

**STRATEGIC CHANGES IN DIRECTION:
USDA-FOREST SERVICE'S REGION 8 GENETIC RESOURCE MANAGEMENT PROGRAM**

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The Forest Service Tree Improvement Program was developed in the late 1950's as an intensive timber management tool. At that time, there was a national perception that the United States would be facing a significant shortage of timber resources by the mid-1980's. The Forest Service was gearing up to meet the predicted "timber famine" that was being predicted. Tree improvement was seen as an important *component in the Forest Service's* intensive timber management program. It would add incremental value to each of the other intensive timber management operations that were carried out over the life of a stand of trees. Since the tree improvement program was developed, there have been significant changes in the public's attitudes concerning national forest timber management and the laws and national policies that guide the harvest and regeneration of timber on the national forests.

In the late 1960's the environmental movement began. Since then, several environmental laws have been enacted that have, directly or indirectly, impacted the timber management program on the national forests. The National Forest Management Act (1976), the Wilderness Act (1964), the National Environmental Policy Act (NEPA)(1970), the Endangered Species Act (1973), revisions of the Clean Air and the Clean Water Acts and the Chiefs policy decisions (1992) on clearcutting and the aerial application of pesticides have all had significant impacts on the timber management programs and/or the costs of specific management actions. While none of the legislation was specifically directed to the tree improvement program, the overall cumulative effects of implementation of the laws have been quite significant. Primarily, there has been a reduction in the acres on which timber management is being practiced, a reduction in the intensity of the practices employed, and significantly increased costs of implementing certain actions that are necessary for the program. At some point, the economic efficiencies of the program deteriorate and more cost effective alternatives must be evaluated. In summary, we had to evaluate the tree improvement program to determine whether or not it still made sense in terms of the funds and personnel committed and in terms of other national objectives.

The tree improvement program was originally built on the basis that genetic improvement of growth and volume production would be great enough to offset the additional costs of selecting, evaluating and propagating the seed. An economic analysis performed at the time indicated that the program would pay for itself if certain conditions were met. The conditions are universal to most improvement programs. To have a viable program, silvicultural regimes must allow the increased growth potential to be expressed, the stand rotations must be shortened to capture the increased growth, and improved materials must be employed on a large enough land base to take advantage of the efficiencies of scale.

Based on the current forest plans and projected levels of harvest, none of the viable program conditions are being met. Genetic gain can be captured if young stands are aggressively managed to provide the growing space required to allow expression of the genetic growth potential and if rotations are reduced to take advantage of the faster growth. Since the tree improvement program was begun, rotations have increased significantly. At the inception of the program in Region 8, the general rotation age for

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REGION 8 CLEARCUT ACRES SOLD 1987 TO 1998

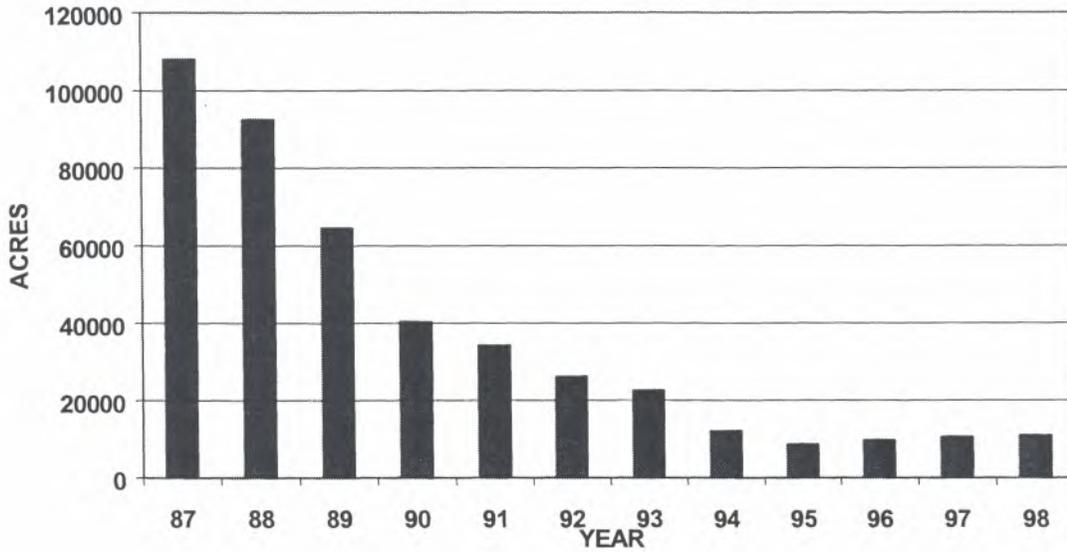


Figure 1. Region 8 clearcut acres sold from 1987 to 1998.

REGION 8 SEED USE TRENDS

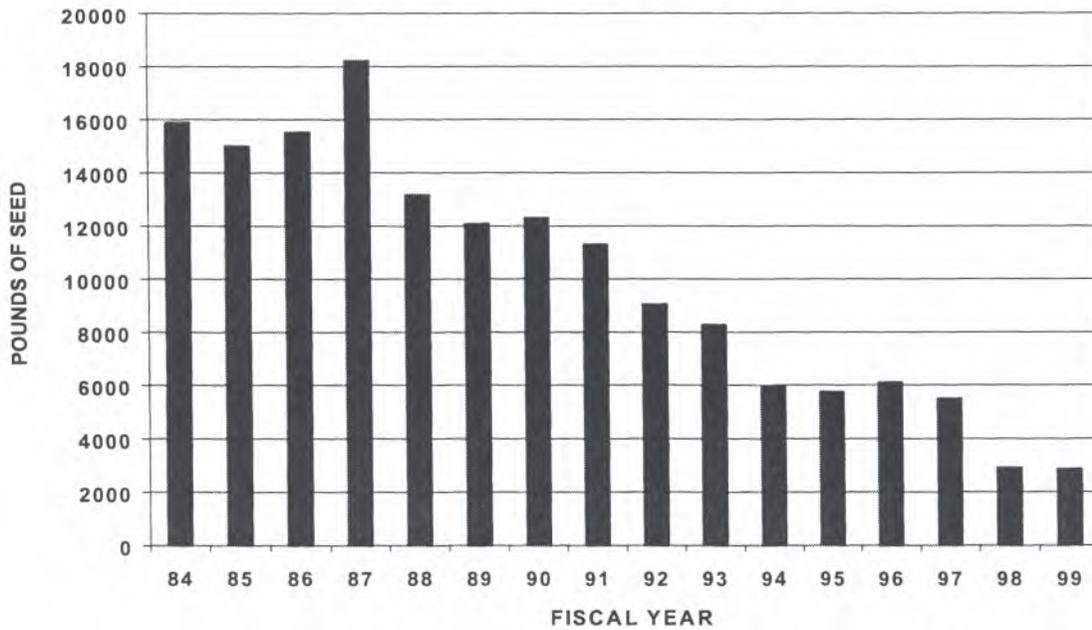


Figure 2. Region 8 seed use trends from 1984 to 1999.

loblolly and slash pine was approximately 60 years. On many forests, rotations are now being planned at 80 to 120 years and in actuality may be approaching 200 years or more based on the actual acres harvested.

Along with the increasing rotation lengths, the reduction in clearcutting (Figure 1) has had dramatic effects on the silvicultural methods and the needs for tree seed. Natural regeneration methods are increasing while planting is decreasing. Site preparation and release operations are being decreased in intensity providing only minimal space for the seedling and lessening the impact on natural vegetation and some animal communities. This meets current program requirements for other resources but is far from that required to allow full expression and capture of genetic growth traits.

The progress made in artificial regeneration of longleaf pine has had a substantial impact on our tree improvement programs. Until about 10 years ago, longleaf pine regeneration, both artificial and natural, was very uncertain and prohibitively expensive. Longleaf stands that were harvested were routinely regenerated with loblolly pine and slash pine. Our original first generation seed orchards reflected this. Most of the seed orchard acreage on the coastal plain forests was developed for loblolly and slash pine seed production. With the Endangered Species Act, the red cockaded woodpecker, and the development of a planting option for longleaf container seedlings, combined with the Chiefs policy on clearcutting, the need for loblolly and slash pine seed dropped significantly. Existing loblolly and slash pine stands, when regenerated to loblolly and slash, are regenerated by seed trees and natural regeneration. Loblolly and slash pine stands are now being replaced with longleaf pine when they are on longleaf sites.

The sum total of all the influences is a reduced demand for tree seed (Figure 2) and seedlings. The economies of scale in seed and seedling production are gone. Stands are not being managed in ways that allow the capture of genetic gains. Given negative economics, a declining budget, and personnel constraints, we have no choice but to make substantial changes in the program. We will implement the following policies:

1. Existing first and second generation loblolly and slash pine orchards will be mothballed. When we need small amounts of reforestation seed, we will procure from commercial sources or states. If suitable amounts of seed cannot be purchased from local market purchases, we will contract for local collections either from the existing orchard blocks or from selected stands on national forest lands. The existing orchards will not be intensively managed. We are encouraging the use of prescribed fire to keep orchards free of seedlings and hardwood encroachment and to keep mowing costs to a minimum. Eventually these orchards will succumb to insects, disease, and/or other catastrophic events. At that time decisions will be made on the disposition of the sites.
2. The original longleaf orchard blocks and new longleaf seedling seed orchards will be maintained at a minimal level. If future seed needs are great enough, these areas may be fertilized to promote growth and increased cone production. Cone collection will probably be made by contract when crops are large and of quality enough to obtain good seed.
3. White pine and Virginia pine orchards will not be replaced. These orchards will be replaced with seedling seed orchards of northern red oak and white oak, as the space is needed. If white or Virginia pine seed is needed, it can be collected from wild stands or existing plantations.
4. Existing shortleaf orchards will be maintained at minimal levels by prescribed fire. Open pollinated shortleaf seedling seed orchards will be established and managed on an extensive basis, to provide seed for future collections. Shortleaf pine, especially in the Southern Appalachians, is disappearing from the

natural stands that are now dominated by hardwoods. We will have to provide active management to maintain the biological diversity provided by this species.

5. All national forests will be encouraged to identify and manage existing plantations of their important pine species for seed production areas as an optional source of reforestation seed. This will require thinning to a low density and a planned prescribed fire regime to keep the hardwoods and natural pine regeneration from encroaching. During years of abundant crops, reforestation seed needs may be met with small to moderate collections.

6. A subset of progeny tests has been identified for special management. These tests will provide sources of pedigreed materials from which to establish future second generation orchards if future needs and conditions change. Active management and protection of these sites is planned to retain them for genetic conservation and program continuity.

7. Active work to develop an artificial regeneration program for northern red oak, white oak, and black cherry will proceed. This will allow us to gather genetic materials, to propagate them and to apply genetic selection for selected characteristics. Seedling seed orchards will supply seed for a limited reforestation program and provide a minimal level of genetic conservation for these species. The long term goal is to gather enough material to establish broad based geographic source studies over a broad geographic range.

8. We will work with our Forest Health Unit, Forest Service Research, and the University of Tennessee on butternut, dogwood, American chestnut, and various other species of trees that have problems maintaining populations in wild stand situations.

9. Existing seed orchard land may be utilized by other FS functional units for the protection and production of threatened and endangered species of plants.

10. Records of the tree improvement program will be protected and will be available in the future.

In addition to the reduction of seed orchard programs, Forest Service nursery programs are also being evaluated based on the same trends and conditions that have impacted the tree improvement program in Region 8. The Ashe Nursery will cease production of seedlings under Forest Service management in the year 2000. Forest Service seedling needs will be met by contracting for seedling production with the state and private nurseries. The nursery facility will be offered to the private sector and other agencies under a special use permit.

These changes in program direction support the Forest Service's Natural Resource Agenda in the areas of "watershed health and restoration" and "sustainable forest ecosystem management.