

## IMPROVING PRODUCTIVITY ON STATE FOREST LANDS

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**ABSTRACT.**—The Minnesota Department of Natural Resources through its Division of Forestry manages more than 3.8 million acres of state-owned forest lands. The Division is committed to improving the productivity of these lands while adhering to the principals of sustainable forest management. The long-term management of these lands is guided by tactical plans developed at the local administrative areas, best management practices, recommendations of a generic environmental impact statement, and various laws. During the coming years the Division will continue to improve the productivity of state forest lands through the application of new technology and proven silvicultural systems that yield increased total volumes of wood fiber per acre over the life of a rotation. Tools and methods to be used include the application of an Ecological Classification System, intermediate harvests and thinnings, reintroduction of white pine on selected sites, and application of tree improvement techniques. Utilization of new harvesting technology and conventional systems that minimize negative impacts to future site productivity will also be emphasized. A number of challenges to improving forest productivity will have to be addressed.

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The Minnesota Department of Natural Resources - Division of Forestry (MNDNR-Forestry) has been working for the past five to ten years on initiatives to promote the sustainability of all forest communities. This effort has been in response to the mitigation strategies outlined in the 1994 document titled, *Generic Environmental Impact Statement on Timber Harvesting and Forest Management in Minnesota* (GEIS). The one mitigation strategy not investigated to this point is *improving productivity*. I am pleased to see that this conference is focusing on the fiber production part of the sustainability equation. This morning I will discuss with you what I believe are a number of important actions that should be taken to improve productivity on state-administered forest lands and what some of the challenges might be when implementing productivity strategies. I will do this by reviewing the resource picture of the state, describing activities from the recent past as well as current initiatives, and outlining what needs to be done in the future.

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<sup>2</sup>*Forest land capable of producing 20 cu.ft./acre/year of industrial wood crops under natural conditions, . . . .*

### MINNESOTA'S FOREST RESOURCES

Minnesota has 16.7 million acres of forested land of which the state owns and manages about 23 percent. Of that amount, the Division manages more than 2.74 million acres of productive timber land.<sup>2</sup> As shown on a map of forest cover types of the state, most of the forest land is in the northern and eastern portions of the state, with the west and southwest composed mainly of agricultural lands. As we examine a graphical representation of timberland acres by stand age class summarized from the Division's Continuous Stand Assessment (CSA) inventory, we see that the combination of all forest cover types ranges in age from the 1–10 year age class through 121 years plus. We can also see that an age imbalance is occurring with a reduction of acres in the 31–50 year age classes, a peak in the 51–71 age classes, followed by a steady decline through the 81–100 year classes. If we were to look just at aspen or other single species, we would find similar imbalances but with greater differences between the age classes. An increase in the productivity of the younger age classes up through age 50 would be beneficial in smoothing out the volume flow at rotation age for the various timber types.

By looking at this same data set using acres by site index class, we see a peak in acres of timberland in the 51–70 site index classes with a fair amount also in the 71–80 site index class. Timber types found on upland sites predominate in these site classes with the wetland conifers dominating the lower 30–40 site classes. We

can see from this data that there is a considerable proportion of the upland timber types that could respond from activities that improve fiber productivity.

### **WHY CONSIDER PRODUCTIVITY IN THE SUSTAINABILITY PICTURE?**

During the past several years the focus of the Division's management initiatives has been to identify and manage for a variety of nonfiber outputs and amenities including visually sensitive areas, old growth, wilderness areas, Scientific and Natural Areas, and areas to be managed for extended rotation management to name a few. All these initiatives have been part of implementing the new paradigm of sustainability and ecosystem management. At the same time, a continuously growing population is increasing the demand for everyday products such as paper, packaging, construction materials, and a variety of wood products to furnish or remodel homes. The time has come to add to the sustainability formula and insert the productivity component. By focusing on improving productivity of manageable lands, we should be able to meet society's needs for fiber and nonfiber amenities.

It is important to add the productivity component for another reason. True sustainability is possible only when there is a successful combining of strong economies fueled by healthy companies producing goods for society, while at the same time managing and caring for the resource in a manner that will insure that future generations will benefit from forest outputs and amenities. A vibrant economy ensures that programs maintaining the quality environment we strive for are affordable. It also ensures that the communities (the people) needed to support environmental quality and economic opportunity efforts remain viable. Improved productivity of the forest resource will complete this triad and help carry forward the goal of long-term sustainability. Minnesota's forest products industry is the third largest manufacturing industry (based upon employment) in the state. The livelihood of 61,000 employees is dependent on this industry that pays annual wages in excess of \$2 billion. The Division and society are, therefore, well positioned to reap the benefits of a forest management program that includes improved productivity.

### **CURRENT ACTIVITIES TO IMPROVE PRODUCTIVITY**

At the present time the Division is taking advantage of and implementing the findings of a variety of research efforts and other management tool developments. The results of research efforts in everything from stand density management to harvesting sensitive sites are

being evaluated and incorporated into everyday management. Many of the topics in the technical presentations and poster displays at this conference address activities and systems the Division is currently involved in at some level. Implementation of an Ecological Classification System (ECS), planning for management on a landscape level, bud-capping white pine, planting improved seedlings, and increasing emphasis on managing the hardwood resource are just a few.

Using new tools and equipment to improve productivity is also an ongoing activity. Cut-to-length (CTL) harvesting systems that leave slash distributed in the woods for nutrient replenishment are just beginning to be utilized. As a point of interest, a CTL workshop planning group is meeting today to develop a one- or two-day training session for loggers and foresters on the safety and maintenance of CTL equipment and timber sale design criteria when using CTL harvest systems. The workshop will be held during the fall of 1999. The Division is also exploring the potential use of a new tool for mechanical brush saw/herbicide release work that will aid in selective release of crop trees, and the use of the Panama backpack paint spray equipment to improve the productivity of foresters marking hardwood stands for intermediate harvests.

The Division has been aggressively developing and implementing best management practices (BMPs) to minimize adverse impacts to wetlands and water quality, visual quality, and cultural resources during harvest operations and other forest management activities. A BMP monitoring program on private and public lands has also been implemented to determine if BMPs are being applied during management activities, and to assess what positive effects they have had on the resource and landscape. In the very near future, the Minnesota Forest Resources Council (FRC) site-level guidelines for forest management will become available. These guidelines will be used to guide management activities on state lands as implementation training is completed.

Since I have mentioned training several times, I should point out that the Division is continuing its training program in a number of important areas to improve timber productivity. During the past several years the Division has put an emphasis on hardwood marking and management by taking advantage of the experience of foresters in Wisconsin and around Minnesota and region. Training has also been provided on the use of the ECS, and plant identification. This will help on-the-ground foresters determine the best species to manage on a site and the best silvicultural system to use to achieve the desired conditions for regeneration of the next forest.

Plans are also in the works for extensive training sessions during 1999 for loggers and foresters on implementation of new site-level guidelines. Ensuring that productivity concepts are part of the planned training program will ratchet upward the understanding of foresters, managers, and loggers on how to reach sustainable management and improve productivity on state lands. This will be an important challenge to meet in 1999, but it may be our best opportunity.

A lot of good forest management is occurring around the state. I support this statement by citing the 1997 SmartWood (a program of the Rain Forest Alliance) certification for sound/sustainable management granted to public lands in Aitkin County. If you are interested in some of the resource planning efforts that are occurring, you can access the DNR web site at [www.dnr.state.mn.us](http://www.dnr.state.mn.us) and look for the "Aitkin County" site. Planning on a landscape level is moving forward and should help in defining the big picture for management and coordinate the productivity improvement programs across administrative lines. Perhaps it will also aid in identifying those areas where highly productive sites can be intensely managed while minimizing the conflict with various nonfiber uses of the forest.

### **WHAT STILL NEEDS TO BE DONE**

Forest productivity must be part of the training and implementation of the FRC site-level guidelines. Implementing the guidelines will require more planning, more project layout time, more administration time in the field, and a reduction in total acres intensively managed. Increasing productivity on the lands to be intensively managed will become even more important.

Throughout the organization, managers should focus their efforts on stands, land types, and subsections with the greatest potential for productivity improvement. This can be accomplished in several ways.

#### **A Plan for the Future**

A number of management activities still need to be emphasized and promoted to improve productivity of the state lands with the best potential for increased growth. Those activities being done on a limited basis need to be accelerated, while others should be implemented wherever the opportunity exists.

#### **At the field level (getting back to the basics of sound forest management):**

- Inventory hardwood stands 15–45 years old, collect sufficient data to develop a stand table that can be used to make the best prescription for the stand.

- Utilize data recorders or other tools to improve the productivity of Division personnel in the field.
- Develop and utilize computer programs to improve the capability of summarizing and displaying field data, and generating reports that improve the Division's ability to make sound decisions and supply information to others.
- Identify timber stand improvement (TSI) opportunities in both natural stands and plantations.

Upon examination of a summary of the CSA inventory data for plantation acres for red pine, jack pine, and white spruce on forestry-administered lands available for harvest, we see a total of more than 125,000 acres in the 0–70-year-old age class. In the 21–60-year-old age classes there are just over 45,000 acres. If we add white pine, the total goes up by 1,800 acres. Examining the 0–20-year-old age class data shows an additional 80,000+ acres. Many, if not most, of these stands are or will be in need of thinning in the very near future. This is a perfect opportunity to improve productivity on lands where management investments have already been made in the form of regeneration costs.

Examining the same data base for natural stands of oak, northern hardwoods, lowland hardwoods, and central hardwoods reveals more than 12,600 acres in the 21–50-year-old age class. Other opportunities to improve productivity might include:

- Mark stands for thinning and/or intermediate harvest when they are on the better sites. Marking guides should include criteria for improving stand composition, growth rate, and future quality, and avoiding future insect and disease problems.
- Design selective harvests to improve or maintain overall biodiversity components while increasing site productivity.
- Recognize the aging forest condition and age imbalance in some cover types and increase harvest in high-site index stands at the expense of some poor access and poor quality stands. (This is a divergence from the harvest the oldest first process.)
- Time harvests to insure that natural regeneration occurs immediately when that is the prescribed regeneration method. Delays in regeneration result in costly losses of volume production.
- Artificially regenerate stands as soon as possible with the best species suited to the site when natural regeneration is not an option or fails.
- Sweeten naturally regenerated or understocked stands with species such as white pine or valuable hardwoods, to add to the future value of the forest and insure full stocking of desirable species for the site.

- Tend regenerating stands with appropriate prescriptions to promote increased growth by insuring a free-to-grow condition early in the life of the stand.

On a broader level, the Division needs to continue efforts to incorporate the best tree improvement information into project plans and activities. Tree improvement principles should be a normal part of tree marking guidelines for intermediate harvests. Selecting and developing improved seed and seedlings through management of existing seed orchards and future seed collection areas will also improve the productivity effort.

We must also focus more strongly on incorporating a productivity component into the forest planning activity. It has been suggested by one administrative area that during the resource planning process, we stratify the planning period stands (stands above rotation age available for harvest) by productivity criteria and make productivity a stand treatment. Another administrative area is focusing more attention to setting rotation ages on Mean Annual Increment (MAI) information and establishing a critical age beyond which stands will automatically be selected for harvest or salvage. We should also be conscious of the big picture in our planning process and focus intensive forest management prescriptions on units within a landscape unit regardless of ownership by seeking sites with high quality and good access, reasonable size for management (no isolated 40s), and low to moderately low conflict with other values (e.g., wilderness, natural area, old-growth, or endangered species). Once these areas are identified, information can be shared with other stakeholders in the management unit such as private landowners or other public agencies. By developing partners who are willing to intensify their management, a greater overall impact can result.

We must strive to promote harvesting systems and equipment to minimize site damage. We should focus on the desired outcome from a specific harvest activity for individual stands or landscape units when writing management prescriptions or designing harvest areas. No longer should we design a sale and then accept less than desirable results because the operator used the wrong size or type of equipment.

With tight budgets and rapidly advancing technology in a number of areas, I support the idea that we establish a multi-agency silvicultural technology consortium—an instate gathering of practicing silviculturists and scientists that can informally share information, evaluate new technologies, recommend training needs, and assist in the training presentations. By developing this partnership in knowledge sharing, we can minimize

reinventing the wheel each time a forester identifies a problem needing a solution.

## CHALLENGES

Although many of the suggestions I have made for improving productivity are familiar to most of us and would seem to be quite doable, there will be challenges to improving productivity on state forest lands. First, there is a lack of a clear forest productivity policy for the Division and DNR to serve as guidance for all employees. The sustainability formula of viable economies strengthening local communities that support a healthy environment, hints at the concept of improving productivity, but leaves interpretation up to the reader. Field managers will also be challenged by invading exotic species, such as buckthorn, that present a threat to future stand regeneration and long-term productivity. Strategies to deal with such exotics need to be developed. On the horizon also looms the potential epidemic of gypsy moth and other challenges to forest health that will have a negative impact upon infested stands.

State government budgets for day-to-day activities, not to mention an acceleration of work, do not appear likely to rise in the near future. Special funding initiatives having strong sponsorship from private partners and stakeholders will be necessary. Sufficient funding to partner in needed research, provide training to new and existing employees, hire additional personnel or contract for field activities not now being done, may be one of the most difficult challenges we have.

Associated with any new initiative will be opposition or lack of support from some interest groups and members of the public. I do not feel there is a general sense of need or urgency on the part of the public to greatly increase the productivity of the state's forest resources. Quite the contrary, the focus of interest groups and others that bring pressure upon state government is to reduce harvesting and protect resources by not disturbing them. Continual involvement of the public in our planning process will be one way to demonstrate that improving productivity of the forest is important and necessary to achieve sustainability.

To summarize, we have a strong base upon which to build. We have a forest resource poised for and in need of productivity improvements, and a strong forest products industry looking to expand even further. However, we need to move forward in an organized and deliberate manner by institutionalizing a productivity policy within the DNR and Division; identifying applied research needs; continued training of loggers, foresters, and managers in new technologies and systems; pro-

actively seek necessary funding through partners in the private sector; forming a silvicultural consortium with partners; and implementation of proven methods. Let's not reinvent the wheel.

Thank you for your attention this morning. I hope that I have provided you with some food for thought, and a desire to help this initiative succeed.