

Anticipating Good Longleaf Pine Cone Crops

The Key to Successful Natural Regeneration

by WILLIAM D. BOYER, Research Forester, USDA-Forest Service, Southern Research Station, Auburn University

Unlike other Southern pines, or most intolerant pioneer species, longleaf pine is a poor seed producer. Cone crops are highly variable from year-to-year, and also from place-to-place in the same year. Crops large enough to assure adequate regeneration are few and far between, especially in the longleaf pine belt of the southern Coastal Plains. Not only is this species a poor seed producer, but the large, heavy seeds have a limited dispersal range. Seedlings, once established, are very poor competitors and may remain in the stemless grass stage for years.

None of these characteristics are normally associated with intolerant, early successional species that depend on prolific seed production, wide seed dissemination, and rapid early growth in order to quickly occupy and dominate an open site. Longleaf pine's adaptation to frequent fire, which its principal competitors cannot tolerate, has given this species its only competitive edge, and has allowed it to maintain itself in place for thousands of years.

How Large of a Cone Crop Is Needed?

First, there must be enough seeds to feed all the little critters so fond of the large, nutritious longleaf seeds, with enough left over to establish a good stand of seedlings. On the average, 360 longleaf cones per acre will barely provide for even one seedling! In most years, a minimum of 750 cones per acre is needed for adequate longleaf regeneration, provided other conditions affecting seedling establishment

Table 1. Long-term Records of Longleaf Cone Production

Cones/Tree	Location of Observed Sites		
	Alabama (39 yrs)	Florida (29 yrs)	Georgia (29 yrs)
75	2	1	1
40	6	2	3
30	8	4	3
25	8	5	3

Table 2. Estimates of Longleaf Pine Cone Crops from Springtime Binocular Counts of Flowers and Conelets

# Flowers Counted/Tree	Estimated Cone Production/Tree	# Conelets Counted/Tree	Estimated Cone Production/Tree
2	1	2	6
4	4	4	9
6	6	6	12
8	9	8	15
10	11	10	18
12	13	12	21
14	16	14	24
16	18	16	27
18	20	18	29
20	23	20	32
22	25	22	35
24	27	24	38
26	30	26	41
28	32	28	44
30	34	30	47
32	37	32	50
34	39	34	52
36	42	36	55
38	44	38	58
40	46	40	61
42	49	42	64
44	51	44	67
46	53	46	70
48	56	48	73
50	58	50	76
52	60	52	78
54	63	54	81
56	65	56	84
58	68	58	87
60	70	60	90

and survival are favorable. The preferred goal is 1,000 or more cones per acre.

How big of a cone crop does it take to provide the minimum 750 cones per acre? That will depend on the density of seed trees. Given 10 seed trees per acre, cone production must average 75 per tree. A shelterwood stand with 25 to 30 trees per acre affords a better opportunity for successful regeneration. With 25 trees, production must average 30 cones per tree to reach the 750 cone minimum, but 40 or more cones per tree is preferable to provide at least 1,000 cones per acre.

How Often Can a Good Crop Be Expected?

Just how often can longleaf cone crops of the needed size be expected? Long-term records of cone production in regeneration areas at three locations along the central Gulf Coastal Plains may provide an indication. This includes 39 years on the Escambia Experimental Forest in south Alabama, and 29 years each at a south Georgia and northwest Florida site. The number of years (from 1957 or 1967 through 1995) in which longleaf cone crops reached or exceeded the indicated size is shown in Table 1.

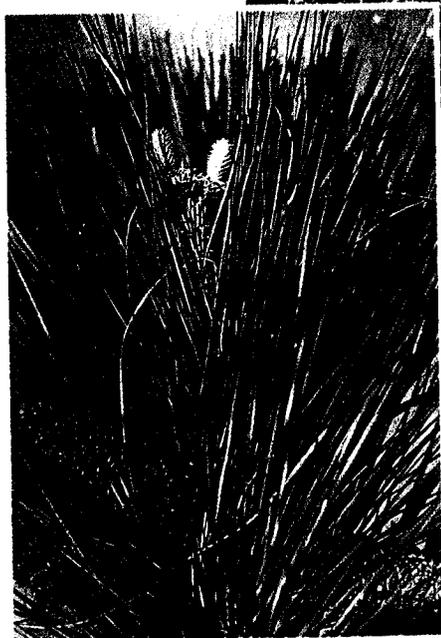
Only once or twice in 29 or 39 years did longleaf cone crops reach the 75 cones per tree level. Given a seed-tree stand of 10 trees per acre, the wait for even the minimum cone crop could be very long! During the wait, of course, the land is essentially out of production.

Managers working toward longleaf natural regeneration

now prefer a shelterwood system. The extra trees increase the frequency of acceptable seed crops up to three to five times in 29-39 years. Not only will there be a shorter wait for a good cone crop, but also reasonably good volume growth on high quality trees, plus the pine needle litter needed to fuel



Binocular counts of flowers and conelets can be used to determine the potential size of longleaf pine cone crops.



Two female flowers can be seen at the end of the terminal shoot, while mature, closed cones can be seen near the bottom.

fires hot enough to inhibit growth of hardwood brush.

The minimum size cone crops at these three sites occurred an average of only once or twice in 10 years. The time between these minimum useable cone crops

ranged from 1 to 17 years on the Escambia Experimental Forest, 1 to 16 years at the Florida site, and 2 to more than 23 years at the Georgia site. So it is possible to have two good cone crops almost back-to-back, and then not again for 15 to 20 years or more.

Preparation for a Good Seed Crop

Advanced preparation is needed in longleaf pine regeneration areas in order to promote seedling establishment and survival. This includes control of excessive competition and also seedbed preparation, as the large winged seeds must reach mineral soil to germinate and survive. Provided hardwood competition has been controlled, a burn within a year of seedfall should remove the surface litter and expose enough mineral soil for seedling establishment. Anticipation of a cone crop large enough to ensure an adequate supply of seeds becomes very important, as timing of preparatory measures is tied to this event.

(Continued on page 31)

It's Time For Action

Continued from page 10

- B. Continue dialog between industry, agencies, environmental groups and landowners.
 - C. Create committee for follow-up.
 - D. Hold meetings and demonstration tours.
2. Educate and inform public and landowners about forest resources and management.
 3. Establish equitable federal tax policies for landowners:
 - A. Estate (inheritance).
 - B. Expensing forest management costs.
 - C. Capital gains treatment.
 - D. Repeal passive loss rules.
 4. Promote a wide variety of land conditions and management, from preservation of unique areas and wilderness, to areas used for a wide variety of private and public uses.

5. Pass private property rights legislation.
6. Secure adequate funding for research and technology transfer.
7. Discuss new management options for USFS National Forests.

What Happens Now?

In Alabama something will happen. The Alabama Forest Resources Center will work to implement the Next Steps by bringing together people who participated in the Roundtable and Congress and others interested in the future of forests. The Next Step to be tackled first is federal taxation. A task force will be established that will decide on federal tax changes needed and recommend how to achieve the changes. The Federal Taxation Task Force is scheduled to meet this fall. Some of the changes that the task force may recommend could be measures to reduce the impact of estate taxation, to allow expensing of forest management costs, to permit capital gains treatment for sales of timber, and to make changes in passive loss rules.

To make progress on federal taxation is a prominent undertaking, but tax changes can be accomplished, especially if Alabama is joined by groups in other states working to achieve the changes.

We're off on a bold, new adventure to enhance the future of Alabama's forests. You can help as time passes by urging your U.S. senator and representatives to make the needed changes in federal tax laws and regulations.

Keep reading *Alabama's TREASURED Forests* and similar publications for updates on the work of the Federal Taxation Task Force in Alabama. You can be an important part in helping to change the federal tax law, which will provide you and other forestland owners with greater incentive to implement forest improvement practices.

To receive free summaries of the Alabama Roundtable and Seventh Forest Congress, call the Alabama Forest Resources Center at 334-343-9747; or write to AFRC, 3632-C Dauphin St., Mobile. AL 36608. ☐