

The Conservation Reserve Program in the Southeast: Issues Affecting Wildlife Habitat Value

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Introduction

The Conservation Reserve Program (CRP) was established under the Food Security Act of 1985 with the purpose of assisting owners and operators of agricultural land in conserving and improving soil, water, and wildlife resources. In 1996, Congress reauthorized the CRP with an acreage limit of 36.4 million acres (14.7 million ha). The 2002 Farm Act increased the enrollment limit to 39.7 million acres (16 million ha). Environmental goals of the CRP were expanded under the 1990, 1996, and 2002 Farm Bills. The 2002 Farm Act explicitly required an equitable balance among conservation purposes of soil erosion control, water quality protection, and wildlife habitat. Insofar as provision of wildlife habitat is one of the statutory objectives of the CRP, broad benefits through creation and enhancement of wildlife habitat might be an expected outcome of this program. However, the realized wildlife habitat benefits of the CRP vary considerably regionally and within region in relation to specific cover crop established, time since enrollment, and management regimes. In the Southeastern United States, unlike the Great Plains (Johnson, 2000; Reynolds, 2000) and the Midwest (Ryan, 2000), the wildlife habitat value and resulting population responses to the CRP have been more equivocal and less thoroughly documented. Within the Southeast, implementation of the CRP and practices established vary considerably among states and differ substantially from other regions. In the Southeastern states, the wildlife benefits are less obvious and in some cases the program has had potentially negative effects on wildlife (Carmichael, 1997; Burger, 2000).

Conservation Reserve Program Enrollment in the Southeast

As of June 2004, 3,247,015 acres (1,314,020 ha) were enrolled in the CRP in 12 Southeastern states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia) (table 1; USDA, 2004a). Enrollment in the CRP was not equitably distributed among states, with Mississippi (28%) and Alabama (15%) having the highest enrollment. Georgia (10%), Kentucky (10%), Tennessee (8%), Louisiana (7%), and South Carolina (7%) had moderate enrollments,

and the remaining five states collectively accounted for only 15% of total enrollment. As of June 2004, more than 1.8 million acres (0.7 million ha), or nearly 60% of the CRP in the Southeast was enrolled in one of three tree cover practices including: CP3 pine plantings (12% of total enrollment); CP3a hardwood plantings (16% of total enrollment); and CP11 existing trees (31% of total enrollment) (USDA, 2004b). Approximately 20% [626,272 acres (253,443 ha)] of the total acreage was enrolled as CP10 existing grass; 5% [143,139 acres (57,926 ha)] in CP1 introduced grass; and 3% [95,816 acres (38,775 ha)] in CP2 native grasses. In the southeast CP1 grasses are largely cool season species and CP2 plantings are warm season grasses. Eleven percent of CRP acres [335,542 acres (135,789 ha)] were planted to various buffer practices, principally CP21 filter strips and CP22 riparian forest buffer. Given the preponderance of enrollment in CP3, CP11, CP1, and CP10 (much of which was reenrolled CP1) more than 68% of total enrollment in the Southeast was in practices that have limited or short-duration benefits to wildlife.

Distribution of Cover Practices

Within the Southeast, the distribution of enrollment among various cover practices differed substantially among states. Conservation Reserve Program enrollment in mid-south states of Kentucky (80.1%) and Tennessee (78.1%) was principally in grass practices (CP1, CP2, CP10). Kentucky and Tennessee accounted for 62% and 22%, respectively, of the total CP1 enrollment in the Southeast. Similarly, these states led in CP10 enrollment, with Kentucky accounting for 23% of total enrollment, followed closely by Tennessee with 22%, Mississippi with 21%, and Alabama with 18%. Much of this enrollment of existing grass was likely reenrollment of CP1, cool-season grass. Kentucky and Tennessee were the only southeastern states with substantial enrollment in CP2, native warm season grasses. CP2 accounted for 11.3% of total enrollment in Kentucky and 15.8% in Tennessee. These two states collectively accounted for 85% of the total CP2 enrollment in the Southeast (Kentucky, 40%; Tennessee, 45%). In contrast, the deep south states of Mississippi, Alabama, and Georgia principally enrolled acreage in tree planting practices (CP3, CP3a, and CP11). These CPs accounted for 68.8% of acres enrolled in Mississippi, 66.1% in Alabama, and 93.7% of CRP acres in Georgia. Mississippi, and Alabama led in CP3, new pine, enrollment accounting for 45% and 20% of total enrollment, respectively. Similarly, Mississippi, Alabama, and Georgia led in CP11, existing tree, enrollment accounting for 35%, 18%, and 13% of total enrollment, respectively. Not

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Table 1. Distribution of Conservation Reserve Program enrollment (acres) by state and type of conservation practice for contracts active June 2004.

State	Cool season grass	Native warm season grasses	Established grass	Wildlife habitat	New pine trees	New hard-wood trees	Established trees	Erosion practices	Buffer practices	Other	Total
Alabama	5,136.9	3,642.1	114,382.0	10,684.8	79,266.2	61,999.9	178,498.2	52.1	26,639.9	2,529.8	482,831.9
Arkansas	3,202.1	2,712.6	27,469.8	3,000.8	8,732.6	32,806.1	57,106.7	21.6	35,430.4	18,176.1	188,658.8
Florida	297.3	150.5	2,152.6	3,499.3	12,867.2	12,767.8	56,565.4	0.0	67.5	159.1	88,526.7
Georgia	572.1	389.4	7,407.9	6,651.3	36,749.7	127,713.9	124,690.5	76.5	1,625.5	2,901.0	308,777.8
Kentucky	88,896.9	37,893.9	141,121.5	773.2	442.6	5,968.7	1,932.0	3,119.5	42,803.4	10,968.9	333,920.6
Louisiana	141.7	2,866.1	18,079.2	758.7	20,678.1	115,441.9	40,571.7	58.1	4,196.8	35,384.5	238,176.8
Mississippi	6,013.3	432.7	132,276.8	8,379.6	176,636.8	120,051.1	345,512.3	68.8	125,500.3	18,741.7	933,613.4
North Carolina	2,312.3	1,669.9	18,338.4	2,965.2	7,539.5	10,296.3	42,046.7	146.6	31,637.0	4,597.5	121,549.4
South Carolina	681.1	107.2	11,680.9	9,460.8	30,687.8	21,034.3	102,624.4	127.0	32,037.7	4,991.4	213,432.6
Tennessee	31,616.6	43,211.9	138,723.8	9,373.7	13,833.7	3,593.8	16,969.4	153.7	13,747.6	1,992.0	273,216.2
Virginia	4,258.8	2,717.2	13,972.0	1,079.4	4,359.3	281.9	14,346.0	76.3	20,406.9	520.4	62,018.2
West Virginia	10.2	22.4	666.9	0.0	134.5	0.0	9.0	0.0	1,449.1	0.3	2,292.4
Total	143,139.3	95,815.9	626,271.8	56,626.8	391,928.0	511,955.7	980,872.3	3,900.2	335,542.1	100,962.7	3,247,014.8

surprisingly, Mississippi and Louisiana, occurring in the lower Mississippi Alluvial Valley, led in hardwood establishment, each accounting for 23% of CP3a enrollment. Additionally, Georgia and Alabama accounted for 25% and 12% of CP3a acreage; however, a substantial portion of the CP3a acreage in Georgia, Alabama, and Louisiana was planted to longleaf pine (*Pinus palustris*). Throughout the Southeast, the most commonly planted tree species was loblolly pine (*P. taeda*); however, a national Conservation Priority Area (CPA) was established with signup 18. The longleaf pine CPA included parts of nine southeastern states and provided special incentive bonus points on the Environmental Benefits Index (EBI) and exemption from the highly erodible criteria for establishment of longleaf pine, on eligible sites. As of September 2004, 207,674 acres (84,043 ha) of CRP had been established to longleaf pine. Mississippi enrolled 37% of the total buffer practice acreage (primarily CP21 and CP22), followed by Kentucky (13%), Arkansas (11%) and South Carolina (10%).

Stand Age

Previous enrollment history and changes in rules and EBI structure influenced distribution of specific CRP cover practices across the Southeast over time. Of the extant CP3 acres in the Southeast, 81% were enrolled between 1998 and 2001 and, as such, are currently 3–6 years old (fig. 1). Three to five years after establishment, CRP pine plantings rapidly close canopy and shade out herbaceous ground cover, contributing to a loss of early successional habitat and declining seed production and forage quality for many species of wildlife. Closed-canopy mid-rotation pine plantings provide relatively poor wildlife habitat and support a relatively simple faunal community between the time of canopy closure and the first

thinning [see Burger (2000) for a review]. Thus, a substantial proportion of currently enrolled CP3 acreage in the Southeast is entering an extended period of relatively low habitat quality.

The majority (91.5%) of CP11 acreage in the Southeast was enrolled between 1998 and 2000 (fig. 2). Presuming most of these contracts were reenrolled following an initial 10-year contract, these stands are currently 15–17 years old. Nearly 55% of the CP3a enrollment in the Southeast occurred during 2000 and 2001, reflecting large enrollments in the longleaf pine practice in Alabama, Georgia, and Louisiana (fig. 3). Most CP3a enrollment prior to this time involved planting

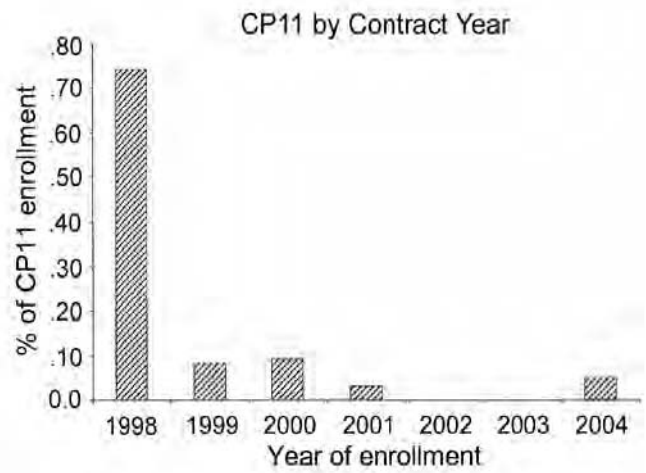


Figure 2. Enrollment in Conservation Reserve Program CP11 (vegetative cover, trees already established) in 12 Southeastern states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia), 1998 to 2004.

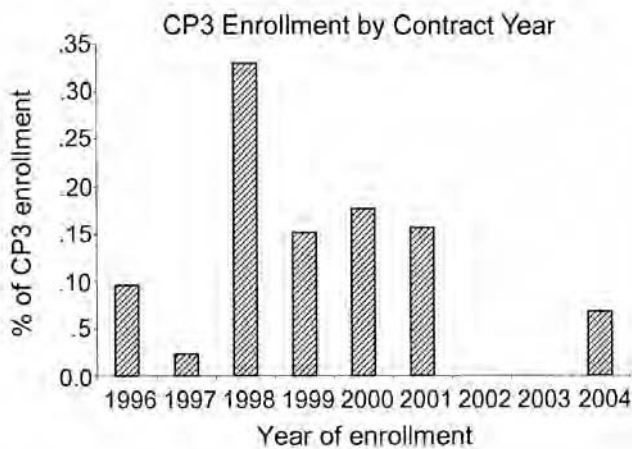


Figure 1. Enrollment in Conservation Reserve Program CP3 (softwood tree planting) in 12 Southeastern states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia), 1996 to 2004.

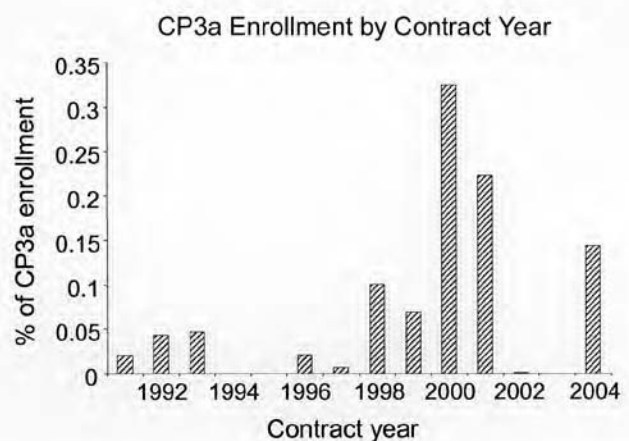


Figure 3. Enrollment in Conservation Reserve Program CP3a (longleaf pine) in 12 Southeastern states (Alabama, Arkansas, Florida, Georgia, Kentucky, Louisiana, Mississippi, North Carolina, South Carolina, Tennessee, Virginia, and West Virginia), 1992 to 2004.

hardwood tree species. Although Mississippi had substantial CP3a enrollment [119,591 acres (48,397 ha); 23% of all CP3a], virtually all was planted to hardwoods in the Mississippi Alluvial Valley. Approximately 10% of the total CP3a is more than 10 years old.

Wildlife Habitat Value

Burger (2000) provided an overview of the potential value of CRP for wildlife in the Southeast and concluded: “Overall, the potential wildlife benefits of CRP in the Southeast are substantial, but they may be unrealized because of the selection of specific practices (e.g., pine plantations and exotic forage grasses).” If that potential is to be realized and CRP is to achieve the statutory goal of improving wildlife habitat resources on private land, existing CRP in the Southeast must be proactively managed and future enrollments must focus on cover practices with high wildlife habitat value. Specifically, adoption of the following recommendations would substantially enhance the realized wildlife habitat value of the CRP in the Southeast.

Mid-Contract Management

In 2004, USDA’s Farm Services Agency (FSA) provided direction to state offices to, with input from State Technical Committees, develop mid-contract management guidelines for new and existing CRP contracts. Cost-share for these management activities would be provided where appropriate to enhance wildlife habitat values of the CRP while still preserving the soil erosion and water quality benefits of these fields. This directive represented a substantial change of policy on behalf of the FSA and provided the suite of management options and incentives that many in the wildlife community had been requesting since nearly the inception of the CRP (Burger, 2000; Burger and others, 1990; Ryan and others, 1998). Although specific guidelines varied from state to state, in general they permitted, cost-shared, and in some cases, required management activities such as strip-disking, prescribed fire, and herbicidal control of invasive species on grasslands as well as thinning, prescribed fire, diskings, and use of selective herbicides on mid-rotation pine plantations.

Management on Grasslands

In the Southeast, annual weed communities provide essential resources for northern bobwhite (*Colinus virginianus*) and other early successional species of wildlife. Annual weed communities are characterized by grasses, forbs, and legumes that occur following some form of soil disturbance such as agriculture, timber harvest, or diskings. Annual plants reproduce by prolific production of seeds, providing granivorous (seed-eating) birds and mammals with abundant food resources. Additionally, this plant community supports an

abundant and diverse insect community furnishing critical nutrients, including protein, energy, and essential amino acids, for growing nestlings and chicks. Annual weed communities are short-lived, lasting only one to two growing seasons. In the absence of further disturbance, plant community composition changes over several years through a normal successional process. Annual weeds are typically replaced by perennial forbs, grasses, and eventually woody plants. Changes in vegetation composition are accompanied by changes in vegetation structure. As a plant community ages, bare ground declines, litter accumulates, and vegetation density increases. The rate of successional change is a function of site fertility, rainfall, local hydrology, temperature, and length of the growing season. Plant communities on CRP fields enrolled in grass cover practices are not static but exhibit predictable successional changes over time (McCoy and others, 2001). Planned disturbance on CRP fields is required to maintain a diverse plant community in a managed landscape. Planned disturbance such as prescribed fire or light diskings has been shown to enhance the structural and floristic characteristics of CRP plantings and improve their wildlife value (Greenfield and others, 2002, 2003). Light diskings, when applied in a strip fashion on the contour, can be implemented without compromising the erosion controlling objectives of the CRP (Greenfield and others, 2002). Planned disturbance should be incorporated into the conservation plan of operation for all grass plantings in the Southeast.

However, prescribed fire or diskings may have limited value in CRP fields dominated by forage grasses (Greenfield and others, 2001; Washburn and others, 2000). In the Southeast, there are more than 143,000 acres (57,870 ha) of CRP in cool-season introduced forage grasses and more than 626,000 acres (253,333 ha) of existing grass, much of which is reenrolled CPI. Introduced sod-forming forage grasses provide poor quality habitat for grassland early successional species and their aggressive growth form inhibits establishment of more desirable native grasses and forbs. With regard to fescue, Barnes and others (1995) reported tall fescue (*Lolium arundinaceum*) fields in Kentucky had dense vegetation with little bare ground and low plant species diversity. They observed fescue stands provided few food resources for granivorous birds. Although tall fescue supported abundant and diverse insect communities, the authors concluded these food resources likely were unavailable to breeding bobwhites or their broods because of the dense vegetation structure. Tall fescue provides poor habitat for ground foraging granivores because it lacks proper vegetation structure, floristic composition, and sufficient quality food resources. Consequently, CRP fields revegetated through natural succession or with native species may provide better wildlife habitat than those established in introduced forage grasses. Fields planted to introduced forage grasses may require herbicidal control of these grasses to achieve lasting habitat benefits (Washburn and others, 2000; Greenfield and others, 2001). Herbicide-facilitated cover crop enhancements should be permitted and cost-shared on CRP fields enrolled in CPI0. Program-wide

application of planned recurring management activities and herbicidal control of invasive exotic forage grasses would substantially enhance wildlife habitat quality on nearly 700,000 acres (283,280 ha) of CRP in the Southeast.

Management on Pine Plantations

Unthinned, mid-rotation pine plantations are characterized by dense, closed canopies, little to no understory or ground cover, and substantial accumulation of needles and other debris. Thinning opens the forest canopy, allows sunlight to reach the forest floor, and stimulates development of a herbaceous understory, thereby enhancing wildlife habitat value of the stand (fig.4). Many of the CP11 contracts were reenrolled under the 30 or 50 point N1a option of the signup 18 or 20 EBI. This option required thinning of pine stands within 3 years after reenrollment. However, the window allowing for thinning was expanded due to landowner difficulty in executing the prescribed thin. As such, many of these contracts have just recently been thinned, or are scheduled for thinning. To enhance the wildlife value of these contracts, thinning should be required regardless of market conditions on mid-rotation CP11 pine stands. Implementation of a second thinning during the contract would further enhance habitat value and should be encouraged. Thinning prescriptions should be based on silvicultural principles and landowner objectives. Early guidance from FSA required thinning to below 300 trees/acre (741 trees/ha), leaving at least 200 trees/acre (494 trees/ha). This requirement is overly restrictive, particularly for second thins. Within 3–4 years following a thin to 200 trees/acre, stands will likely again have closed canopy, mitigating any accrued wildlife benefits. Timber thinning guidelines should be flexible and based on landowner wildlife objectives. Optimal thinning targets vary depending on wildlife objectives. For example, if creation of bobwhite habitat is a desired condition, stands should be thinned to 30–40 trees/acre (75–

100 trees/ha), whereas thinning to 50–60 trees/acre (125–150 trees/ha) may achieve better habitat objectives for wild turkeys (*Meleagris gallopavo*). Management guidelines based on basal area, instead of trees/acre are intuitively more meaningful and would be more likely to achieve desired outcomes.

Depending on site conditions, proximity to other forest cover, and seed bank, encroachment of low quality invasive hardwoods in the midstory may be problematic following thinning of pine stands. Use of selective herbicide (Imazapyr®) and prescribed fire will effectively control hardwood invasion, release a diverse herbaceous ground cover rich in grasses, forbs, and legumes, and create a stand structure that mimics a pine/grassland. The combination of selective herbicide and fire is called Quality Vegetation Management (QVM) and is approved for cost share under mid-contract management guidelines in several southeastern states. In southern pine forests, QVM has been shown to increase herbaceous and understory leaf biomass 4-fold, digestible protein 5-fold, and carrying capacity for white-tailed deer (*Odocoileus virginianus*) 38-fold (Edwards and others, 2004). QVM used in mid-rotation pine plantations has been shown to increase avian species richness and abundance, and support a bird community that includes regionally declining species of high conservation priority such as northern bobwhite, Bachman's sparrow (*Aimophila aestivalis*), and brown-headed nuthatch (*Sitta pusilla*) (Thompson, 2002). Implementation of QVM should be encouraged and cost-shared as a mid-contract management practice throughout the Southeast.

Future Enrollment

If the CRP is to achieve the statutory objective of providing wildlife habitat, future enrollments must be much more restrictive than past enrollments. There is little ecological justification for enrolling CRP acreage in introduced forage



A



B

Figure 4. Loblolly pine (*Pinus taeda*) plantations of comparable age illustrate effects of thinning, prescribed fire, and chemical treatment to enhance habitat quality for wildlife. Photo A is an unthinned 17 year-old plantation with a nearly closed canopy and a resultant lack of diversity in vegetation species composition and structure. Photo B depicts a 15 year-old loblolly pine plantation treated by thinning of the overstory, prescribed fire, and Imazapyr to control invasive hardwoods. The managed stand mimics regionally scarce pine-grasslands providing enhanced habitat for wildlife.

grasses with little or no wildlife habitat value [e.g., fescue, Bermuda grass (*Cynodon dactylon*)]. These grasses should not be included in available seeding mixtures for CP1. Local county and state offices should actively promote selection of cover practices with greater wildlife benefits (e.g., native warm-season grasses and legumes). Furthermore, reenrollment of CP10 acres should be predicated on eradication of these undesirable species prior to enrollment, or should provide a cost-share to support mandatory herbicidal eradication following enrollment.

Tree planting practices should emphasize longleaf pine on appropriate sites. Additional incentives associated with the national longleaf pine CPA were very effective in promoting establishment of this conservation practice. There is little environmental justification for reenrollment of existing trees after CP11 contracts expire. These contracts should be allowed to expire. The environmental benefits of reenrollment of CP3 stands are of questionable value. If left unthinned, these stands provide virtually no wildlife habitat. Incentives to promote thinning and creation of early successional openings within these stands have largely been ineffective due to lack of enforcement and relaxed standards. Reenrollment of CP3 as CP11 will produce wildlife habitat benefits only if aggressive thinning, control of hardwood midstory, and use of prescribed fire are mandatory requirements that are enforced.

Future CRP enrollments should target practices that accrue multiple environmental benefits and can be incorporated in production systems within working landscapes. Buffer practices supported under the Continuous Conservation Reserve Program (CCRP) (CP21 and CPP22) meet these criteria. Additional incentives associated with CCRP were effective in eliciting landowner participation. The newly developed CP33-Habitat Buffers for Upland Wildlife has the potential to create early successional grass habitats in agricultural landscapes. Creation of herbaceous field borders in agricultural landscapes has been shown to substantially increase local abundance of northern bobwhite and provide habitat for wintering grassland birds (Marcus and others, 2000). Acceptance of CP33 should be aggressively promoted by the Natural Resources Conservation Service (NRCS) and the FSA. Consistent with other CCRP practices, landowner rental rates for CP33 should be increased to 120% of soil and county-specific weighted mean cash rent values.

Conclusions

The CRP has had substantial impact on land use and landscape composition in the Southeast. However, the wildlife habitat value of fields enrolled in the CRP in the Southeast has been diminished by selection of cover practices with short duration or minimal habitat value. Proactive management of extant CRP acreage and selective enrollment of high value cover practices will be required to achieve the types of wildlife habitat benefits associated with the CRP in other regions.

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