up to and including the present to have public regulation of forest practices. In 1939, the then current Chief of the Forest Service, Ferdinand A. Silcox, supported federal legislation that would have outlawed clearcutting on private land as well as in national forests. Fortunately, this legislation did not pass. Lack of adequate regeneration on clearcut sites was, of course, his primary concern.

PRESENT SITUATIONS

Recently, Texas preservationists succeeded in greatly altering the clearcutting practices in Texas National Forests using the guise of protecting the red-cockaded woodpecker. The Forest Service is prohibited from clearcutting timber within three-quarters of a mile of a red-cockaded woodpecker colony. It is worth noting that the National Forests in Texas have pine rotations of 70 to 80 years, and clearcuts are held to a maximum of 80 acres (Miles, 1989). This restricted cutting policy is now in effect on 14 National Forests in the South. An industry lawsuit has been filed over this policy.

Either the courts or Congress has so far blocked anything this restrictive of forest management on private land. The issue is still very much alive, however, as Congressman John Bryant of Texas introduced House Bill 2406 entitled, The Clearcutting Restraint Act of 1989. This bill will probably die in committee. This January, however, the Environmental Defense Fund and the Southern Environmental Law Center notified the Weyerhaeuser Company of their intent to file suit against the company, EPA, and the Corps of Engineers under section 404 of the Clean Water Act for intensive pine management on poorly drained pocosin sites in Coastal North Carolina. The


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environmental coalition objects that the conversion of these wetlands to pine plantations is not a "normal" practice and, therefore, should require a permit. A January 21 editorial in the Raleigh, North Carolina, News and Observer is typical of the pro-environmental media. "Federal officials should see to it that Weyerhauser's practices are not hereafter labeled 'normal' and that in altering wetlands, the company must first obtain a permit. What's more, obtaining one of these permits ought to be a tall order."

Also, in January of this year, two initiatives were put forth in California. On January 12, the Forest Forever initiative was filed. The industry consensus is that, if passed, this initiative would render the majority of the commercial forest lands in California unavailable for long term timber management. The forest products industry in California introduced an alternative on January 16. The industry initiative covers clearcutting, buffer zones, log exports, reforestation, wildlife, recreation, and the relationship between timber management and many of the issues concerning the environmental groups.

THE ENVIRONMENTALISTS' AGENDA

The issue goes far beyond a silvicultural system. The environmental activists have targeted the wood-using industries. Environmental issues are regularly in the forefront for all the wood-using industries not only in the South, but nationwide and worldwide. Forest management practices are now intimately intertwined with all the hot environmental issues of the day. Increasingly, these controversial issues extend far beyond clearcutting. In no order of priority, one can list air quality, forest decline, wetlands, water quality, cumulative effects, best management practices, global warming, bio-diversity, old growth, threatened and endangered species and recycling. Some of these issues have a real relationship to timber management practices, some are bogus and some act as surrogates of other issues. The concern of the industry is that environmentalists are using these issues to sway public and political opinion against harvesting in general, and the use of fire, herbicides, insecticides and any form of intensive management. The opinion of one chief executive officer of a forest products company is that the environmental imperative is now ahead of the economic imperative.

All of these issues concern industrial forestry because they threaten the stability and quantity of the timber supply. Ideally, wood supply questions would revolve around acres by timber type and the ability of those acres to supply wood at a competitive price. This is no longer the case in the current environmentally sensitive arena in which the wood-using industries now operate. Timber inventories per se are probably less important than politically driven environmental coalitions that seek to regulate how and where timber is grown and harvested.

Ron Arnold's book, Ecology Wars, explores this in great detail. He states "The truth about resource management is this: it is no longer simply a technical and economic pursuit. Today it is social and political as well, replete with institutionalized citizen activism, an entrenched environmental bureaucracy, and a coterie of lobbyists who would like to see industry hobbled, if not butchered." Value judgements have entered the picture in an important way. Technology and economics seem increasingly irrelevant to advocates. George Hall is referred to in Arnold's book as saying, "Indeed, at times, the argument seems to be that only aesthetic and moral considerations are relevant."

Quotes from, The Forest and the Trees: a Guide to Excellent Forestry, by Gordon Robinson, are relevant. Robinson, a spokesman for the Sierra Club for many years states that "his book is written from the point of view of a forester who loves the forest and would prefer to see no trees cut." He was encouraged to write the book by friends who were members of an environmental group called CATS (Citizens Against Toxic Sprays). "In their fight against chemical forestry, they had come to the conclusion that they were attacking the wrong thing. They had decided to fight the methods of forest management that require toxic sprays rather than the use of the sprays themselves, and they were convinced that the practice of multiple use forestry (uneven-aged management) would eliminate the need for poisons." Robinson, in another section states that "the forester, on the other hand, if he loves the forest and has not confused his role with that of the businessman, will resist the temptation to maximize income and will be concerned with a wide range of environmental factors." In another section, he states that "Readers will find this section useful for building solid cases in opposition to tree farming."

The executive director of the national Earth Day organization was quoted as follows in the March 20 Wall Street Journal: "We're really looking to make an opportunity for those companies that have a good story to tell. There aren't an enormous number of companies in that position. Planting nearly a million and a half acres of trees per year apparently does not qualify timber companies as her organization will not accept Earth Day sponsorship from chemical, oil, or timber companies.

ENVIRONMENTAL ISSUES CURRENTLY BEING ADDRESSED

It is widely recognized that the public concern over environmental issues is the greatest single challenge facing the industry today. Karl (1990) listed air and water emissions, recycling and forest management as the most serious environmental issues facing the pulp and paper industry today. "The days when the industry
operated free of public scrutiny are over. The industry needs to be more assertive in explaining its operations and its products and the impact of both on the environment." John Georges, Chairman of International Paper Company, in the February Financial World, estimated that the industry will spend 2 billion dollars cleaning up the two ounces of dioxin put out in pulp mill effluents. This two ounces is estimated to be 1 percent of what is in the environment.

The industry has made a public commitment to recycle more fiber to respond to the public concern that paper products are the largest single component in municipal landfills. Use of waste paper as a fiber source is projected by the American Paper Institute to increase at 6.2 percent yearly for the next three years, which is a growth rate twice as fast as that projected for virgin fiber.

THE ROLE OF WOOD IN THE GLOBAL ENVIRONMENTAL PICTURE

Wood has a strategic role in the global environmental picture. There are worldwide environmental consequences of a lower wood supply. If wood is expensive relative to alternatives, then consumers will most likely choose the substitute irrespective of the greater impacts on the environment and greater energy consumption that results from using these non-renewable resources. THE OVERALL GOAL SHOULD BE TO MANAGE OUR FORESTS TO MEET WORLD FIBER DEMANDS WHILE DOING THE MOST OVERALL GLOBAL ENVIRONMENTAL GOOD. Reduced output from the forests of the United States could result in fiber demand being met from developing countries with minimal resources to achieve adequate reforestation.

THE OPPORTUNITY COST OF ENVIRONMENTALISM

George Will commented in a March 10th editorial on clean-air legislation. "The cost to industry would be about 21 billion dollars. That may be, as some say, a bargain, purchasing health-care savings and preventing much lost productivity as a result of pollution-related illness and premature death. One thing is certain. The $21 billion spent for cleaner air cannot be spent on other things. Environmentalism is a worthy concern. But it is one among many." This comment is certainly pertinent to the even vs. all-aged issue. A productive forest from all-aged management systems will not just happen without significant inputs of dollars and manpower. Harms et al. (1990) discuss these issues as potential challenges of uneven-aged systems. My concern as an industrial forester is that these inputs will be at the expense of the even-aged systems with a resultant decrease in overall wood availability. This is an expensive price to pay since the main objections to even-aged management center (for the most part) around aesthetic considerations rather than environmental protection.

Alarming trends of lower allowable cuts are already evident as the national forests de-emphasize timber production in order to satisfy non-commodity needs. The industry now notices that this also extends to the Forest Service research plans in the South which increasingly are devoted to such items as acid rain and global climate change. "Like all organizations, we have finite resources in budget, personnel, equipment and facilities. Therefore, efforts in some current program areas will have to be reduced or terminated to compensate for the areas of increased emphasis." (Jerry Sesco, Deputy Chief for Research)

Forest inventory, a program vital to the industry and also critical to providing answers of interest to pro-environmental groups, is being reduced to compensate for the new emphasis. Non-commodity research is important. However, it should not be funded at the expense of the timber management programs. Environmental activists need to redirect their energies away from even-aged management and concentrate on obtaining the additional funding needed for the development of the technical know-how to support both even- and uneven-aged silvicultural systems and non-commodity uses of the forest. When such research is done, I'm sure we will find that all the needs can be met without reducing timber output and also with a concern for the environment.

GLOBAL COMPETITIVENESS

The pulp and paper business is becoming increasingly global while at the same time world demand for paper industry products could double by the turn of the century. Survival in this world market will demand a highly competitive industry where wood costs and wood availability play a major role. North American producers are set apart from world competition by wood costs (Poyry 1989). Jaakko Poyry stated that this preeminent position is in danger because of a diminishing supply of softwood pulp due in part to neglected silviculture in the "U.S. woodbasket" of the southern United States.

The United States ranks poorly in terms of labor and energy costs to produce a ton of pulp. Our labor costs are 3.5 times higher than in Brazil, while our energy costs are twice those of Canada. Brazil ranks lowest in labor costs while Canada has the lowest energy cost.

GROWTH/DRAIN SITUATION FOR THE SOUTH

The softwood timber supply in the South will not keep pace with demand if significant effort is not put into timber management. Any shortages would indicate a trend toward rising prices and thus some substitution of non-renewable resources for wood products which, in turn, would lead to more air and water pollution. These resource availability trends clearly indicate that a favorable growth-to-drain timber supply depends on
significant acreages devoted to intensively managed even-aged plantations.

Hardwood availability could be a problem if environmental regulations excessively restrict logging. Hardwood is attractive to the industry because of price. Fiber qualities are also important, but technological changes could allow quality standards to be met with less usage if price is not competitive.

THE IMPORTANCE AND VULNERABILITY OF THE FOREST PRODUCTS INDUSTRY IN THE SOUTH

There are 182 million acres of commercial forest land in the South. The non-industrial private forest landowner (NIPF) owns 122 million acres, the forest industry 42 million and the public 18 million. The 67 percent owned by the NIPF owners is currently the least productive. In 1984, 5 billion cubic feet of softwood and 2.5 billion cubic feet of hardwood roundwood valued at 3.1 billion dollars were cut from these acres. This timber harvested in 1984 ranked among the top three agricultural crops in terms of value production in all 12 southern states. The predominant land use is as timberland -- timberland is the source of the highest valued agricultural crop and also the base for the leading manufacturing industry in terms of persons employed and income generated. Forests, forestry, and the wood-using industries are big business in the South.

If the timber industry and the citizens of the South are to continue to prosper, timber management must be more intensive than currently practiced. In proposing alternatives, the Forest Service projected that by 2030 the area in pine plantations must double and large areas of mixed pine-hardwoods and upland hardwood must be converted to pine plantations. This depends, to a large part, on the NIPF owner using even-aged management. The Forest Service estimated (Forest Service Resource Report No. 24, 1988) that financial returns of 4 percent or more could be earned on 70 million acres of southern forest land by more intensive management. Fifty million of those 70 million acres are owned by the NIPF owner. The most productive treatment on the majority of these acres is even-aged management. Another alternative is planting pine on 7.7 million acres of highly erodible crop land which would increase softwood growth by 37 percent.

Without some additional incentives, including the return of favorable tax treatment of timber management, NIPF owners could well practice less productive forestry in the future; especially if they are convinced by environmental propaganda that intensive forestry is bad for the environment. Failure to use the even-aged systems which have a proven track record on millions of acres across the South will surely result in a reduction in overall yield and a worsening of the growth/drain situation.

EMPIRICAL YIELDS

Appendix Tables 3.15 through 3.20 of the Forest Service's Forest Resource Report No. 24 provide empirical yields for pine and hardwood. Data presented here (Table 1) are yields at age 25 for trees growing on medium sites. Even-aged pine plantations growing on industrial or public land are nearly twice as productive as natural pine, mixed pine-hardwood, or hardwood. The latter types can probably be assumed to include a varying mixture of even- and uneven-aged conditions under varying degrees of management and, I believe, will mimic the practical potential of "environmental forest management."

Table 1.--Age 25 empirical yield for medium sites

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<thead>
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<th>Ownership and/or forest management type</th>
<th>cubic feet/acre/year</th>
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<tbody>
<tr>
<td>Industry or public pine plantations</td>
<td>100</td>
</tr>
<tr>
<td>NIPF pine plantations</td>
<td>64</td>
</tr>
<tr>
<td>Natural pine</td>
<td>53</td>
</tr>
<tr>
<td>Mixed pine-hardwood</td>
<td>49</td>
</tr>
<tr>
<td>Upland hardwood</td>
<td>43</td>
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<tr>
<td>Bottomland hardwood</td>
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Yields considerably above these can be obtained by intensive plantation management. Likewise, the data presented by Cudlin and Baker (1988) and Hotvedt et al. (1989) indicate that intensively managed uneven-aged pine systems can produce yields greater than those assumed from this table. However, on average, for a given level of input, it would appear that the 100 percent greater wood output from the pine plantations as opposed to the other alternatives of uneven-aged pure pine or hardwood, or uneven-aged pine-hardwood mixtures, is realistic.

Of particular note is that the NIPF pine plantations are producing at 64 percent of the industry and public plantations. This is, no doubt, due to less technical expertise and dollars being devoted to management. The success of uneven-aged systems depends to a large degree on a high level of technical expertise, periodic tending of the forest, and long tenure. These items are frequently lacking for the majority of NIPF owners. A more logical alternative is an even-aged system applied on only portions of the property if a clearcut does not meet the owner's non-commodity objectives. Planting or natural regeneration can be used.

THE ROLE OF GENETICS AND TREE IMPROVEMENT

Genetics and tree improvement programs have added significantly to the productivity potential of the southern pine forest. Superior trees have been successfully bred with improved growth rates, straighter boles, smaller and more efficient crowns and with greater resistance to disease and insects. Gains in stand value from one generation
of loblolly pine improvement are estimated to be as high as 32 percent when planting stock is derived from fully rogued seed orchards (Talbert et al. 1983). The prospects of even greater gains are before us by using clonal plantings of rust resistant loblolly or molecularly engineered trees produced from tissue culture or single cell cultures. Clearcutting followed by planting is the best way to maximize these gains.

THE IMPACT OF INTENSIVE CULTURE ON PINE PLANTATION YIELDS

Intensive site preparation, control of competing vegetation and fertilizers -- alone or in combinations -- have had significant impacts on the productivity of southern pines on a range of site conditions throughout the South when used with even-aged management regimes. Volume produced at the end of five growing seasons for a treatment composed of shearing, root-raking, burning, disking, fertilizing and application of a herbicide for vegetation control was five times greater than a clearcut-only treatment (Edwards 1990). Whole tree chipping of fuelwood eliminates the costly process of shearing and raking. Swindel et al. (1988) found that either fertilization or competition control alone can quintuple stand volume at four years of age. These effects are additive for, when combined, these cultural practices increased stand volume at four years by at least ten-fold.

With even-aged management these techniques can be used to either shorten the rotation length or, if the rotation length is held constant, to increase volume production. Application of some of these techniques to uneven-aged management regimes is possible, but arriving at an economically optimum prescription could be especially difficult.

A ROLE FOR MANAGEMENT SYSTEMS OTHER THAN INTENSIVELY MANAGED PINE PLANTATIONS

Non-Industrial

Poor cutting practices that have left undesirable growing stock rather than complete clearcutting is the reason many NIPF acres now produce little income for the owner. A reasonable assumption is that important considerations for the NIPF owner are low capital costs, some income from the forest on a periodic basis, low annual maintenance, and a degree of forest cover that would support wildlife and recreational use. If this is so, these objectives can easily be met by practicing even-aged management using natural regeneration. Small clearcuts, seed-trees, or shelterwood cuttings can be used. Once established, periodic thinnings can generate income.

Encouraging long term uneven-aged selection management with NIPF owners who typically have short tenure holds little hope of success in my opinion. Providing technical expertise over extended periods in order to assure a distribution of age classes would be an absolute necessity to make the uneven-aged system work. Reaching 3 million plus NIPF owners would be no small problem, especially the 92 percent that own less than 100 acres. I see numerous opportunities for stands to be high graded with this being passed off as individual tree selection.

Industrial

Within the industrial forest, there are acres that do not economically justify intensive site preparation and planting. There are also environmentally sensitive areas where less intensive forms of management are necessary. It is increasingly important that industrial foresters do a better job of identifying these acres not suited to intensive even-aged management and of prescribing the proper less intensive silvicultural treatments. The stands that result from these treatments could be pure pine, pure hardwood, or pine-hardwood mixtures -- and they could be composed of more than one age class. In the case of Mead's Georgia and Alabama timberlands, there are several cases that come to mind -- areas identified as streamside management zones and other Best Management Practice areas. Also, there are sites too rough to economically harvest, site prepare and plant.

The majority of our lands are used intensively for hunting. We intend to manage the above mentioned areas in a manner that will enhance our game management program and non-commodity values.

THE PARADIGM HAS CHANGED

Joel A. Barker describes himself as a futurist. In his educational tape entitled "Discovering the Future" he describes how we fail to recognize and accept new ideas because of the paradigm effect. Most importantly, when a paradigm changes, everyone is set back to zero, and the competitive nature of whole industries changes. The excellent example he gives is the failure of the Swiss watch industry to recognize and accept the importance of the quartz crystal even though it was invented in their laboratories. As a consequence, the Swiss no longer dominate the watch industry. Could it happen here? Maybe it already has in the case of the steel industry and the auto industry. A Wall Street Journal headline on February 16 caught my attention -- "Losing Control: Auto Industry in U.S. Is Sliding Relentlessly Into Japanese Hands." There's no question that there will be a U.S. automobile industry. It's just that the owners will be different.

Could the Japanese become a significant competitor in the wood products industry? Maybe. Although significantly behind the U.S. and Canada in pulp production, they rank third in the world. Of the world's top 20 pulp and paper companies, four are Japanese.
What about Latin America? Latin America has reached a stage of virtual self sufficiency in paper and board and is now developing an export oriented industry (Filesi, 1990). Ten years ago, paper exports were nominal; now they are 1.5 million tons per year. Pulp exports were nearly 1.7 million tons in 1988. Brazil is the leader in this effort.

The Aracruz operation may well be the forest products industries' quartz crystal. In 1967, the first Eucalyptus plantations were established. Since 1979, they have been using clonal even-aged forestry by planting rooting cuttings. This cloning method has produced an extremely productive forest with uniform wood characteristics. Trees grow to a harvest height of 115 feet in seven years. The most recent plantations show mean annual increments of 10 cords/acre/year which is double the rate of ten years ago. The genetic improvement of Eucalyptus by Aracruz has also contributed to a more environmentally acceptable process since tree breeding has reduced chlorine use. Pulpwod currently used has less lignin and extractives, making it easier to pulp and bleach to a high degree of brightness.

Production will increase from the current 530 thousand tons of pulp to a million one-hundred thousand tons by 1991. The fiber supply for the current mill is produced on less than 200,000 acres. An additional 50,000 acres of native forest surrounding the Eucalyptus plantation is managed for the preservation of the native forest. Because of the lower productivity of our U.S. forests, a typical U.S. mill currently requires a land base 5 to 10 times larger than that used by Aracruz.

One of the cheapest sources of high quality virgin hardwood pulp comes from the Aracruz mill. Their Eucalyptus pulp is 10 to 15 percent cheaper than the cheapest U.S. pulp produced in the South, 40 percent cheaper than pulp from Portugal and Canada and 60 percent cheaper than the Scandinavia's cheapest pulp. The Aracruz pulp is a premium pulp that provides an excellent surface for writing and printing paper.

Aracruz is following a forest through the mill strategy. They are dedicated to having the most competitive and cost-effective system attainable. We can do nothing less if we are to maintain our competitive position. To me this means even-aged industrial forests planted with genetically improved trees and cultured intensively.

LITERATURE CITED


Will, George. 1990. ‘Life is priceless?’ - The argument’s worthless. Columbus Ledger Enquirer; March 10.