

Relation of Forest Research to the Soil Erosion Problems of the South

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The queries of a curious and uninformed public as to what constitutes forestry are becoming increasingly difficult to answer. Perhaps no two foresters could exactly agree on which of the divergent lines of professional endeavor the emphasis should be placed. The events of the past decade, however, are indicating the truly wide-reaching relations which the forestry profession bears to the lives and welfare of the public. The water problems in many of the arid western states are typical of these more recent developments. Increased water needs resulting from agricultural and industrial expansion, coupled with a cycle of dry years, are lending undreamed importance to the water yields of mountain watersheds. Few men of a generation ago could have visioned a time when a chaparral-covered canyon could compete in economic favor with the timbered slopes of a logging chance. As a result of such developments, it is not surprising that the more indirect influences of forests and forestry practice on public needs are looming large on the forester's horizon.

It is a far cry from the arid West to the well-watered coastal plain of the southern United States, yet the water problems peculiar to that region are also pressing for solution. Here, however, it is not the conservation of water but the control of destructive surface flow that creates a problem. Contrary to popular conception, the bulk of the land area of the Gulf States consists not of inundated swamps, but rather of well-drained upland some of which has pronounced topographic relief. In such a region, extensive soil erosion might be expected when one also considers that the soils are, in general, extremely erosive; that the annual rainfall is well distributed throughout the year and averages 50 to 60 inches; that only partial freezing of the soil occurs during the winter months; and that cotton and corn are grown to the exclusion of other crops. Such a combination of factors could hardly fail to produce soil losses. One must, however, search for less obvious factors to account for the widespread and appalling amount of erosion which characterizes certain portions of the South today. (Fig. 1).

More than 65 years have elapsed since the Civil War, and the innumerable changes occurring since leave only glimpses of what must have been the romantic, thriving South of the antebellum days. Remote as the war may seem, nevertheless to it

and to the economic system it set in motion can be attributed much of the extensive soil devastation of today. The Reconstruction Period marked the passing of the plantation system, for during those chaotic times owners began relinquishing con-



Fig. 1. *An abandoned field, severely gullied and typical of thousands of acres in the Silt Loam Uplands of Mississippi.*

trol of their land holdings. Even in cases where financial misfortune did not necessitate giving up the land, planters began moving to the towns, sub-dividing the plantations and renting



Fig. 2. *A composite glimpse of a Mississippi erosion cycle—the girdled trees left on newly-cleared woodland; the inevitable cotton crop; and in the background, the eroding slopes of an abandoned field on which native vegetation is waging a losing battle in its efforts to reclaim.*

the land parcels to negro tenants for a share of the crop. Such practices meant no less than virtual abandonment of the land. With the owners indifferent to soil impoverishment and chiefly interested in their holdings at cotton picking time, it is little to be wondered that the tenants were not concerned with maintaining the fertility of their allotments. Land was cheap and even though the cultivatable life of the erosive soils averaged only five to ten years, it was simpler to abandon the eroding slopes and transfer operations to new fields. (Fig. 2.) At the time of abandonment, these old fields might easily have been converted to pasture or hay land, but here again the incentive was lacking. Cotton was king and forage crops, though desirable during certain periods, could be dispensed with. Such practices have gone on uninterruptedly until at present in certain counties in Mississippi over three-fourths of the agriculture is carried on by tenants and 50 to 75 per cent of the original farm acreage abandoned.

It is interesting to speculate on what the reactions of a planter of the pre-war days might be could he only be given a view of the Loessial Region of Mississippi as it appears to day. He would see recently-cleared cotton fields gullied and ready for abandonment before the decay of stumps and girdled trees. He would see thousands of acres once white with bursting cotton bolls but now scarred with huge gullies and washes. He would see streams reminiscent of the trips of the packet steamer but with channels now so completely choked with sand and erosional debris that nothing larger than a rowboat could traverse them. (Fig. 3.) He could not fail to note the deposition of sandy

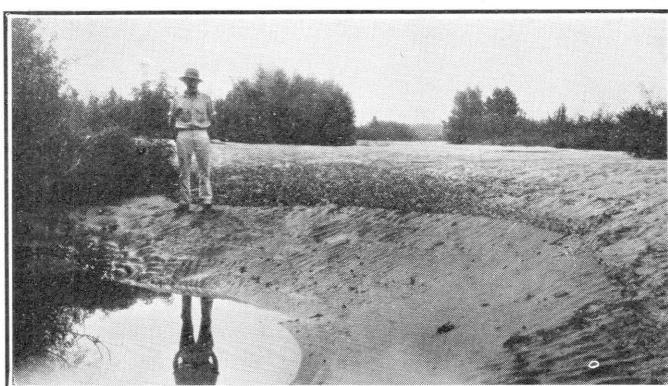


Fig. 3. A stream bed in northern Mississippi filled bankfull with sands washed from the uplands of the region.

wastes on fertile, alluvial fields and the declining agriculture on what was once productive upland.

It has been pointed out that the soil erosion problems of the South are directly due to the agricultural practices and that the damage is of greatest and most direct concern to southern agriculture. What relation then can forest research have to such problems and what part can a forester play in helping to solve a land problem of such magnitude?

As a result of such extensive land abandonment, it is inevitable that abandoned acres by the thousands are reverting to southern states each year for non-payment of taxes. Regardless of whether the public favors an increasingly paternalistic form of government, the fact remains that state governments, through no choice of their own, are being forced into the real estate business. It appears certain that, at a time not far in the future, some organized attempts must be made to administer these waste areas. The land programs developed may not, necessarily, involve actual use of the land for production of a marketable commodity. These programs must, however, be based on a sound knowledge of the facts relating to land use and its possible influences. A few of the moot questions to which definite answers must be known are (1) the soil losses from different types of vegetative cover and from different forms of agricultural use; (2) the relative capacity of woodland, pasture, crop land, and other areas for absorbing rainfall; and (3) the influence of major land classes on stream flow and floods. Such data could be expected to indicate the land classes most hazardous from the standpoint of soil losses and rapid run-off, the areas that should remain out of production, and the most desirable practices and methods of handling the productive acreage. The investigations of foresters and biologists will be needed to supply the complete answers to many such questions.

It is, however, for a different phase of the erosion and land problems of the South that forest research is most needed. The reclamation of impoverished, abandoned areas through tree planting affords an unusual opportunity for constructive, investigative effort. The problems involved are many. In most cases the planting sites are extremely unfavorable because of the unstable, infertile soil materials exposed in the larger washes. Then, too, only a few species are known which combine effective soil-binding qualities with adaptability to the eroding sites. Plant materials, including herbaceous forms, which show promise for erosion control must be developed and their effectiveness thoroughly tested. The use of dams and other soil-saving devices needs investigation and the most efficient methods for preparing gullies for planting must be worked out.

To be of any value, reclamation studies must not only point to rapid and effective erosion control but must also demonstrate the economic practicability of such work. Prevailing low land values, although an obstacle to extensive erosion control in the South, do not completely preclude such investigations nor make them less necessary. A few land owners are often vitally interested in controlling large, destructive gullies. Moreover, wider use of erosion control measures should result once their effectiveness has been demonstrated. For example, the prevention of erosion along highways probably affords a practical use for the results of studies of vegetative control.

It has already been demonstrated by the Tennessee State Forest Service that as many as 1,057 black locust fence posts valued at \$264.25 can be produced on an acre of badly gullied land in 12 years. (Fig. 4.) Encouraging as this appears, the



Fig. 4. Only 12 years ago this area was a deeply-gullied, abandoned field. It has been completely reclaimed through tree planting and now supports a thrifty stand of black locust.

widespread planting of black locust should not be offered as a panacea for land problems of the South. The reclamation of abandoned lands on a large scale may appear at present neither feasible nor, in view of over-production trends, desirable. Few people, however, would maintain that the problems involved in restoring as basic a resource as soil be left unsolved until the time when actual corrective attempts can be made. It is in just this role—that of determining the facts relating to the rehabilitation of eroding lands of the South—that forest research can render a service.