Transitioning Land from Expired CRP to Forage Production

Has your Conservation Reserve Program expired, or will it be expiring soon?

The Conservation Reserve Program (CRP) is one of the largest conservation programs serving private lands in the United States. This program was designed to take marginal and highly erodible land out of commodity crop production and put it into conservation practices that protect land from erosion, benefit wildlife habitat, and improve water quality.

Farmers involved in the program receive payment to establish grasslands, shrubs, and trees. This practice can provide areas for wildlife habitat, improve water quality, lessen soil erosion, and reduce the use of agrochemicals that could impact water quality and species diversity above and below the soil surface.

The Conservation Reserve Program tries to create niches that could help mitigate climate change by creating carbon sinks in plant and root systems. As of September 2017, there are over 23.4 million acres of CRP land in the U.S., with an annual rental value of $1.8 million and an average payment of $76.78 per acre (USDA FSA, 2017).

In Mississippi, there are 10,731 farms enrolled in CRP, covering 699,502 acres, with an annual rental value of $46.4 million and an average payment of $66.38 per acre (USDA FSA, 2017).

Producers with expired CRP contracts are always debating what to do with the land. **Figure 1** shows the number of acres that are expected to expire each year in Mississippi between 2017 and 2030. These acres could benefit from transitional management practices into pasture production.

Depending on how the land was managed under the contract and the maintenance period, CRP land may or may not be suitable for immediate transition to forage production. Renovation of CRP land may be needed to establish a productive forage system. The type and degree of renovation depends on the intended use of the forage, the previous management, and the plant species composition (proportion of grasses, legumes, and weeds). Complete renovation requires completely destroying the CRP vegetation and then reseeding more desirable grass and/or legume species.

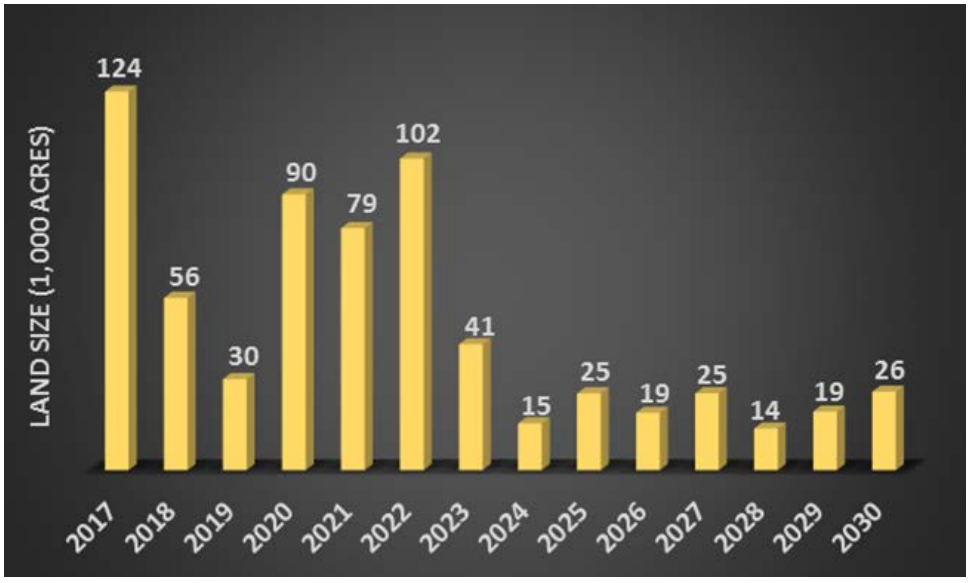

Figure 1. Expected number of acres that will expire from CRP land programs in Mississippi between 2017 and 2030. Source: USDA FSA, 2017.

Land committed to CRP programs tends to have healthier soil from reduced soil erosion, increased organic matter, and enhanced water quality. These benefits are the result of improved soil structure, increased water infiltration, reduced sediment movement, and reduced fertilizer and herbicide applications. Converting CRP land back to forage production does not mean losing these benefits; it means implementing practices that, with good management and long-term planning, can sustain productivity while minimizing impacts on soil quality. If you have CRP land under an expiring contract and you are considering a transition to forage production, here are some steps you can take to transition to an efficient system for livestock production.

Soil Test

Conservation Reserve Program lands often make low-quality pastures during the transition period because they have low fertility and high competition from weeds. Studies have indicated an increase in organic matter in soils under CRP land practices. Despite the increase in organic matter, a lot of the nutrients are tied up in complex carbon compounds in the woody material, thatch, roots, and mature plants growing on the land.

No soil disturbance and at least 10 seasons of grass growth will result in some improvement in organic matter content. Rates of soil organic matter decomposition and stability depend on the carbon content, organic matter composition, placement of the soil organic material within the soil profile, microbial activity, soil moisture conditions, soil temperature, oxygen levels, soil pH, soil texture (soil aggregates), tillage practices, and plant species present. This can impact the soil's ability to supply nutrients.

The active organic matter (OM) levels (OM consumed by microbes for energy) can be limited because of slow degradation and, therefore, so could microbial populations such as mycorrhizal fungi. These usually develop a symbiotic relationship with plants: they provide water and minerals to the plant and, in exchange, they receive carbohydrates from the plant. Limited microbial populations can lead to low colonization rates, low organic matter turnovers, and nutrient deficiencies.

Establishing a soil fertility program should start with soil testing. Taking representative soil samples can provide a good understanding of nutrient deficiencies, organic matter level, cation exchange capacity (CEC), and steps needed to correct nutrient imbalances. In CRP lands, nitrogen (N) levels tend to be low because of the slow nitrogen release created by a high soil carbon-to-nitrogen ratio. Phosphorus (P) and potassium (K) could be substantially reduced because these nutrients are tied up in the plant residue and, therefore, not readily available for uptake by the new forage crop being established after tilling up the land.

Prepare Fields before Establishing Pasture

Since most CRP contracts expire in the fall, it might be a good practice to begin the transition to pasture or hay at that time. Due to wet conditions in the spring, fall tillage is preferred, followed by the establishment of a winter annual crop. Deep tillage of dry soil breaks up any excessive fragipan in the soil subsurface.

Prepare the field by removing undesirable species of trees, shrubs, and brush. Before tillage, consult with your local Natural Resources Conservation Service (NRCS) representative to make sure that you are not in violation of the 1985 Food Security Act. Commodity crops such as winter annuals should not be planted on highly erodible lands without a conservation compliance plan.

In cases where fertility is inadequate (especially organic matter, phosphorous, and potassium), incorporating poultry litter into the soil might be a good management practice before a new crop is established. Depending on the level of tillage and the equipment used, excessive residue after CRP can be a challenge for establishing a good forage crop. Keep in mind that retaining some residue might be ideal to avoid soil erosion.

Incorporating some of the surface residue into the soil will build the organic matter. Where highly erodible land compliance is not an issue, work the land enough to incorporate plant residue and increase nutrient cycling. While plowing to renovate hay fields or pastures, you might consider leaving riparian strips in sensitive areas to reduce water, herbicide, and fertilizer runoff into streams. Another option is controlled untilled strips.

In other instances, you could reduce the amount of residue by disking and planting a cover crop for the winter. Although moldboard plowing might be an effective way to incorporate the residue, this leaves the soil surface exposed to possible erosion unless a crop is established immediately. The best option is to till the land with a heavy disk to ensure that some of the residue is retained in the soil surface.

Another option for pasture establishment is using an aerator that can act as a mini-subsoiler that can incorporate plant residue and allow the use of a no-till planter. If a no-till planter is not available, then double-chisel plowing followed by disking or harrowing could help prepare

the CRP land for a conventional drill. It is important to remember that CRP land was marginal land with high erosion potential, so, when possible, tillage should be limited.

Land that has been in CRP for many years could be infested with weeds, invasive species, shrubs, brush, and small trees. Cultivation alone might not provide satisfactory control of the vegetation. It is more difficult to control weeds once desirable species of grasses and weeds have been established because of herbicide limitations or selectivity. Chemical (herbicides) and mechanical (plowing, clipping, and burning) weed control methods may be needed.

Before developing a weed-control plan, it is important to identify the weed species present in the pasture to develop a treatment strategy that is effective and cost-effective. Some of the herbicides used in forage production can have planting, haying, and grazing restrictions, so consult your local MSU Extension county office to determine the type and rate of herbicide to use. Always follow the label recommendations. For more information on herbicides labeled for use in forage production in Mississippi, consult the forage section of Extension Publication 1532 *Weed Control Guidelines for Mississippi* (***http://extension.msstate.edu/publications/publications/weed-control-guidelines-for-mississippi***).

Although plowing, mowing, or clipping can be used to control weeds, repeated applications of mechanical strategies may be required because some weed species could produce new shoots after mowing and lead to seed production. In areas of extremely high weed infestation, an herbicide treatment applied several weeks before tilling will help reduce the amount of vegetation and competition at establishment.

There are other practices that can be implemented to reduce residue in CRP land without soil disturbance. Prescribed burning is the fastest and most effective way to remove some of the residue and thick biomass. Burning can also reduce the top growth residue. This releases phosphorous (P), potassium (K), calcium (Ca), and magnesium (MG), but nitrogen (N) and sulfur (S) will volatilize and be lost. Only use fire when it can be handled safely and legally. For more information related to prescribed burning, see Extension Publication 2726 *Prescribed Burning for Pasture Management* (***http://extension.msstate.edu/publications/publications/prescribed-burning-for-pasture-management***).

Producers who use prescribed burning as an alternative to mechanically removing excessive residue should do so close to planting a crop to reduce nutrient loss through leaching, erosion, or other environmental factors. Always pay attention to fire bans or restrictions when incorporating burning into your management practice. A vigorous weed-control program the following spring and summer should follow mechanical vegetation control in CRP land.

Another way to reduce plant residue is through haying or heavy grazing. Haying could be challenging due to rough terrain and the amount of dead biomass. Be aware that woody biomass and stumps could cause damage to equipment and puncture tires when mowing and baling. Much of the hay produced on CRP land will be low in quality, and protein and energy supplementation most likely will be required. Another approach is "mob grazing," which involves placing a large number or animals on a small area for a brief period of time. Animals will trample dead biomass into the ground and open the space for subsequent burning or mechanical cultivation. If new forage crops will not be established until the spring, then CRP land could be used as calving pasture to increase trampling and nutrient cycling.

Forage Selection and Use

Once the land has been prepared, the next step to consider is what to plant. Although annual winter cover crops are a good option during the first year of transition, consider adding permanent pastures. The types of soils found on the transition CRP land will determine what species might be more suitable. Web Soil Survey (***https://websoilsurvey.sc.egov.usda.gov/App/HomePage.htm***) can help determine the soil types on your land and identify forages that are adapted to those soil types. Contact your Extension county office or the Natural Resources Conservation Service (USDA-NRCS) for information on obtaining a soil map, or visit the Soil Web Survey online.

Keep in mind that high carbon rates in CRP land can impact nutrient availability and nutrient cycling. Forage production in the first year might be lower than expected, and it could take several years to increase nutrient cycling and improve production.

Factors such as rainfall, soil drainage, soil pH level, nutrient availability, intended use of the stand (hay versus grazing), and persistence (**Tables 1** and **2**) influence the selection of grass and legume species. Other critical considerations include field preparation, seed quality, planting depth, and time of establishment. It is always a good idea to select forage crops that have good yield potential, good winter-hardiness, and resistance to grazing

pressure and diseases. For more information on forage species for your area, check the MSU Forage Variety Trial information at ***http://mafes.msstate.edu/variety-trials/forage.asp***.

If conditions are optimum, establishing a mixture of grasses and legumes might help to reduce fertilizer needs, provide higher forage quality, and improve animal performance. Mixtures of two or three well-chosen forage legume or grass species are more desirable than mixtures of five or six species.

Expired CRP lands can be used for forage production such as haying or grazing. However, before grazing can be part of the forage management program, water and fencing issues must be considered. In some cases, establishing water systems is very expensive. Livestock must have an adequate water supply through sloughs, dugouts, wells, tanks, or pipelines. CRP lands often are not fenced, or the fences need major repairs. Fencing options range from double-strand electric fences to five-barbed or high-tensile wire. Fence type depends on land size, livestock species, and grazing management. For more information about fencing, see Extension Publication 2538 *Livestock Fencing Systems for Pasture Management* (***http://extension.msstate.edu/publications/publications/livestock-fencing-systems-for-pasture-management***).

Contact your local NRCS office for help with assessing the quality of CRP pasture and for information about design, renovation, fencing, and incentive programs.

Summary

Returning CRP land to forage production will involve some combination of tillage, weed control, fertilization, and establishment of a new stand. Keep in mind that CRP land will need a different management strategy combined with planning, preparation, fertilization, and work to make it sustainable. Before making the transition, it is important to look at the inputs (seed and fertilizer) and labor costs (land preparation, equipment, fencing, and water systems) needed to make it a productive forage system. It might be best to divide the CRP land into sections and renovate one section each year.

Contact your local NRCS office for help assessing the quality of your CRP land and to find out about available incentive programs. The Environmental Quality Incentives Program (EQIP) and other programs may be available to help implement some of the conservation practices needed to develop a grazing system on your land.

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Table 1. Characteristics of seeding vigor, tolerance, sod-forming capacity, seeding rates, and planting depths of grasses.

	Forage Crop	Seeding Vigor	Tolerance to				Sod-Forming Capacity	Seeding Rate (lb/ac)	Planting Depth (in)
			Soil Acidity	Poor Drainage	Heat/ Drought	Grazing			
Warm-season	Bahiagrass	P	E	G	E	E	E	15–20	¼–½
	Bermudagrass								
	Common	F	E	P	E	E	E	5–10	0–½
	Hybrid	V*	E	P	E	E	E	30–40 bu/ac	1–3
	Bluestem	P	F	G	E	F	P	6–10**	¼–½
	Crabgrass	G	G	P	F	E	F	5–10	¼–½
	Dallisgrass	P	F	E	G	G	F	10–15**	¼–½
	Eastern gammagrass	P	F	E	G	G	P	8–10**	1–1 ½
	Indiangrass	P	F	G	E	F	P	6–10**	¼–½
	Pearl millet	E	E	P	E	F	P	25–30	½–1 ½
	Sorghum	G	P	P	E	F	P	15–20	1–2
	Sorghum-sudan	E	P	F	G	F	P	20–25	½–¾
	Teffgrass	G	F	P	G	F	F	8–10	0–½
	Switchgrass	P	F	F	E	F	P	5–6**	¼–½
Cool-season	Annual ryegrass	G	G	E	F	E	F	20–30	0–½
	Oat	E	F	F	F	G	F	90–120	1–2
	Rye	E	E	F	F	G	F	90–120	1–2
	Tall Fescue								
	Endophyte infected	G	G	G	G	G	F	15–20	¼–½
	Novel or free endophyte	G	G	G	F	G	F	15–20	¼–½
	Triticale	E	G	G	G	G	F	90–120	1–2
	Wheat	E	P	P	F	G	F	90–120	1–2

*V = vegetative propagation
**Recommended seeding rates on pure live seed (PLS) basis
P = poor; F = fair; G = good; E = excellent
Source: Roberts and Kallenback, 1999; Ball et al., 2012; Miller, 2012.

Table 2. Characteristics of seeding vigor, tolerance, seeding rates, and planting depths of legumes.								
			Tolerance to				Seeding Rate (lb/ac)	Planting Depth (in)
	Species	Seeding Vigor	Soil Acidity	Poor Drainage	Heat/Drought	Grazing		
Warm-season	Lespedeza							
	Annual	F	E	F	G	G	25–35	¼–½
	Sericea	P	E	F	E	P	12–15	¼–½
	Peanut							
	Annual	E	P	P	G	F	100–120	1½–2
	Perennial	V*	G	F	E	P	80 bu/ac	
Cool-season	Alfalfa	G	P	P	E	P	20–25	¼–½
	Clovers							
	Arrowleaf	F	F	P	F	G	5–10	0–¼
	Balansa	G	G	E	F	G	5–8	¼–½
	Ball	F	P	G	F	G	2–3	0–¼
	Berseem	G	P	G	G	F	20–25	¼–½
	Caley pea	G	F	G	F	F	50–55	½–1
	Crimson	G	G	P	F	F	20–30	¼–½
	Hairy Vetch	E	G	P	F	F	20–25	1–2
	Persian	F	F	G	F	G	5–8	0–¼
	Red	E	F	F	F	F	12–15	¼–½
	Rose	F	P	P	G	F	8–12	¼–½
	Subterranean	G	F	G	F	E	15–20	¼–½
	White	F	F	G	P	E	2–3	0–¼

*V = vegetative propagation
P = poor; F = fair; G = good; E = excellent
Source: Ball et al., 2012.

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