Highway Rights-of-Way as Longleaf Pine Restoration Habitat

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Abstract

Longleaf pine (*Pinus palustris* Miller) has been extirpated or reduced in extent throughout many parts of its range. Highway rights-of-way may offer substantial habitat for longleaf pine planting and could play a significant role in restoration efforts. Desirable attributes of longleaf pine for right-of-way planting include aesthetic appeal and resistance to insects, disease, fire, and wind-throw. We highlight a pilot project in Virginia that may be applicable range-wide for longleaf pine. Five longleaf pine reintroductions were done with the Virginia Department of Transportation utilizing cloverleafs and a wetland mitigation site. The plantings were done as part of an integrated ecosystem restoration and include attractive, indigenous, associate plants. Longleaf pine survival rate is 84% at the first cloverleaf site planted in 1999. The plantings also represent an 11% increase in the native Virginia longleaf pine population. This project indicates that substantial gains in longleaf pine restoration may be obtained by utilizing appropriate habitat on highway rights-of-way.

Introduction

Longleaf pine historically occurred on about 92 million acres in the southeastern United States (Frost, 1993). Today, less than 3 million acres of this once expansive forest remain. In Virginia, the northern limit for the species, less than 800 acres remain of an estimated original 1.5 million acre longleaf pine forest (Sheridan et al., 1999a; Frost, In Prep.). Given such drastic declines in the distribution of a major forest species, we sought to develop novel approaches to maintaining or increasing acreage for restoration purposes.

This paper highlights a pilot project with the Virginia Department of Transportation (VDOT) to reintroduce longleaf pine within its historic range on appropriate habitat on highway rights-of-way. Highway rights-of-way may offer substantial habitat for longleaf pine planting and could play a significant role in restoration efforts.

Materials and Methods

Virginia longleaf pine seeds were collected and propagated by Meadowview Biological Research Station (Sheridan et al., 1999b). Longleaf pine seedlings were donated to students at Potomac Elementary School in King George County, Virginia, as part of their rare plant restoration program under the Toyota Tapestry Grant. Students raised their

seedlings in 6-inch pots and maintained them at constant moisture through a bottom watering system.

Five sites were selected for longleaf pine restoration. Three of the sites were selected by a VDOT roadside development manager and involved small-scale roadside plantings of Meadowview longleaf stock (n = 10, 25, and 25) in Portsmouth, Sufolk, and Virginia Beach, Virginia, respectively. The 2 other plantings were located in a cloverleaf in Prince George County, Virginia (n = 217), and a wetland mitigation site in Greensville County, Virginia (n = 590).

The Prince George County longleaf pine planting was done in January 1999 with bare root and container stock. Ground cloth and mulch were placed around each longleaf pine seedling to control competition. A bamboo stake with survey tape was also placed close to each seedling so that maintenance crews would avoid mowing the seedlings.

The Greensville County wetland mitigation site received 2 longleaf pine plantings: 500 seedlings planted by Meadowview biologists, and 90 seedlings raised by Potomac Elementary School students. Seedlings were planted in December, 1999 in mineral soil without mulch or groundcover. The seedlings planted by the Potomac Elementary School students were delivered as potted plants to the mitigation site and planted as container stock (6 inch pots) while the Meadowview material was bare root. Native Virginia yellow pitcher plant, *Sarracenia flava* L., was also planted by Meadowview biologists (adult plants, n = 361) and Potomac Elementary School students (one-year-old, 1/0 seedlings, n = 365) in May of 2000 as part of an integrated ecosystem restoration.

Results

Survival of longleaf pine planted at the Prince George County cloverleaf site was 84% after 1 growing season (Sheridan, 2000). Longleaf pine survival at the Greensville County wetland mitigation site was 61% for the Potomac Elementary School seedlings and 54% for the Meadowview seedlings. No survival data was provided for the other VDOT sites. Survival of *S. flava* at the Greensville County site was 82% for adult plants and 44% for seedlings.

Discussion

These longleaf pine plantings on highway rights-of-way in Virginia represent an 11% increase in the native population of 4,432 trees (Sheridan et al., 1999a), and the reintroduction of this species to 2 historic counties (Harris, 1999; Tennant, 2000). The situation for longleaf pine in Virginia was so dire that significant increases in population size were easily achieved by roadside and mitigation site planting. Can such dramatic increases in longleaf pine populations be achieved in other states by planting along highway rights-of-way? We suspect that a careful evaluation of appropriate habitat along highway corridors will disclose significant acreage for longleaf pine planting.

The relative success (84% survival) of longleaf pine planting in Prince George County may be attributable to the effective control of competition provided by mulching the seedlings (Haywood, 2000). Longleaf pine survival rates at the Prince George site would have been even higher but for losses resulting from accidental mowing in the cloverleaf. The low survival rate at the Greensville County mitigation site is explained by late site preparation by VDOT, soil subsidence around seedlings, and subsequent high mortality rates. However, we were willing to accept these high mortality rates since we have found very few agencies with protected land in Virginia willing to plant longleaf pine. The VDOT has been a leader in the effort to restore native Virginia longleaf pine.

Many DOT projects have used exotic ornamentals to "beautify" highway rights-of-way. These species often are poorly adapted to local conditions and require expensive, polluting, and time-consuming efforts to maintain; they also may become nuisance, invasive species. In contrast, longleaf pine is a signature tree of the southeastern United States that is well adapted to local conditions and requires little maintenance outside the seedling phase. Our longleaf pine restoration work on highway rights-of-way in Virginia has focused on incorporating a number of rare, native associate species in these plantings as part of regional restoration efforts (Sheridan and Penick, In Press).

One of the primary values of planting longleaf pine on highway rights-of-way is to act as a catalyst to bolster large-scale restoration efforts. Longleaf pine and associate species could be planted along highway rights-of-way and at rest areas and visitor centers. Rest areas and visitor centers provide the appropriate, safe setting for short trails with detailed interpretive signage to satisfy public curiosity and disseminate information.

Although highway rights-of-way fragment wildlife habitat in rural areas, they may act as refugia in urban areas where longleaf pine has been locally extirpated. These refugia along highway rights-of-way provide appropriate habitat for longleaf pine persistence and regeneration through the control of competitors and exposure of mineral soil by mowing operations. Careful consideration must be made in the choice of native associate plant species used in longleaf pine restoration along highway rights-of-way. We are using longleaf pine planting sites in Virginia to help restore a number of other rare plant species (e.g. *S. flava*). Plantings by wildlife departments in demonstration sites on roadsides have resulted in the formation of ecological traps to bobwhite quail (*Colinus virginianus*) and other bird species. Higher mortality rates for a threatened bird species have been recorded along rights-of-way than on non-road territories (Mumme et al., 2000). Conservation biologists be consider all options available in the natural palette to produce a result that will not imperil wildlife species.

Involving local school systems in restoring longleaf pine habitat with the VDOT was an important part of our program (Anonymous 2000). Involving the next generation in raising, experimenting with (Sheridan et al., 2000), and reintroducing rare native plants is important to the future of biological conservation. This pilot project in Virginia highlights how those goals can be achieved.

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