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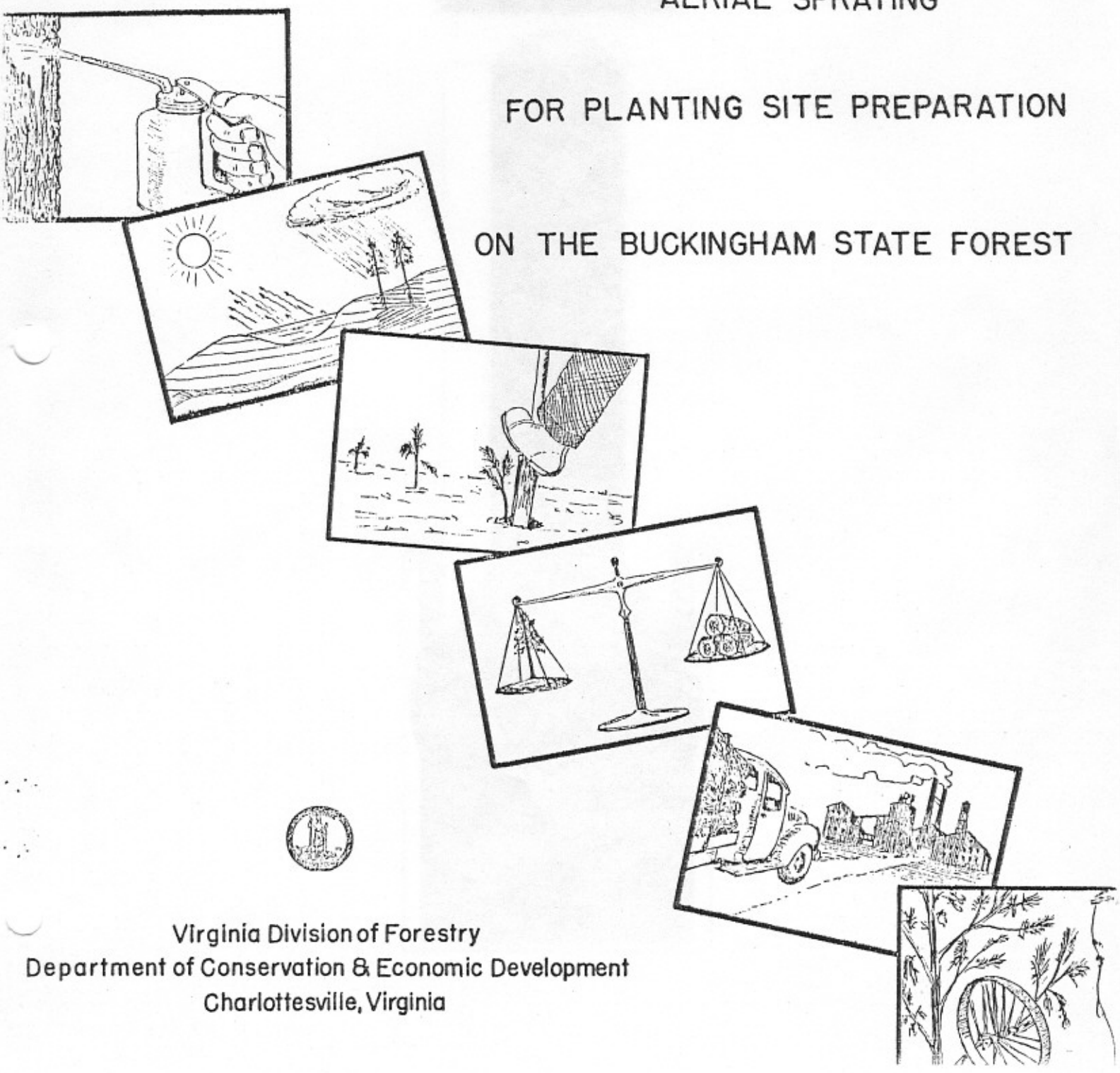
AERIAL SPRAYING

FOR PLANTING SITE PREPARATION

ON THE BUCKINGHAM STATE FOREST



Virginia Division of Forestry
Department of Conservation & Economic Development
Charlottesville, Virginia

AERIAL SPRAYING ON THE BUCKINGHAM STATE FOREST FOR PLANTING SITE PREPARATION

Summary

A 40 acre area of low-grade hardwoods was treated with an aerial application of Dow Chemical Company's product, 245 OS, at the rate of 3 pounds acid equivalent per acre during late July 1959. The test area is located on the Buckingham State Forest and is typical of many cut-over, second growth timberland areas in this section of Piedmont Virginia.

Results of the aerial spraying show that (1) unwanted hardwoods were satisfactorily controlled and (2) a suitable planting site was prepared.

Loblolly pine seedlings were hand planted on the sprayed area in March 1960.

Chemical injury to scattered natural shortleaf and Virginia pines present at time of spraying was negligible.

The aerial spraying cost was $11.30 per acre and is a reasonable cost to control hardwoods in this particular section of Virginia.

The Area Sprayed

Both high and low levels of shade were present, resulting in a two-story shade canopy level condition. Portions of the area support both shade levels and other portions either one or the other. The low shade ranges up to 20 feet in height; the high shade includes the dominant tree canopy level up to 60 feet in height.

The 40 acre area sprayed had been severely cut in the past and might be considered quite typical of many other Piedmont woodland acres. Tree species present include oaks (considerable number of chestnut oaks), red maple, hickory, dogwood, and black gum. Some of the larger hardwoods range up to 16 inches D.B.H. (diameter at breast height).

Trees adjacent to the boundary lines were frilled and poisoned in May 1959 to provide easier indentification of the plot from the air.

Spray Mixture Used

Dow Chemical Company's product, Esteron 245 OS, containing four pounds (acid equivalent) of the low volatile propylene glycol butyl ether ester per gallon was used in the test.

For the 40 acres sprayed, the following total spray mixture was applied:

30 gallons - 245 OS
40 gallons - Fuel oil
130 gallons - Water
200 gallons, Total

On a per acre basis, the following spray mixture was applied:

3/4 gallon -- 245 OS (3 lbs. acid)
1 gallon -- Fuel oil
3 1/4 gallons - Water
5 gallons, Total

Date Sprayed and Weather

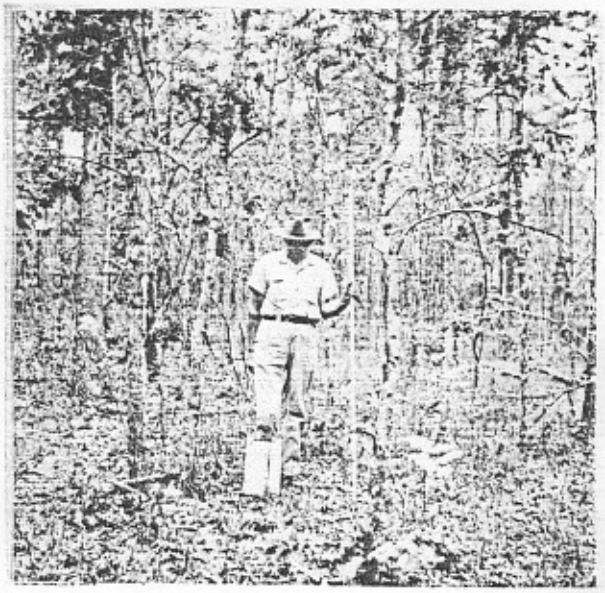
The area was sprayed by helicopter on July 28, 1959. As a matter of interest, from start to finish, the entire spraying operation for the 40 acres sprayed took just one hour.

The weather at time of spraying was warm (temperature approximately 87°F.), bright, and humid (relative humidity estimated at 76%). Wind speed was low, ranging from 0 to 2 m.p.h.

Growing conditions for vegetation was good with ample soil moisture present due to heavy rainfalls which occurred during July.

Area Planted

The spring (March 1960) following spraying the entire 40 acre area was hand planted with loblolly pine seedlings. Approximately 1,000 seedlings per acre were planted and initial survival exceeded 80 percent.



Typical look into area following spraying and planting. Clipboard providing background for planted loblolly pine in left hand photo and shows the planting site. The photo on the right shows the rapid height growth made by the planted pines within the sprayed area. The pines were planted during March 1960 and photos taken in September 1960.

Results of Spraying

All tree species present except red maple were strongly affected (50 to 100 percent defoliated) by the spray mixture (3 lbs. acid equivalent per acre).

A percentage breakdown, by number of trees,1/ showing spray effect one year following application follows:

	Species						
	White Oak 2/	Red Oak	Black Gum	Hickory	Red Maple	Yellow Poplar	Other 3/
Percent Strongly Affected	98	100	100	97	47	100	60

Natural shortleaf and Virginia pines, ranging from reproduction to sawtimber trees, scattered throughout the sprayed area were not damaged by the spray.

Throughout the entire area it is estimated that 75 to 80 percent of the understory trees (less than 2 inches D.B.H.) were destroyed by the spraying.

1/ Trees 2 inches D.B.H. and larger

2/ Includes white, chestnut, and post oaks

3/ Includes sourwood, dogwood

Typical "before" and "after" spraying photos showing almost complete defoliation in "after" photo on right taken one year following sprayings. Both photographs were taken in the summer.

"Before" and "after" sprayings photos looking up into the crown canopy. Note defoliation of the oaks in the "after" photo on right and the pine which was not injured as a result of the spraying. Both photographs were taken in the summer.

Pine Stocking Figures

Field data taken to measure stocking success of the planted loblolly pines revealed that the average "free to grow" stocking of the planted pines was 619 ± 92 pines per acre (5 percent probability). Stated differently, 19 times out of 20 the mean stocking on the area would lie between 527 and 711 "free to grow" pines per acre.

The "free to grow" pine stocking picture improves by adding the natural "free to grow" shortleaf and Virginia pines present to the planted loblolly pine stocking -- this total pine stocking is 731 ± 86 pines per acre (5 percent probability).

The above data reflects the number of mil-acres (1/1000 - acre plots, plot size a square 6.6' x 6.6') on which one or more "free to grow" pine seedlings are present. A "free to grow" seedlings must be free from overtopping competing vegetation or be judged capable of satisfactorily outgrowing competing vegetation.

Costs

Spraying (40 acres):

a. Chemical (245 OS) 3 lbs. acid per acre
   30 gal. @ $8.73 per gal.....$261.90
b. Fuel oil
   40 gal. @ $0.15 per gal..... 6.00
c. Water
   No charge
d. Labor - for flagging purposes
   4 man hrs. @ $1.00 per hour..... 4.00
e. Helicopter
   40 acres @ $4.50 per acre..... 180.00
   Total Cost $451.90

Avg. spraying cost per acre.....$11.30

Tree Planting (40 acres):

a. Seedlings
   39,500 seedlings @ $4.50 per M.....$177.75
b. Labor and Supervision
   364 hours labor @ $0.90 per hour..... 327.60
   64 hours supervision @ $1.72 per hour..... 110.08
   Total Cost $615.43

Avg. planting cost per acre.....$15.38

Avg. cost per acre for project.....$26.68

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