Klawitter

Woodland Drainage in the Southeast

RALPH A. KLAWITTER

TWENTY million acres of wetland forests of the southeastern coastal plain collectively constitute a complex of highly productive types and submarginal timberlands. With large acreages of these lands already drained for timber production in the last 20 years, water control measures have become the object of hopeful enthusiasm and thoughtful concern. A brief account of these practices and their use to alter various wet forest sites is given in this paper.

Ralph A. Klawitter is project leader, Wetland Improvement Project, Southeastern Forest Experiment Station, Forest Service, U. S. Department of Agriculture, Charleston, South Carolina.

The practice of woodland drainage in the coastal plain began on the Altama Plantation in Glynn County, Georgia, in 1947 and has been applied throughout an ever widening area at a steadily increasing rate since that time. Presently, about 2 million acres of forest land throughout the gulf and Atlantic coastal plains are ditched as a part of their management.

Purposes for Drainage

Two purposes of woodland drainage are to restock marginal lands and to improve tree growth. Forest owners are trying it as a means to increase timber production

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on thousands of acres where overabundance of water injures seedlings, reduces growth, and hampers land improvement efforts. Drainage also shows promise as a way to improve accessibility on lands that are otherwise wild and unmanageable. Roads constructed on the spoil from drainage ditches facilitate timber salvage operations and protection of the forest against fires, insects, and disease. They also provide access to new fishing holes and streams and make possible a more equitable distribution of hunting pressures over the land. Harvest of surplus game helps preserve the balance between natural food supplies and the wildlife populations found on these areas.

Wetland Forests

Wetland forests are scattered along a thousand-mile stretch of the coastal plain from southeastern Virginia to southern Florida. Their soils, vegetation, and wildlife reflect the dominating influence of abundant water supplies. Some of them in their natural state are highly productive for timber and wildlife; many others are not. Therefore, broad generalizations about the need for drainage in them is hazardous without better definition of the kinds of woodlands involved. One scheme of classification recognizes four broad types of wetland forests: (a) bottomlands, (b) swamps and ponds, (c) coastal plain bays, and (d) wet flats.

Bottomlands

Bottomlands occupy the land adjacent to the branches, streams, creeks, and rivers that crisscross the coastal plain. The slightly elevated and better drained lands in them are referred to as "terraces", while wetter areas below are called "first bottoms". Collectively, these woodlands are considered among the most productive in the Southeast for hardwood timber and wildlife because of their inherent fertility and abundant moisture. As a rule, water management in these areas is aimed at maintenance of natural water levels.

One example of the multiple benefits to bottomlands that can be produced by seasonal flooding is the green-tree reservoir. When managed properly, green-tree reservoirs provide feeding areas for waterfowl, increase ground-water supplies, and improve timber growth.

Swamps and Ponds

At the wet extreme of wetland forests are swamps and ponds, with very poor drainage and boggy soil conditions. When added to the bottomland type, they account for between 13 and 14 million acres of the 20 million acres of wetlands in the Southeast. Ordinarily, swamplands are highly productive in their naturally wet state, although this may not always be true for ponds. Consequently, woodland drainage probably has limited value in soil improvement. Rather than removing water, management programs may consist primarily of water applications in prescribed amounts to meet the needs of plants adapted to wet conditions.

Coastal Plain Bays

Bays cover approximately 2.5 to 3 million acres of wet forest land in the coastal plain. Natural drainage from them usually is impeded by elevated rims, sluggish outlets, and depressed, impermeable subsoils. Peat soils may accumulate over mineral subsoils because high water levels retard the decomposition of plant remains. Potentially, these are pine lands in their native state, but they are relatively poor producers of timber and wildlife. Where mineral soils lie within 2 feet of the surface, adequate drainage in combination with other land preparation measures may raise site productivity for pine pulpwood.

Bays with deep peat seldom display the productivity response shown by those with mineral soils. Early survival may be good, which indicates that initially, at least, high water levels are a limiting factor. As time passes, however, survival sometimes declines and growth is slow, which may mean that drainage by itself is not a cure, and improvement must come through solution of complex, hydrochemical bog processes about which little is known at the present time.

Wet Flats

At least 3.5 to 4 million acres of wet flats have overabundant water supplies, seasonally or otherwise, that currently limit a more intensive program of woodland management. Use of woodland drainage in an effort to raise the general level of soil productivity for pine trees is widespread.

Early research results from a drainage study on the Apalachicola National Forest in northwest Florida indicate the response of certain kinds of wetlands to drainage. In 1960 and 1961, the national forests in Florida and the Southeastern Forest Experiment Station cooperated with the Soil Conservation Service to determine the response to drainage of newly planted and older trees on a sandy, wet flat. After 3 years in the field, slash pine seedlings (4 years from seed) averaged 92 percent survival and 3.4 feet in total height. These results compare favorably with those achieved in plantings on better drained natural areas in the upper coastal plain.

Additional research in north Florida to evaluate the change in growth response of 20-year-old slash pine after drainage indicated total tree height at age 50 years was increased substantially. Unless this response proves to be temporary, the potential of this wet flat to produce pine pulpwood has been nearly doubled.

Woodland Drainage

Woodland drainage, more appropriately called water control, is a tool that can be used to improve the productivity of millions of acres of pinelands in the Southeast, where excessive water reduces survival and growth. But, as any tool, it must be applied to the task for which it is designed and only when the user fully understands its capabilities and limitations.

Present woodland drainage patterns and methods are geared to road access needs, rule-of-thumb procedures adapted to woodlands from other situations, and short-term experience. If we wish only to expedite the movement of water from wetland forests to the sea, perhaps this state of knowledge is adequate. But, if we wish to manage the water resource of wetlands effectively, we must answer such critical questions as: What water levels and soil properties should be achieved in wet woodlands to improve their productivity for timber, wildlife, and forage and to conserve groundwater supplies? What water control techniques and soil management measures produce these desired water levels and soil properties?

When we have answers to these questions, we will be in a position to increase the current contributions of wetland forests and at the same time conserve vital soil and water resources.