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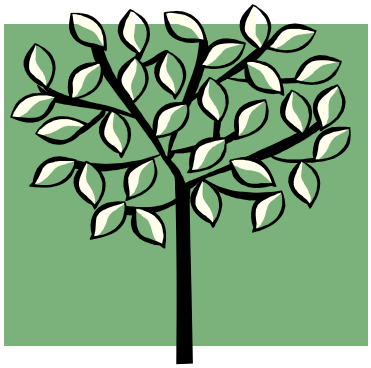
The Stand Manager

Technical Development, Planning and Utilization Unit Newsletter
NC Division of Forest Resources—DENR



Ron Myers

The purpose of this newsletter is to update and inform DFR field personnel, private landowners, and other agencies about FM projects, silvicultural research projects, and DFR program activities. Our agency is involved in many program areas of resource management.

This issue highlights a diversity of research projects outside our traditional pine tree planting activities. NC DFR is very active in providing more information about the fire environment and how factors such as weather, fuel types, and soil properties can impact not only wildfire suppression tactics but also prescribed burning prescriptions and decisions.

Our Technical Development, Planning, and Utilization Unit has been working to develop more technical workshops and highlighting upcoming training beneficial to field personnel. Some Upcoming Training opportunities include:

- Upland Hardwood Silviculture Workshop. Nov. 6-7th, 2007 in Crossnore, NC
- Invasive Plant Ecology and Management. (FEOP) October 23-24th, 2007 in Raleigh, NC
- Longleaf pine Silviculture Workshop. February 12-13th, 2008. Location TBA

Check out the Field Notes section for Ranger Training Pictures. See you in the Field!

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Pine/Other Conifer Silviculture

Bill Pickens

THE EFFECTS OF PLANTING DENSITY ON THE GROWTH AND YIELD OF ATLANTIC WHITE CEDAR—THIRD YEAR RESULTS

Atlantic white-cedar (*Chamaecyparis thyoides* (L.) B.S.P.) is a wetland species that has been in decline across its range since the late 1800's when it was extensively logged as a valuable timber product. Today it is valued both ecologically and economically. Regeneration efforts are needed to restore Atlantic white-cedar to its original range. Artificial regeneration by private landowners is an important component of the restoration effort.

The conical shape and small bole of Atlantic white-cedar (2-16 inch diameter at breast height) allow it to naturally regenerate and maintain dense stands (250 to 300 ft^2 basal area per acre). Because of high seedling and site preparation costs, artificial regeneration of Atlantic white-cedar is expensive. Planting fewer trees per acre reduces establishment costs, but may not optimize economic returns.

Currently, many resource managers recommend planting densities common to loblolly pine (600-800 seedlings per acre), but that may not be appropriate for Atlantic white-cedar. Little data is available on how planting density affects the growth and yield of Atlantic white-cedar stands. This study examines the influence of planting density on the growth and yield of Atlantic white-cedar plantations to determine if higher planting densities will increase volume yield and result in a better rate of return that will offset high establishment costs.

AWC—Third Year Results Continued

The study is located at the NCSU Hoffman Forest, Onslow County, NC on a former pond pine forest site. The soil is very poorly drained, but the tract is extensively ditched. The soil type is a Pantego black fine sandy loam that has a site quality index (base age 50) of 95 for loblolly pine. The site was clearcut, root-raked, and burned in preparation for the planting.

Planting density treatments were: 1) 605 trees/acre, 2) 1210 trees/acre, and 3) 1815 trees/acre.

The first data collection was made after three growing seasons in March of 2004. Surviving trees were measured for height to the nearest 0.1 feet and stocking density and survival was determined. DBH was not measured since many trees were less than 4.5 feet tall.

After three years in the field survival was 91%, 86%, and 83% for treatment 1, treatment 2, and treatment 3 respectively. Height was 6.2 feet, 6.6 feet, and 6.5 feet for treatment 1, treatment 2, and treatment 3 respectively, with no significant differences among treatments at P = 0.05 (Table 1).

Table 1. Average height in feet for AWC trees three years after establishment

Treatment	n	Height (feet)	St. Dev.
Treatment 1 (605 trees/acre)	656	6.2 a	1.39
Treatment 2 (1210 trees/ acre)	1156	6.6 a	1.34
Treatment 3 (1815 trees/acre)	1640	6.5 a	1.38

Means followed by the same letter are not significantly different at p=0.05

Even with the smaller seedlings and medium intensity site preparation the survival of the Atlantic white-cedar seedlings was high. The high survival rate is consistent with rates observed by the author from previous Atlantic white-cedar plantings. Land resource mangers should expect good survival with adequate site preparation and competition control.

Seedlings grew quickly and were able to outgrow the emerging competition of gall berry, fetterbush, wax myrtle, cat briar, blackberry, poke weed, and various grasses. Most mortality was in very wet areas or in areas of very dense grass or woody shrubs. Deer or rabbit browse was not a problem on this site as is often the case in other plantings.

Height growth averaged 2.13 feet per year with the largest trees averaging about 3 feet of annual height growth. The tallest tree measured was 10.8 feet tall. The Atlantic white-cedar height was comparable to loblolly pines planted on adjacent fertilized beds the same year.

Atlantic white-cedar is a good choice to reforest this soil type. In general, the trees are above the predominate competition and do not appear to need a release treatment to survive. Long term data and research are needed for both planted and natural stands regarding the effect of density on growth and yield of Atlantic white-cedar.

Figure 1: Atlantic white-cedar at 5 years old.

Longleaf Pine Silviculture Workshop Scheduled for February 12-13th, 2008

Contact Bill Pickens for more specific details & location

Forest Utilization News

Michael Mann

District 5— NC DFR Employees Meet the Dixie Queen

In August, **Brandon Hill, Randy Kearney, Rob Lipford, Brian Lovett, Scott Ludlum, Michael Mann, Jason Odum, Reggie Stevenson and Carla Threadgill** toured KapStone Kraft Paper Corporation's integrated pulp and paper mill in Roanoke Rapids, North Carolina. KapStone was very accommodating and rolled out the red-carpet for the Division. The tour began with a warm welcome and comments from Anitra Collins, the Vice President of Mill Operations. Following Anitra's comments, Bob Patterson, the Business Technical Manager gave a PowerPoint presentation that addressed the history, stewardship and current manufacturing capabilities of the mill. After the PowerPoint presentation, the group was divided into two smaller groups for tours of the wood-yard, power plant, pulp mill and paper mill.

The KapStone mill began production in 1907 as the Roanoke Rapids Paper Manufacturing Company and was the first mill in North America to use the Kraft process. The mill has changed ownership many times over the course of a 100 year history of operation. The most recent change took place in January of 2007 when International Paper Company sold the mill to Roger Stone (former CEO of Stone Container Corporation) and his business partner Matt Kaplan.

Today, the pulp mill and its two papermaking machines annually produce about **400,000 tons of kraft paper and linerboard** which are used to make multi-wall bags and corrugated containers. The paper machines themselves are affectionately named the **"Southern Star"** and the **"Dixie Queen"** and they have been producing paper since the 1950s.

Following the paper mill tour, Jason Miller joined the group for an afternoon tour of West Fraser's Seaboard mill. West Fraser's Judy Haney and Lewis Cox kicked off the tour with welcoming remarks and an overview of the mill's operation and history.

The group then went to the wood yard where several loads of chip-n-saw were rolled-out for log quality inspection. Time was spent inspecting logs and discussing the impact of log quality on operations before moving on and touring the remainder of the mill. The Seaboard mill was built in 1968 and currently produces about 100 million board feet of dimension lumber a year.

NC DFR will be hosting a group of International Foresters on October 15-16th, 2007 in NC. If you would like to join the group in the field or help with the tour contact Barry.New@ncmail.net

Field Notes: Special Projects & FM Activities submitted by County personnel

Group Pictures from Summer Ranger Training at Crossnore with Level I Class on Left and Level II Class on Right.

Fire Environment Working Group

Gary Curcio

NC DFR Fire Staff is working to be at the leading edge of emerging Fire Environment technologies and research. All this activity is conducted in partnership with the Division's strategic interagency partners and natural resource community. The Fire Environment Working Group & Strategic Partners (FEWG & SP) are the driving force at work to achieve the NC Division of Forest Resource Fire Environment goals.

This Working Group has been established pursuant to the authority of NC DFR State Forester, Deputy Director, and the Management Team. Fire Staff Personnel and the Fire Environment Working Group have several research projects under-way to improve firefighter safety and understanding, along with minimizing public health risks associated with smoke.

A few of these projects include: live fuel moisture study, computerized fire gate for single engine air tankers, mixing height verification project, fire danger/weather station network, and evaluation of smoke management systems to include smoke dispersion modeling. Several of these projects are federally funded and most are done in cooperation with other state, federal and natural resource partners. The results from many of these projects will have implications to fire managers within the southern region and across the nation.

Recently NC Fire Environment Research Studies received $1.8 million dollars in funding for special projects.
On the next page, we examine the potential and research objectives of one of these Fire Environment Research Studies.

- Establishment of Raven Knob Fire Danger Station in Surry County. This system will improve the density of the interagency network while providing valuable fire intelligence information from the NW region of NC.
- Improving Characterization of Fuel Consumption and Air Emission under both flaming and smoldering conditions during prescribed burns.
- Develop New NC Smoke Management Program (NC SMP). When implemented, this new program will migrate the present voluntary program into one that will be mandatory.
- Identifying Smoldering Combustion Limits of Organic Soils in North Carolina

Western Certified Prescribed Burn School—Dallas, NC.

October 31 -November 1, 2007

Smoldering Combustion Limits of Organic Soils in North Carolina

Jim Reardon, Roberta A. Bartlette, Gary Curcio

Prescribed burning in wetland communities with organic soils present serious challenges to fire managers. At present there are a number of barriers to effective fire use in these community types. One factor that limits the effectiveness of suppression tactics and fire use is uncertainty about conditions that will support sustained smoldering combustion in organic soil.

Introducing prescribed fire to promote wildlife habitat benefits, potential oak regeneration, native plant diversity, invasive species control, and forest health benefits are creating an increased need to know more about fire effects in these ecosystems.

This study will build on previous research conducted in North Carolina wetland communities and will help to improve our understanding of how moisture and mineral content affect the smoldering combustion limits of organic soil.

Root mat and muck soil samples from a number of sites in North Carolina's coastal plain will be burned under laboratory conditions.

Laboratory results will be used to model the probability of sustained combustion over a range of moisture and mineral contents. Model estimates will be compared with the results of prescribed burning on a number of field sites.

Predicting smoldering combustion risk based on measurable soil properties will improve the effectiveness of burning programs while increasing management opportunities and knowledge.

An increased understanding of the relationship between soil properties and sustained smoldering has the potential to improve our predictive ability on a larger scale.

Results may be used to compare data points that utilize North Carolina RAWS weather station networks, soil moisture & fuel data, and hydrologic data bases to better predict smoldering combustion limits of organic soils in North Carolina.

The ability to better understand the probability of sustained ignitions in organic soils can provide valuable assistance to natural resource managers when making decisions about prescribed fire on the forest environment.

Knowing the success of sustained ignitions in organic soils can assist in minimizing economic and social repercussions from prescribed fire, containment & control measures, and smoke management considerations.

For more information contact Gary.Curcio@ncmail.net

Environmental Review

Ron Myers

US Forest Service Land Management Litigation Study Results

The first-ever comprehensive study of US Forest Service land management litigation was published in the Journal of Forestry, June 2006. The study examined all 729 legal challenges to Forest Service land management filed in federal court from 1989-2002. Previous studies only examined cases where a judicial decision was published – about 30% of all cases during this time.

Contrary to public perception, the Forest Service enjoys an excellent success rate – winning 57% of all cases and 73% of the cases decided by a judge or panel of judges. Previous research underestimated the Forest Service's success rate in land management cases and failed to document the agency's propensity to settle cases.

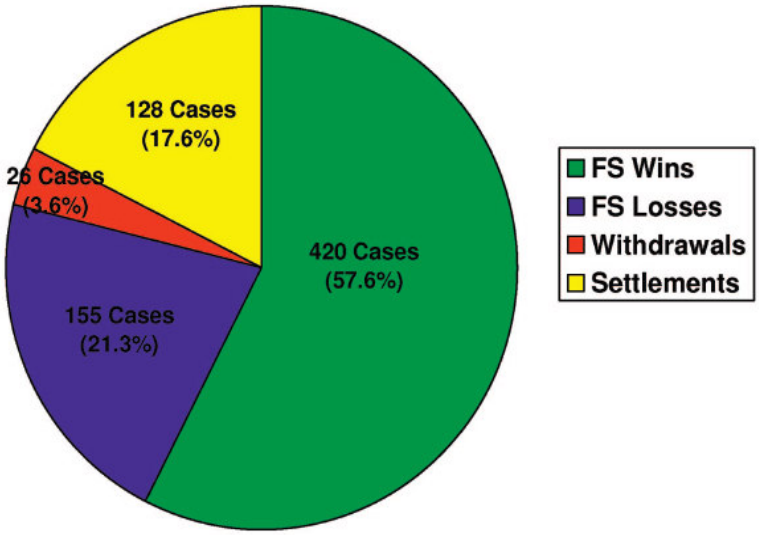

Figure 1: Number of Land Mgmt. cases from 1989-2002 by final case outcome

A total of 729 completed legal challenges were identified. The Forest Service won 420 (57.6%) of these cases; lost 155 (21.3%); settled 128 (17.6%); and 26 (3.6%) of the cases were withdrawn before judges made decisions on the cases' merits.

Of the 575 cases where the final outcome was decided by a judge or panel of judges (i.e., cases not settled or withdrawn), the Forest Service won 73.0%.

Most litigants (75.1%) sued the Forest Service for less resource use. The Forest Service won a majority of these cases – 275 (53.54%); lost 123 (23.94%), and settled 98 (19.1%).

Almost 25% of litigants sued the Forest Service for greater resource use. The Forest Service won 117 (68.89%) of these cases, lost 28 (16.57%), and settled 21 (12.4%).

Logging, planning, and salvage accounted for almost half of all challenges. While plaintiffs sue the Forest Service over logging more than any other activity – the agency's success rate in these cases is equivalent to other activities – nevertheless, logging cases represented less than 40% of cases.

Three statutes dominated the cases: National Environmental Policy Act of 1969 (NEPA), which was involved in 68.6% of all cases; the National Forest Management Act of 1976 (NFMA) – 43.5% of all cases; and the Endangered Species Act of 1973 (ESA) – 17.9% of all cases.

The Forest Service settled more than one of every six cases – almost as many land management cases as it lost in court. Plaintiffs win less than one of every four cases. In fact, plaintiffs seeking less resource use lost more than half the cases they initiated and plaintiffs seeking greater resource use and development lost more than two of every three cases they initiated. This suggests that plaintiffs may receive indirect benefits from litigation, such as publicity and delay of action, and indicates these benefits may be as important to some litigants as the direct benefits of winning.

The study results highlighted above is reprinted with permission from Society of American Foresters.

The complete study can be found at http:www.safnet.org/periodicals/fslitigation.cfm

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