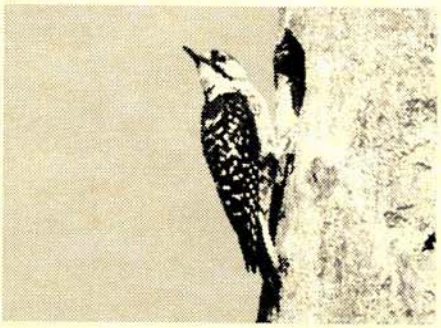
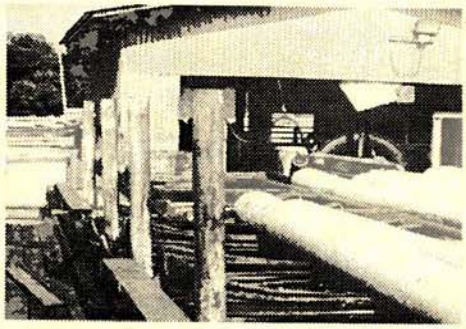
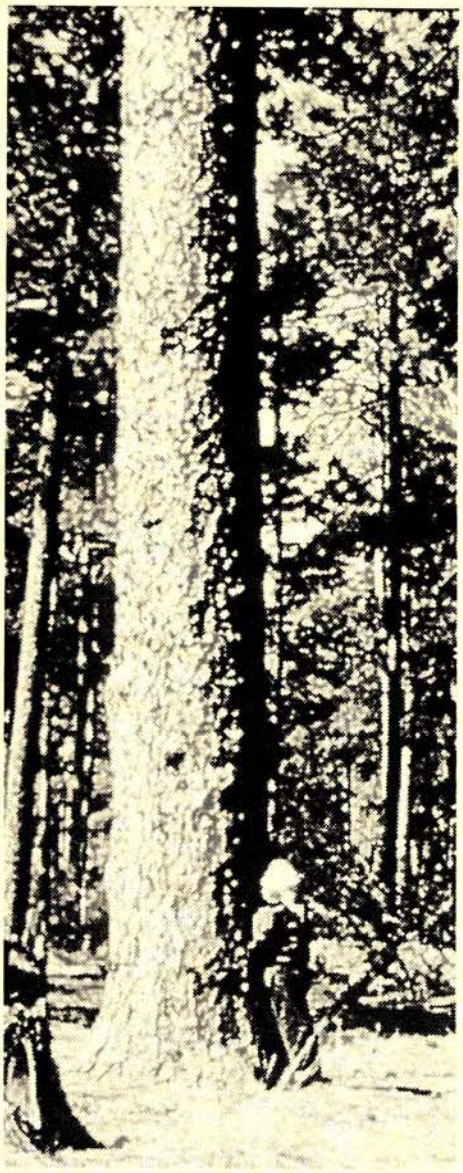




PROCEEDINGS

First Longleaf Alliance Conference



LONGLEAF PINE: A REGIONAL PERSPECTIVE OF CHALLENGES AND OPPORTUNITIES

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LONGLEAF ALLIANCE REPORT NO.1

THE LONGLEAF ALLIANCE

Ecosystem Management Ideas for the Longleaf Pine Ecosystem

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ABSTRACT - Ecosystem management is a buzzword swirling through the natural resources community. Great controversy has been created by the lack of a concrete definition. At the same time few authors give specific guidelines on how this practice could be carried out. In this presentation we will provide a simple definition and one model of how it might be achieved this year in the Gulf Coast tri-state area (southwest Georgia, southeast Alabama, and the panhandle of Florida). The proposed model will be used as the first step in the construction of a more complete management prescription for ecosystem management of longleaf pine. Ecosystem management is best reflected by the early writings of the nation's first group of foresters and is called stewardship. Careful observation of a year's cone crop and recent stand history can guide sustainable management of a longleaf pine forest. The drought of 1996 experienced throughout much of the region in combination with the apparent above average seed crop make this an ideal year to use a late summer burn to control hardwoods and prepare a seedbed for germination during the winter months. A summer burn would create the window needed for longleaf pine regeneration. Working within recent climate and forest stand conditions can reduce management costs and guarantee productivity of the future forest.

INTRODUCTION

Management of natural resources has again become an important topic of discussion nationwide with logging of old-growth forests in the pacific northwest and subsequent decline of the spotted owl. One outgrowth of the discussion has moved people to survey their backyards closely for old-growth, native ecosystems, and/or endangered species.

As a result in the southeastern United States, interest has escalated in the recovery and management of the longleaf pine-wiregrass ecosystem. This ecosystem has been called the most diverse system in North America. It is the diversity that drives the conflict between extractive management and maintenance of system integrity.

A second, and perhaps more important, consequence of the debate has triggered the proposal of a new resource management philosophy termed ecosystem management. Most parties agree that ecosystem management will solve the desires of society by procuring timber from the natural environment without taking habitat from resident wildlife. However, very few specific procedures have been described to meet the complicated goals of ecosystem management.

HISTORICAL PERSPECTIVE

We believe many of the definitions of ecosystem management were eloquently stated by the first generation of foresters in these United States. Many of these foresters had a stewardship mentality or a land ethic. Witness the 1899 objective of forestry by Henry Graves, the Superintendent of Working Plans for the USDA Division of Forestry:

> "The object of forestry is to remove the timber from a given tract in such a way that repeated crops can be obtained for an indefinite period of time without decreasing the productive power of the forest. In order to do this it is necessary to know what trees must be left standing to form a basis for future growth and to seed the ground to valuable species. It is necessary to know what the rate of growth of the trees left in the forest will be after the first cutting in order to determine how the second crop can be obtained, and also to know what new growth will come in to take the place of the trees which have been removed. The purpose of making a working plan is to study questions of the growth, reproduction, and general character of important trees, and to devise a system of cutting which will enable the owner to make a profit from the land and at the same time to secure the permanence of the forest."

In the 100 years since Graves' quote, we have learned about the interconnectedness in the natural environment between species, nutrient cycles, disturbance regimes, and ecosystem integrity; hence the need for ecosystem management. This was reflected in a 1996 paper by Richard Knight arguing that

ecosystem management is an adaptation of Aldo Leopold's idea that "we are facing the oldest task in human history: to live on a piece of land without spoiling it."

ECOSYSTEM MANAGEMENT DEFINITION AND PHILOSOPHY

Our definition of ecosystem management combines wisdom from the past and the reality of today in the southeast. Our goal in ecosystem management of the longleaf pine-wiregrass ecosystem on private lands is to maintain, restore, and perpetuate the total forest while emphasizing specific structures and functions necessary to satisfy the current owner. This is a complex philosophy of management. However, it can be accomplished successfully if the land is committed to this goal for an extended time period and the management is competent and knowledgeable about the components, patterns, and processes in the longleaf forest.

Furthermore, management following this philosophy will become more successful over time. It precludes the short rotation, even-aged commercial crop method of forestry that emphasizes the fastest economic return of trees to the exclusion of all other components of the forest.

To accomplish these goals, we have outlined certain ecological rules and procedures determined to help in the most practical way. While the entire process is forever ongoing and the perfect condition in which management is no longer necessary, the procedures in our model for 1996 are some of the most basic.

COMPETENT MANAGEMENT AND NATURAL OBSERVATION

An integral part of competent management lies in having a naturalist perspective of the forest. This includes seeing more than one species, factor, value, or frame in the long movie of the forest. William Boyer noted that large crops of female and male flowers do not necessarily coincide (Boyer, 1989). Therefore, a cone crop might be limited by female flower production.

Male and female flowers are set during the growing season before the flowers appear, male in July and female in August. Development of both flowers is weather dependent. Male flowers typically occur in the lower crown while females are often located in the upper crown (Boyer, 1989). By observing female flower development, cone crop abundance could be anticipated a year in advance.

Furthermore, there seems to be a relationship between a significant cone crop and late summer rainfall amount three years previous. The record rainfall of the summer of 1994 might played a major role in this year's bountiful seed production. An observant manager will be able to plan for regeneration well in advance of a substantial cone crop. This would extend the window of opportunity for timber and fire management plans to enhance longleaf pine regeneration.

A competent manager also should know the characteristics and limits of the land being managed. Within the range of the longleaf pine-wiregrass ecosystem there are many ecotypes and site conditions. Management plans for a dry site would differ from a wet site. Dry site regeneration tends to be more patchy than wet site regeneration because of heterogeneity in stand structure, disturbance patterns, and herbaceous layer cover. The mosaic of the herb layer influences fire regime and stand structure and composition (personal observation). We assert that a manager needs to possess an innate knowledge of the land to attain the goals of ecosystem management.

Finally, a competent manager needs to know the population and distribution of forest species habitats across the land. Timber harvesting could proceed without reducing wildlife populations. Certain sites identified as habitats of birds, gopher tortoises, pine reproduction, and rare plants should be marked and buffered from logging damage. In addition, individual trees suitable for red-cockaded woodpeckers, hawks, owls, eagles, and fox squirrels must be recognized and saved if possible. These flora and fauna are components of diversity and are vital to ecosystem integrity of the forest.

1996 ECOSYSTEM MANAGEMENT MODEL

<u>Drought and Seed Crop Interaction</u>

The drought and large seed cone crop of 1996 provides an opportunity to conduct ecosystem management in the longleaf pine system. In southeast Alabama and dry sites of southwest Georgia, the early summer drought caused overstory pines to shed second year needles and trigger dieback in oak species. A fire in these stands would burn hotter with the heavier than normal needle load.

The intense fire would accomplish two tasks. First, the hotter fire would burn off the litter and herbaceous layers, providing a seed bed of mineral soil required for successful germination and establishment of longleaf pine. Secondly, the fire could induce premature senescence of the already drought stressed oaks. Increased mortality in the Red Hills has occurred in similar situations (personal observation). A reduction in competition would increase regeneration success of longleaf pine. If the fire does not provide adequate mortality of competing oaks, we would advise mechanical removal (chemical treatment if necessary) before seedfall in mid-October to reduce losses by logging damage.

Enhancement of Regeneration Opportunities

If timber removal is one of the goals of the land being managed, we stress all harvesting activities must occur before seedfall. Timber removal in these stands after seedfall would severely reduce regeneration stocking. Additionally, opening the forest canopy would increase opportunities for longleaf pine establishment.

We suggest the longleaf pine forest should be managed to obtain a full stocking of trees, according to the communities involved, though cutting amount would be governed by goals for the land. It will result in a stand of uneven aged trees varying in density from low to high. We warn against depleting the overstory of dominant trees. Fire is absolutely essential to the longleaf pine-wiregrass ecosystem. To guarantee frequent and adequate fires, the overstory must always be stocked to guarantee fuel loads and reduce operating costs.

Selective cutting is not the only means of ecosystem friendly timber removal in our forest management philosophy. However, too large a patch cut will reduce chances of adequate seedfall from neighboring or edge trees. A recent study by Brian Palik and others (in press) has implicated a threshold size for regeneration and growth of longleaf pine seedlings occurring in gaps around 1200 m^2 in area. Competition from edge trees in gaps smaller than this significantly reduce growth. However, seedlings can survive overstory competition for periods of five years or longer (Smith 1955, personal observation). Although longleaf pine is considered an intolerant species, we submit that seedlings can persist in denser than expected overstories. During this time of suppression, whether the canopy in thinned naturally or by design, the seedlings are already established as needed for future forest productivity.

Regeneration Establishment and Post-Germination Guidelines

Once a seedbed is prepared, management of the longleaf stand becomes relatively easy. Seedfall begins in mid-October and continues through the winter. Activities in the forest should stop to prevent losses by physical damage.

Although, fire is essential in a longleaf pine forest, seedlings less than a year old are extremely susceptible to fire. We believe fire is not necessary until at least 1998. In stands with good wiregrass groundcover, fire might not be necessary until 1999. In forests with old-field groundcover, a very cool winter burn would be advisable if competition on seedlings is too intense. It is important that this fire be used wisely. After 1999, normal management plans can resume. The period of susceptability for most of the individual seedlings will have passed.

CONDITIONS, RANDOM AFTERTHOUGHTS, ETCETERA

We find that seed crops of some degree are made quite frequently across the landscape. They should be utilized whenever a suitable window of opportunity occurs. A manager should not worry about the density of a stand or having many over-topped trees. Longleaf pine has the ability to respond vigorously to release from suppression at nearly any age.

Disturbance by man on the longleaf pine forest should be kept to a minimum allowable by the management plan. Even when heavy equipment is necessary, the timing should be favorable to avoid

unnecessary damage. When a selective cut is allowable, the selection of trees for removal is perhaps the single most important step in the success of management goals. It is because of the diversity of age in stocking that a longleaf forest can be perpetuated whilst occasionally allowing the harvesting of some timber.

Ecosystem management and, realistically, any form of management is complex. To make a selection that protects the various components of the forest and yet allows an economic return, a thorough knowledge of the forest is required including stand conditions, climatic patterns, and year-to-year events is a must for successful forest management. Many decisions need to be made in the selection of trees for removal. We can maintain a forest of trees, but not a forest that maintains the total diversity that once occurred in the longleaf forest.

Winifred Kessler and others (1992) point out "many scientists remain skeptical, arguing that experiment at the watershed scale, for example, will not only be prohibitively costly but impossible to replicate. And where will suitable controls be found?" To take this a step farther, each harvest should be viewed as an experiment, a work of art, or fingerprint. That is, no two are the same. Continuing in the thought of Douglas Sprugel (1991), what is constant and natural in a changing environment? Managers need to be flexible and manage according to existing and constantly changing physical and biological conditions.

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