

FORESTATION OF SURFACE MINES FOR WILDLIFE¹

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Abstract--This report reviews TVA program efforts to promote the use of wildlife shrubs in mined-land reclamation including work on plant materials development, demonstrations to acquaint landowners with a variety of food and cover plants, and action programs to incorporate wildlife plants into postmining land use. It deals briefly with wildlife considerations under Public Law 95-87 and the wildlife seedling needs and supply problem.

INTRODUCTION

The remoteness of most Appalachian surface mines logically dictates these lands be returned to their original forest and wildlife condition. While there may occasionally be other land-use options--agriculture, housing, or other community uses--the long-term reclamation goal for most sites should be to ensure their productivity for forestry, fish, and wildlife.

There will be disagreement between resource groups--foresters and wildlifers--as to what portion of the stripped land (and water) should be devoted to each resource. In looking at forest management from a wildlifer's point of view, Ripley (1973) states:

Conflicts will arise but our mutually shared resource, the forest, is not and should not be the sole concern or property of any group or profession. As long as we, as functional specialists, can accept production realities that are submaximal (we cannot maximize both timber objectives and wildlife target species at one time), progress is possible. . . . It does mean single resource objectives will be subordinate to other multiple goals.

Determining whether disturbed acreage should be managed primarily to yield forest products or provide wildlife habitat will depend on landowner objectives. Resource professionals can help the landowner design an overall management plan for the land, but

one of the resource objectives must be given importance over the other. The kind of vegetation that performs well on the site could influence the landowner in making the final selection.

Some will call the title of this paper ambiguous and even question how one can conduct "reforestation for wildlife." The term "forestation" implies a planting action is being carried out either to convert land into a forest or to replant with trees. Funk and Wagnall's New Practical Standard Dictionary defines "forest cover" as the sum total of vegetation in a forest--more especially trees, shrubs, and all the litter on the forest floor. Presumably, this would include all biological activity. And, one of several definitions for a "forester" is a person in charge of a forest, its timber, and its game. Under English law, the forest is wild land belonging to the Crown and kept for the protection of game. Based on these definitions, we feel comfortable with our title, "forestation for wildlife," and consider it appropriate terminology when applied to the planting of trees and shrubs for the benefit of wildlife populations.

This paper reports on Tennessee Valley Authority program efforts to develop and promote the effective use of wildlife food and cover plants in surface mine reclamation as a site restorative measure and for habitat improvement. A plea is also made to the State and private nursery sector to provide an adequate and dependable supply of seedlings to meet current and future revegetation needs.

WILDLIFE PLANT SELECTION AND IMPROVEMENT

An enormous body of literature covers research dealing with problems encountered in mined-land reclamation. A glance at bibliographies spanning the period of formal

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and informal research emphasizes the importance of vegetation in the reclamation scheme. While studies on the performance of forest tree species predominate, the more recent literature shows an expanding interest in wildlife shrub development and use. The U.S. Fish and Wildlife Service guide (Rafaill and Vogel 1978) for vegetating surface-mined lands for wildlife in eastern Kentucky and West Virginia reflects this interest.

Most plant materials improvement has been by the U.S. Soil Conservation Service (SCS). Ruffner (1965) and Ruffner and Steiner (1973) summarized shrub evaluations on strip mines and provided species recommendations. Among the SCS's more successful shrub selections are the familiar Cardinal autumn olive (*Elaeagnus umbellata*), Arnot bristly locust (*Robinia fertilis*), and Remred amur honeysuckle (*Lonicera maackii*). Studies by the U.S. Forest Service (Plass 1975) and Pennsylvania State University (Horn 1968) involved comparisons on the performance of different shrub species. Several species with good reclamation potential were identified.

Plant research by TVA covers efforts to: (1) provide a wide variety of species for reclamation and (2) develop improved strains through progeny testing and selection. Fowler and Adkisson (1980) studied the survival and growth of 17 species--both trees and shrubs--over a range of acid spoil conditions at two locations near the eastern slope of the Cumberland Plateau in east Tennessee. They recommended autumn olive, *elaeagnus* cherry (*Elaeagnus multiflora*), Arnot bristly locust, sawtooth oak (*Quercus acutissima*), red maple (*Acer rubrum*), and Toringo crabapple (*Malus sieboldi*) for quick improvement of wildlife habitat. Autumn olive was given the highest habitat index rating in a ranking of mast, browse, and cover parameters.

Genetic improvement research at TVA is aimed at providing selections for food for a diversity of wildlife, both birds and animals (Scanlon 1979). The selection and evaluation involve 31 tests of 15 species established from 1974 to 1978. Species include the shrub dogwoods (*Cornus*), shrub oaks (*Quercus*), wild grape (*Vitis*), cherries and plums (*Prunus*), and American elder (*Sambucus*). The payoff from these tests in terms of seed production is only two or three years away. Selections already completed for silky dogwood (*C. amonum*) are now in nursery propagation for seed orchard use.

Selections of the best families and individuals in the other tests can be initiated at any time. Through selection, gains in food production of 100 percent or more may be realized.

PLANTING DEMONSTRATIONS

A brief historical account of TVA's efforts to promote the use of wildlife shrubs through the demonstration approach is presented to illustrate the growing interest in improving habitat for wildlife. In 1963, food and cover plants were included in the planting plans of four reclamation demonstrations--three in Tennessee and one in Virginia--dealing with the abandoned mined land problem. Holland (1973) reported on how the combination of planting and natural plant succession worked to provide a productive wildlife habitat. Another early 1960 demonstration established on a 300-acre tract of TVA land near the Paradise Steam Plant in western Kentucky showed that when surface mined lands are well reclaimed, biological productivity develops in a relatively short time (TVA 1969).

These early demonstrations included cooperative plantings in southwestern Virginia with the Penn Virginia Corporation and the Commonwealth of Virginia. During 1970-72 over 135,000 wildlife trees and shrubs were set out on surface mined sites within a 10,000-acre area devoted to wildlife management (Fowler and Perry 1973). The mined areas either predated reclamation legislation or had been legally reclaimed under State provisions. Management planning and practice were geared to maximize wildlife benefits.

All these demonstrations have provided valuable input helping to assess wildlife potential of surface mined lands and improve reclamation technology. Results on planting performance have application in planning post-mining land use for abandoned lands and current and future mining as well.

ACTION PROGRAMS

Considerations for wildlife have played a significant role in two major action programs. One dealt with the reclamation requirements built into the Agency's coal purchase contracts. The other dealt with the Orphan Land Reclamation Demonstration conducted in four Valley coal States (Alabama, Kentucky, Tennessee, and Virginia) between 1976 and 1979.

Coal purchase contracts

TVA coal purchase contracts let between January 1971 and November 1978¹ contained very demanding revegetation requirements. Unless the postmining land use was for agriculture, mine operators were required to revegetate the disturbed acreage with trees, shrubs, and herbaceous ground cover. The planting requirement included wildlife shrubs--some 225 on each acre. These plantings represent perhaps the first large-scale "forestation for wildlife" in southern Appalachia.

TVA used the planting opportunity to acquaint mine operators with a variety of wildlife plants suitable for mine planting and to show landowners how their use improves existing habitat structure and enlarges the food base available to wildlife. TVA provided the seedlings, and mine operators did the planting as part of the revegetation required by State and TVA standards. The improvement plantings ranged from 5 to 10 acres each and involved species selected for their tolerance to acid mine conditions and for their habitat diversity. Some 88 plantings, totaling 503,000 wildlife trees and shrubs, were set out over a range of site conditions between 1973 and 1979. The extensive plantings are available to biologists for monitoring and evaluation and can provide a ready source of seed when needed for nursery production of seedlings in future planting programs.

Orphan Land Reclamation

This Federal-State-landowner action program carried out in a 38-county area over three planting seasons--fall 1976 through spring 1980--involved extensive "forestation for wildlife." The cooperative effort was designed to alleviate offsite impacts by reclaiming orphan mines in a demonstration of techniques and administrative arrangements that could be applied on old minesites elsewhere in Appalachia.

In treating 14,514 acres, more than 4.6 million of the 10.4 million seedlings planted were wildlife shrubs. The wildlife resource should benefit significantly in years to come from the establishment of these food and cover plants. Game enthusiasts will share immeasurably in the wildlife recreational opportunities presented on thousands of acres of land.

WILDLIFE FORESTATION AND PUBLIC LAW 95-87

Frequent references to wildlife in the Federal Office of Surface Mining's Permanent

Regulatory Program (Public Law 95-87) should alert biologists to the opportunity for further developing this resource. Major beneficial impacts are predicted and will come about if biologically sound reclamation considerations are integrated into the mining process.

Under the Act and its supporting regulations, the back-to-contour provision should favor wildlife habitat development. The land configuration resulting from steep-slope mining limits land use, except for forestry and wildlife. The proper selection and placement of wildlife food and cover plants on these sites can contribute significantly to habitat improvement. Permissible land surface modifications to provide water, which animals need along with food and cover, would assure successful development of this resource as a postmining land use. Even fish can be incorporated if provisions for ponded water are allowed.

WILDLIFE PLANT NEEDS AND SUPPLY

A dependable future supply of wildlife plants and seed is a requisite to meeting reclamation needs throughout southern Appalachia. The demand for seedlings will become more pressing as planting programs visualized under Public Law 95-87 get underway.

Needs

Any projection of needs must consider estimates of abandoned land acreage that can be improved through planting of wildlife food and cover plants and acreage that is disturbed annually in current mining. The SCS (1978) estimates some 160,000 of the 227,000 abandoned acres in southern Appalachia (five Valley States) is suitable for wildlife habitat development. Also, TVA estimates some 9,000 acres is disturbed annually in the Tennessee Valley coalfield by active mining. Another 15,000 to 20,000 acres can be added for active surface mining in the eastern Kentucky and southern West Virginia fields. To translate these land requirements into seedling production, a base production rate of 10 million wildlife plants per year will be required. This estimate is subject to change depending on emphasis given to wildlife in State regulatory programs under OSM's Permanent Regulatory Program.

Generally, there has been a shortage of the kinds of wildlife plants needed for mined-

¹Contracts let after this date require operators to comply with all State and Federal regulations.

land reclamation. In 1971 when TVA first required its coal suppliers to include wildlife shrubs in their reclamation plans, there was a short supply and very limited species diversity of planting stock for revegetation. A similar condition prevailed in fall 1976 when TVA initiated the orphan land reclamation demonstration. State nurseries responded by increasing forest tree and wildlife shrub production by some 4.9 million seedlings. Shrubs made up about 40 percent of this production.

While the States expanded production in response to these needs, seedling supply is still short of demand. Increases in production are limited by a shortage of nursery bed space at some of the nurseries. Significant increases of wildlife plants are also unlikely because of the prior emphasis on production of timber species for general reforestation. Commercial nurseries can be relied on to produce some of the planting stock, but mine operators find many of the private nurseries cater to the ornamental trade, and the cost of seedlings reflects these values.

When apprised of the need, the State and private nursery sectors should respond and provide much of the required production. Some incentives to producers may be required, but this will help ensure the availability of planting stock needed in the region's planting programs.

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