

Timber Management Methods

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There are two primary timber management methods important to landowners at the onset of timber ownership. An understanding of each is fundamental to forestry. They are based on two regeneration techniques which ultimately influence all future management decisions and returns. They are:

- 1) [Natural Seeding](#).
- 2) [Planting](#).

Natural seeding for pine regeneration simply relies on existing mature pine trees for seeding dispersal and hopeful regeneration, while planting utilizes improved genetics in nursery raised seedlings. Natural seeding is sporadic, grows slow, and averages 45 years to sawlog maturity verses planted seedlings averaging 30 years. Subsequently, natural seeding has less initial cost (average \$35 - \$120/acre depending on enhancements), while planting cost average \$70 - \$400/acre, depending on site preparation intensity (none, chemical, mechanical or a combination). Ironically, even with the increased cost, the rate of return is slightly higher in planting due to shorter rotations. The average external rates of return after costs and before appreciation and taxes are:

<u>Method</u>	<u>Return of Return</u>	<u>Rotation</u>	<u>Reforestation Cost</u>	<u>Intermediate Cost</u>
Natural Seeding	6.4%	48 years	\$120	\$ 90
Planting	7.2%	29 years	\$299	\$ 137

Historically in Arkansas, all private, industry and public (government administered) owned lands relied on natural seeding. During the late 1960s and 1970s, industries like Weyerhaeuser and International Paper Company began transitioning into planting to meet growing consumer demands and competing with increasing international markets while maintaining competitive returns. In the 1980s and 1990s, sideline observing industries like Potlatch and Georgia Pacific (Plum Creek), joined the transition into planting. During this same era, less than 10% of Arkansas private landowners planted. Consequently, even with less surface ownership, corporations still produced the majority of timber supplied to mills in SW Arkansas.

To put Arkansas' evolved timber production into perspective, Arkansas produces 40% of our nation's rice and, resultantly, is the nation's top ranked rice producer. However, timber in Arkansas out-produces rice while being ranked 4th in national timber production. Timber competes only with poultry for the number one cash crop in Arkansas. Rice is primarily produced in the eastern Delta, and commercial timber in the central west and southern half of the state (Ouachita Mountains and Coastal Plains). Our abundant hardwoods in northern Ozark Mountains and portions of the Ouachita Mountains are utilized for recreation and aesthetics (scenic mountain views and tourism). Additionally, Best Management Practices are voluntarily employed and monitored by the Arkansas Forestry Commission on timber production lands. All the above have uniquely and strategically worked together in providing an unparalleled ecological balance supported and sustained by a stable economic diversification in timber production, recreation, tourism, scenic views, wildlife, conservation, preservation, agronomy, poultry, husbandry, and supporting blend of manufacturing.

Arkansas is part of the geographical "southern pine belt" which includes the southeast 13 states, spanning from southeast Oklahoma to the Carolinas. Collectively, the southern pine belt provides 15% of the world's annual lumber consumption and ranked as the world's largest sustained lumber supplier in the world. Canada is the second largest contributor at 13%. Surprisingly, our US domestic demand for lumber exceeds our

annual growth creating a limited dependency for lumber imports. In other words, our US imports help sustain our national supplies. The US is the world's largest consumer of lumber products.

The bold transition steps into planting, made by our leading industries in west central and south Arkansas (Ouachita and Coastal Plains), created a long-term sustained supply of timber in southern Arkansas. Arkansas now strategically produces approximately 2% more softwood than it currently harvests each year. These sustained surpluses are primarily generated from industry planted pine plantations, while the majority of private ownerships rely on natural seeding, annually harvesting above their growth. Fortunately, during the last decade more Arkansans have conscientiously transitioned into planting. Over the next 40 years Arkansas timberlands are expected to increase by 2 million acres. These conversions are primarily expected from husbandry (pasture) and agronomy (row-crops). Presently Arkansas has over 18 million acres in timberland of her total 33 million acres.

A chronological comparison for Natural Seeding and Planting are illustrated below:

- 1) Natural Seeding simply refers to relying on existing pine trees to regenerate seedlings by natural seed falling from cones in the crowns of the maturing pine trees (referred to as "parent" or "seed" trees). There are three techniques used in natural seeding: Seed Tree (common), Shelterwood (common) and Uneven-age (practiced by less than 1%). The traditional seed tree method is chronologically illustrated below (based on soil with a 90 site index on a 50-year base which interprets to unattended natural trees growing 90 feet in 50 years; typically a sandy loam soil with a clay base at three feet):

Step 1: Prior to final harvest, control burn the stand in late fall. The pre-harvest burn is important to ensure a uniform burn and prepare seed bed by exposing mineral soil (age 39 - 40).

Step 2: At time of final harvest leave approximately 6 - 11 trees per acre of seed trees to utilize their natural seed fall for regeneration (age 40). Trees selected for utilization as seed trees should exhibit the following characteristics:

- i. Straight and of good form (preferred genetics).
- ii. Superior diameter and height trees (average of 12" - 16" dbh.).
- iii. Mature healthy crowns (1/3 crown ratio).
- iv. Equally spaced to provide good seed coverage.
- v. No skins or root damage from previous logging.

Step 3: If the under-story is still impeded with competition following previous burning in step 1, a chemical spray may be advantageous (9 - 16 ounces of arsenal based on species present and degree of control intended; escort optional based on species present; age 40 - 41).

Step 4: Final harvest parent trees when regeneration is considered established (age 45; new stand age 5).

Step 5: Following year pre-commercial thin to approximately 400 - 500 seedlings per acre if stocking average is over 1,000 seedlings per acre (age 6).

Step 6: Commercial thin to 215 trees per acre (80 basal area; age 19).

Step 7: Commercial thin to 130 trees per acre (80 basal area; age 26).

Step 8: Commercial thin to 87 trees per acre (80 basal area; age 33).

Step 9: Seed Tree thin to 6 - 11 trees per acre (15 basal area; age 40) - repeat above steps.

External Return Rate: 6.1% (after costs and before appreciation and taxes).

Rate of Return: 6.6%.

Net Present Value: \$298.

Tons/acre/year: 4.6.

Average Annual Gross Proceeds: \$116.

Rotation: 45 years.

- 2) Planting refers to transplanting genetically improved seedlings after one-year growth in the nursery. This process is laborious and considered extravagant by those who historically utilize seed tree method. There are four primary techniques used in preparing sites for planting: burning (common with small private owners), chemical site preparation (common), mechanical site preparation (common), and a combination (common). The traditional combination method is illustrated below (based on soil with a 90 site index on a 50-year base which interprets to unattended natural trees growing 90 feet in 50 years; typically a sandy loam soil with a clay base at three feet):

Step 1: Following final harvest after competing vegetation reaches four feet in height, chemical spray in mid or late summer (arsenal and accord or similar mix; age 0).

Step 2: Control burn same summer or fall (optional; age 0).

Step 3: Subsoil in 10 – 12 feet rows with 3 – 4 inch wide by 18 inch-deep shank. (also referred as a rip; age 0).

Step 4: Hand plant following December – February (age 1).

Step 5: Grass spray following March – April (Oust and Arsenal; age 1).

Step 6: Thin to 177 trees per acre (70 basal area; age 14).

Step 7: Fertilize (phosphate and nitrogen; age 15).

Step 8: Thin to 99 trees per acre (70 basal area; age 21).

Step 9: Fertilize (phosphate and nitrogen; age 22).

Step 10: Final Harvest (age 28) – repeat above steps.

External Return Rate: 7.1% (after costs and before appreciation and taxes).

Rate of Return: 7.4%.

Net Present Value: \$458.

Tons/acre/year: 6.2.

Average Annual Gross Proceeds: \$167.

Rotation: 28 years.

Arkansas' current sustained competitive timber supply is primarily contributed to planting, and historically, to natural seeding. A common expressed concern is, "too much timber is being produced dropping prices and returns". No part of this statement is quantitatively or economically verifiable:

- 1) National and international competition influences market prices.
- 2) By growing more, we are able to lower timber prices and compete for a greater percent of the world market.
- 3) By growing more through planting, we can accept lower timber prices and receive increased returns due to improved production while simultaneously achieving greater competitiveness in world markets. Which of the following examples are more preferred?
 - a) Natural Seeding: 4.6 tons/acre/year over 45 years (annual average proceeds of \$118/acre).
 - b) Planting: 6.2 tons/acre/year over 25 years (annual average proceeds of \$167/acre).

Two rotations in the second example basically fit into one rotation of the first. Thereby offsetting fluctuating market prices with twice the production, and also increasing returns while simultaneously competing in the world market. The same applications were capitalized in Arkansas via Sam Walton.

In summary, both management methods are effective and practiced in Arkansas. Natural seeding (seed tree) provides low initial investment but takes approximately 45 years, while planting (combination) requires higher initial investment but is achievable inside 30 years. Both methods provide good return rates, with planting yielding the highest return.

Conclusion:

Arkansas annually grows more softwood than she harvests. This is achieved primarily by corporations who invest in planting, while private landowners tend to reinvest less. It is important for Arkansas to continue increasing its production with good sound ecological management for the following sustained and economic benefits:

- 1) Meet increasing world demands.
- 2) Maintain competitive prices in an expanding competitive global market.
- 3) Increase local supply margins between timber supplies and mill demands to maintain competitive prices and, likewise, continue to attract supportive industry to expand existing facilities and locate new facilities. Increased local margins between timber supply and mill demand does not alter world margins between construction demand and retail supply, but prices do.
- 4) Increase timber supply creating intended expansions and new facilities; emphasize the simultaneous need for upgrading Arkansas' education of her students and future managers.