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PINE PLANTATIONS IN HARDWOOD STANDS BENEFIT WILDLIFE

(An example of timber and wildlife management coordination)

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There are about 15,000 acres of poor site hardwoods on the New Castle District of the Jefferson National Forest on Big Stony Creek, Giles County, Virginia. The wildlife on this area, as on the rest of the Jefferson National Forest, is managed jointly under a cooperative agreement between the Jefferson National Forest and the Virginia Commission of Game and Inland Fisheries. The timber stands consist chiefly of poor quality scarlet, chestnut, white and red oaks, red maple, hickory, black gum, with some yellow poplar, pitch and white pine and hemlock. The stand ranges in age from 25 to 50 years and from 30 to 70 feet in height and 4 to 16 inches DBH. The work described in this paper was undertaken as a wildlife habitat improvement measure. It was proposed as an experiment by the State Game Biologist.

Judging from the stumps, the original stand consisted chiefly of white pine and chestnut. These stands were cut about 1900 and since that time and up to 1930 burned every few years. These fires resulted in elimination of white pine and conifers over much of the area and have helped the growth of the poorer species of hardwoods.

The canopy is closed and with the exception of scattered patches of laurel and rhododendron along the streams, there is little cover for deer and forest game species. Approximately 85% of the area has no ground vegetation. There is a lot of land like this on the Jefferson National Forest.

It is generally recognized that young conifer stands provide good cover for game and hardwood sprouts furnish excellent deer browse.

Early in 1949 a strip 60 to 100 feet in width and one-half mile in length was clear cut in the hardwood stand on Big Stony Creek. Most of the timber was of small size and had no commercial value at that time. It was piled in windrows in the clearing and allowed to decompose. It has long since disappeared. At the same time 2,500 red pine, white pine and Norway spruce were planted. In the following three years 2,300 more red and white pine were planted. All of the planting was done with a spacing of 6 x 6 feet and a total of five acres were planted. Areas covered with winddowed slash and areas too rocky to plant were allowed to revert to hardwood sprout growth. The purpose of this work was to provide both cover and browse.

Hardwood sprout growth rapidly took over the plantations so they were released in 1949, 1950, 1951, 1952 and again in 1956. Probably the 1956 release could have been omitted on part of the area. It is hoped this will be the last

release necessary. All of this work was accomplished with Pittman-Robertson funds and was planned and supervised by the District Ranger and the Game Biologist of the Virginia Game Commission. There has been sufficient time to evaluate this management technique. The results are very encouraging.

The white and red pine ranges from 8 to 16 feet in height. The Norway spruce is apparently off site and what little is left is small. The neighbors for miles around have helped themselves to the spruce and probably will get the rest of it. Fortunately there has been no browsing damage to the plantations in this area. There has been some damage by the white pine weevil.

Unfortunately the local game manager for some reason known only to himself, poisoned out all of the hardwood sprout growth on the unplanted areas. However, this sprout growth has passed the point where it has any browse value. These areas are now stocked with: Greenbriar (Smilax spp), Grape (Vitis spp), Mountain Laurel (Kalmia latifolia), Wintergreen (Gaultheria procumbens), Sheep sorrel (Rumex acetosella), Blueberry and Huckleberry (Vaccinium spp and Gaylussacia spp), Cinquefoil (Pontentilla spp), Strawberry (Fragaria sp) and others.

The area is being heavily utilized by deer and grouse. They are seen nearly every time one passes the area. There is a well worn deer trail along the upper edge of the area and when snow is on the ground, deer tracks converge in the planted area.

FUTURE PLANS

The Game Biologist will select and layout additional strips for treatment and suggest the species and mixtures to be planted. Tentatively it is planned to locate narrow strips about one-fourth mile apart over the more level part of the area and on the poorer hardwood sites. He will arrange for the release work on the plantations. The Virginia Game Commission may contribute in some cases to access road construction and the purchase of planting stock.

The District Ranger will assist the Game Biologist in determining the location of the areas proposed for clearing and will approve the work. He will lay out the road system, mark and sell the timber and supervise the operation. It is visualized here that the area between and adjacent to the strips will be thinned. As much as possible of the timber sale receipts will be retained for sale area betterment work. This will consist mostly of conifer plantations in cleared areas. It will be necessary to keep close check of deer browsing damage. In some other parts of the forest, deer browsing damage has made the planting of pine impractical.

This is an interesting project. It demonstrates that in the Stony Creek area poor hardwoods can be replaced with valuable white pine and at the same time benefit the stand and wildlife. It gives some idea of the costs involved. Perhaps the killing of the stumps with ammate or 2-4-5T would materially lessen costs. It shows that the white pine seed source is important. The best white pine came from a local seed source. It was grown in the Virginia Forest Service Charlottesville nursery. The poorer white pine came from the U. S. Forest Service nursery at Parsons, West Virginia. The seed source is unknown.

The red pine is about 500 miles south of its range. Red pine planted so far south is reported to break up at an early age. However, in Stony Creek at an elevation of 2,600 feet above sea level, it is doing remarkably well.

It is doubtful if we will ever be able to replace more than one or two per cent of the hardwood stands with pine on the Jefferson National Forest.

SOME NUTRITION PROBLEMS OF DEER IN THE SOUTHERN PINE TYPE [1]

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A major problem of deer management in the South is recognition of optimum levels of stocking. This level is reached before a general browse line is in evidence and while it is difficult to demonstrate the shortage of food. This is because of the quality deficiencies of all plants due to low soil fertility; and also because much of the available herbage is not palatable to deer.

Recent surveys of deer ranges in East Texas have revealed disturbing evidence that problems of overpopulation, range deterioration, and die offs are common. Since deer are building up throughout the South, it is timely to consider the problems of nutrition, recognition of signs of trouble, and possible solutions.

Livestock in the South generally require fertilized supplementary pastures and/or winter feeding to obtain a diet of adequate quality. Where neither is provided, calf crops rarely exceed 50 per cent, weights are light, mortality is high and profits are negligible. This points to the weakness of the southern range low quality especially in winter.

The minimum desirable nutrition levels for cattle as reported by Campbell and Cassady (1951) are about 8 to 9 per cent crude protein (moisture free basis), 0.20 to 0.25 per cent calcium, and 0.18 to 0.21 phosphorus. On the air dry basis with 15 per cent moisture, these minimums are 6.8 to 7.8 per cent protein, 0.17 to 0.21 calcium, and 0.35 to 0.40 phosphoric acid.

Fraps and Fudge (1940, p. 18) say a fair nutrition level for beef cattle is 6.00 to 10.40 protein, 0.16 to 0.30 calcium, and 0.33 to 0.66 phosphoric acid, air dry basis. The composite winter cattle diet on forested range in coastal Louisiana was reported by Campbell et al (1954) to be 3.92 protein, and 0.09 phosphoric acid, air dry basis.

Nutritional requirements of deer in the South have not been defined. However, there is some evidence from other sections that the above levels for cattle are approximately correct for deer. Einarsen (1946) reports the crude protein requirement of Oregon deer is at least 5 per cent. Leopold et al (1951) found in California a critical protein level of 7 or 8 per cent, 40 per cent starvation having occurred when the diet dropped below 7 per cent. French et al (1955) found in Pennsylvania pen-feeding that 13-16 per cent protein and 0.25 phosphorus was necessary to obtain optimum growth of deer. Although these citations vary, there is general agreement that as quality of the forage declines, weights and reproduction decline (Morton and Cheatum, 1946; Dahlberg and Guettinger, 1956; and Goodrum and Reid, 1954).

Quantity requirements are fairly well defined. A 100-pound deer needs about 2.5 pounds of air dry forage per day, according to Nichol (1938), Smith (1950), and Davenport (1939). By green weights this averages 7.3 pounds in spring, 6.3 in summer, 5.8 in fall, and 5 in winter.

THE QUANTITY AND QUALITY OF AVAILABLE HERBAGE

A series of browse studies in southeast Texas at the State Forest in Newton County provides some information on available herbage in unburned flatwoods pine-hardwood type.

Quantity determinations were made by estimating seasonal growth on 27 permanent 2 by 48-foot plots in a 58-acre deer pen. Results were slightly lower than those from nearby plots which were clipped and reported last year (Lay, 1955). The air dry standard with 15 per cent moisture content is used throughout.

The available herbage (including browse, herbs, and grasses-sedges) totaled 187 pounds per acre in spring, 220 in summer, 151 in fall, and 137 in winter. As shown in Table I, the major portion of the herbage is browse. These weights

1 Contribution of Federal Aid in Wildlife Restoration Project, Texas W-63-R. Presented at the Southeastern Association of Game and Fish Commissioners meeting in Little Rock, Arkansas, October 8, 1956.