Grasslands: The Future of CRP Land after Contracts Expire

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The Conservation Reserve Program (CRP) of the 1985 Food Security Act, through the eighth signup, has retired 30.6 million acres of highly erodible and other cropland. However, the 10-yr CRP contracts will begin to expire in 1996. Fundamental economic trends do not indicate clearly whether CRP land will be needed for either crop or livestock production when contracts expire. Given present expectations of future agricultural markets, we anticipate no more than 20% of the land now in the CRP to remain in grass. Three sets of factors will influence landowner's decisions: long-term relative economics of crop and livestock production; direct and indirect incentives in existing and proposed agricultural policy; and the characteristics of CRP landowners.

The Food Security Act of 1985 is 5-yr legislation governing basic agricultural policy in the USA. For the first time, this legislation contained a conservation title with far-reaching potential for agricultural resources, including grazing lands. Among other conservation provisions, the CRP was established to plant 40 million acres of highly erodible cropland to permanent vegetation for 10 yr, in exchange for annual rental payments to the landowner and 50% of cover establishment costs. CRP has accomplished the largest addition to our stock of grasslands since the 1930s.

The CRP contracts will begin to expire in 1996. What will happen then to lands currently enrolled in the CRP? The fate of CRP land is of increasing concern to farmers, government officials with responsibilities for grazing lands, and especially to policymakers who must consider the implications for upcoming 1990 farm legislation. This paper examines factors that will influence retention of CRP grasslands and presents some ideas for retaining those lands in grass.

As of February 1989, 30.6 million acres of highly erodible land were enrolled at an average rental rate of $48.71/acre. Land retired under CRP is required to be planted to permanent cover or trees and cannot be used for grazing, haying, or other economic uses except in declared emergencies. Haying was permitted in declared drought areas in 1988 and 1989, helping to boost forage supplies and reduce levels of herd liquidation. Contracts will expire in the same order as land was enrolled in CRP, reaching a peak of almost 10 million acres in February 1997.

The future of CRP grasslands is a function of three sets of interacting factors: long-term relative economics of crop and livestock production; the characteristics and attitudes of CRP owners and operators; and direct and indirect incentives in existing and proposed agricultural policy.

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Published in J. Prod. Agric. 3:7-12 (1990).

LONG—TERM CROP AND LIVESTOCK ECONOMICS

While short-term crop and livestock economics are heavily influenced by natural and manmade shocks, such as droughts and wars, the best guides to the long-term future are observable secular trends and recurring cycles. The evidence from relevant trends is as old as Malthus and as new as genetic engineering, and often provides conflicting insights. The major dimensions discussed here are familiar ones: demand and supply for crops and livestock, both domestic and worldwide.

Demand for Crops and Livestock

Looming over the relative demand for crops and livestock, and the derived demand for land, is population growth. World population is about 5 billion now and is expected to increase 63% by 2025. Judging from the rapid reversals in viewpoint experienced over the last decade, we know as little about the response of agriculture to such population growth now as was known in Malthus' time. As an example, the USDA Resources Conservation Appraisal (RCA), conducted in 1980 under the influence of tight food supplies and rising export demand, projected U.S. cropland requirements for 2030 at 457 million acres, an 11% increase over the 413 million cropland acres inventoried in 1977 (USDA-SCS, 1981, Table 18, p. 70). Only 5 yr later, the promise of high technology for increased productivity and declining agricultural exports influenced the second RCA to project cropland requirements in 2030 at 218 million acres, a 48% decline from the 421 million acres of existing cropland inventoried in 1982 (USDA-SCS, 1987, Table 12-5, p. 12-20).

The grazing land projections prepared for the 1979 and 1989 Renewable Resources Planning Act (RPA) assessment were similarly influenced by relative scarcity and surplus. Derived demand for grazing land was projected to increase to 1.5 billion animal unit months (AUM) by 2030 in the 1979 assessment, but the projected increase dropped to only 618 million AUM in the 1989 assessment (USDA Forest Service, 1981, p. 179; Joyce, 1988, p. 4-11a). Primarily responsible for these large differences in projected demand is a 34% drop in projected U.S. meat consumption (edible weight basis) per capita (Darr, 1988, p. 36). The point is not that the earlier RCA and RPA projections were done badly, but that they are very sensitive to assumptions about exports, productivity, and consumption patterns (Fuglestad and English, 1988).

In terms of domestic demands, red meat consumption per capita has declined 7.4% since 1970 (USDA-ERS,

1987). The Food and Drug Administration and National Institutes of Health, in interviews with 4,000 consumers, found that 62% made major changes in their diets to reduce risk of heart disease and cancer. Thirty-six percent reduced intake of red meat (Briggs, 1987). Both the 1985 RCA and 1989 RPA assume a relatively constant annual domestic consumption of beef, veal, lamb, and mutton of 112 lb/capita (carcass weight basis) through 2030. Blaylock and Smallwood (1986), analyzing demographic and income effects on per capita food consumption expenditures, projected a 39% increase in total food expenditures, while beef, pork, and other red meat expenditures are projected to increase only 20% (Blaylock and Smallwood, 1986, Table 33).

The 11.7% increase in U.S. exports during the 1970s was a funcion of rapid growth in real per capita incomes, growth in foreign exchange earnings, plentiful credit, import-enhancing agricultural policies of other countries, and a declining dollar, all of which were reversed from 1981 to 1985. Even if continued high levels of foreign demand are assumed, the implications for retention of CRP land depend on the mix of commodities demanded. Change in the kinds of commodities demanded is less a function of absolute population growth as of growth in per capita income and changes in tastes as incomes rise (Marks and Yetley, 1988). For example, if high exports are primarily due to population growth in less developed countries with low per capita incomes, it is likely that they will focus on wheat, rice, and other commodities for direct human consumption. On the other hand, exports fueled by increases in incomes in more developed countries are more likely to be concentrated in commodities like meat and poultry. This is particularly true for land-poor countries like Japan, Korea, and Malaysia that are less able to develop sizeable livestock industries of their own through imports of feed grains.

U.S. exports of meat (excluding poultry) are small relative to crops, accounting for 5% of the value of total exports in 1987 vs. 33% for grains and feeds (USDA-ERS, 1988a, p. 6). However, meat exports have increased steadily since 1977, rising 31%, while exports of grains and feed fell 23% from their peak in 1981. The 1989 RPA assessment assumes that increased demand for meat in developing countries will be met by local production, resulting in little increase in net exports from the U.S. (Joyce, 1988, p. 4–6). Two-thirds of 1987 U.S. beef exports were to Japan; increased import quotas and decreased tariffs should further increase exports (USDA-ERS, 1988b, p. 30). Japanese beef markets have not yet seen the health-related emphasis on lean beef in American markets, raising the possibility of differentiation between longer-fed beef for export and shorter-fed beef for the domestic market (Lin et al., 1989).

Recent estimates of domestic and export market potential for crops and livestock products by Economic Research Service (ERS) conclude that ". . .demand growth is likely to be less than productivity growth over the next 15 yr" (Meyers et al., 1987). Technological advance may reduce the need for U.S. agricultural land resources in two ways: both increasing productivity per acre of U.S. producers and more rapidly increasing productivity of our competitors and former export customers (Phillips and Lu, 1987). Derived demands for both cropland and grazing land are likely to be less than capacity in the near-term future and uses for the economically marginal land will likely be outside traditional agriculture, such as the demand for environmental goods like water quality improvement (Purcell, 1987).

Supply of Grazing and Croplands

On the supply side, there is no lack of forage resources available for U.S. livestock production that would create much pressure to keep CRP lands in grass. Total grazing land amounted to 817 million acres in 1982, down 20% since 1950 (Daugherty, 1988). However, most of the decrease occurred in cropland used only for pasture and grazed forest land; pasture and range decreased only 6% between 1950 and 1982. Further, much of the decreased pasture and range was in the urbanizing regions of the Northeast, Lake States, and Pacific region. In the regions with the greatest amounts of CRP land, the Southern Plains actually had a 30% increase in other pasture and range, while the decrease in the Northern Plains was only 10%. Grazing land per animal unit declined from 15 acres in 1950 to 9.1 acres in 1982, but increased from 8.9 acres per animal unit at the last peak in the cattle cycle in the mid-1970s.

Grazing supplied on public lands has remained nearly constant at about 20 million AUM (Joyce, 1988, p. 2–40). Grazing on Bureau of Land Management (BLM) lands declined from 13 million AUM in 1969 to 11 million AUM in 1986. Grazing use of CRP land could eventually substitute for some public forage. How much depends on the location of CRP land relative to existing public land permittees, ownership or rental arrangements for CRP forage supplies, and the price of CRP forage relative to public grazing fees.

The 1989 RPA assessment assumes that all of the CRP acreage will remain as grassland, constituting a 5% increase, and projects a 47% increase in range productivity by 2030 (Joyce, 1988, p. 4–18; Darr, 1988, p. 36). The 1985 RCA appraisal makes no specific projections of grazing land supply, but the nearly 50% reduction in cropland required will obviously be available for use (Joyce, 1988, p. 4–14). We estimate that between 15 and 30% of CRP land might remain as grassland. At most, CRP could add only 5% to existing forage acreage and is more likely to add only 1 or 2%.

Carver (1989) speculates that increased supplies of grazing lands and decreased cattle and sheep numbers could spark herd expansion. It remains to be seen, however, if the decreased cost of grazing can offset the increased cost of breeding stock to entice CRP landowners, or others, into new cattle enterprises. Even if grazing land costs fall, will livestock prices remain high enough to make new enterprises profitable?

Overall, the U.S. cropland base has remained remarkably constant at about 400 million acres for much of the postwar period (USDA-ERS, 1988c). However, only 328 million acres of U.S. cropland were used for crops in 1988, down 15% from the peak in 1981. This drop was

due primarily to a record 78 million acres in annual and long-term government idling, including CRP land. Stocks of major program crops have been reduced through a combination of increased exports, production controls, and the 1988–89 drought. U.S. grain and soybean stocks in 1989 are expected to be cut about 60% (USDA-ERS, 1989, p. 2). World stocks are expected to decline sharply to only 45 to 60 d of use. How much of the cropland currently idled will be needed as CRP contracts expire will be heavily influenced by new cropland development in competing countries and productivity increases on existing cropland through adoption of existing and emerging technology in the USA and abroad (Phillips and Lu, 1987; Purcell, 1987).

In short, the fundamental economic trends do not indicate clearly whether CRP land coming out of 10-yr contracts will be needed for either crop or livestock production. Both crop and livestock production seem poised for expansion in the 1990s, but existing supplies of cropland and grazing land seem adequate to meet that expansion, particularly if productivity increases associated with new technology do materialize. The key economic factors appear to be the growth and nature of world demand and the impact of technology on U.S. and world cropland productivity.

CHARACTERISTICS AND ATTITUDES OF CRP LANDOWNERS

Another set of factors influencing the fate of CRP land after contracts expire is the characteristics of the land and the people who own and manage it. Within any economic and policy environment prevailing when contracts expire, it is likely that some owners on some CRP land will be disposed to return the land to crop production and that others will be more likely to keep the land in grass.

One window to the future is the past. Almost half of CRP land has been enrolled in the Plains States of Texas, Montana, Kansas, North Dakota, Colorado, and Minnesota. Some of these lands have been retired before under government programs in the 1930s and the 1950s (Helms, 1989). Much of the land retired under earlier programs was returned to crop production as cyclical droughts gave way to more favorable weather, but 3.8 million acres acquired in the 1940s and 1950s remain in public ownership as national grasslands.

The parallels with the Soil Bank program in the Agricultural Act of 1956 are obvious. Almost 29 million acres were under Soil Bank contract in 1960, but over 80% left the program in the 1970s (Alig et al., 1980; Bowers et al., 1984, p. 22). More than 80% of Soil Bank land planted to trees remained in that use, but much of the land planted to grass probably was plowed out during the export boom of the 1970s. Farmers had the opportunity of choosing land to retire under the Soil Bank, and presumable chose economically marginal land. Much eligible highly erodible land for CRP is productive and has substantial opportunity costs when retired (Heimlich, 1989). The fate of the Soil Bank shows the vulnerability of government conservation programs to high commodity prices and suggests that most of the land in the CRP may be put back into crop production after contracts expire if economic conditions warrant.

Table 1. Estimated probability of retaining CRP land in grass, Daviess County, Missouri.

Five-year average annual gross sales	Base opportunity cost†			
	Low		High	
	Livestock farm	Crop farm	Livestock farm	Crop farm
	Probability of retention in grass			
<$20 000	0.90	0.68	0.84	0.56
$20–40 000	0.77	0.44	0.67	0.33
$40–100 000	0.56	0.23	0.44	0.16
$100–200 000	0.32	0.10	0.23	0.07
$200–300 000	0.15	0.04	0.10	0.03

† Base acres times average sales per acre (Kula, 1989, unpublished data).

Given the experience of the Soil Bank, perhaps we need to ask whether any CRP lands will be left in grass when contracts expire? To answer that question, we look to landowners participating in the CRP to identify characteristics associated with their intent to either keep CRP lands in grass or to plow back CRP lands to crops. Landowners in Daviess County, Missouri, were interviewed in early 1988 in a study of factors influencing CRP participation (Kula et al., 1989, unpublished data). Almost half of the landowners controlling 52% of CRP acres in the study planned to leave the land in grass after contracts expired and graze or harvest forage. Forty-two percent of owners controlling 45% of acres planned to return the land to crop production, while 2% did not know how they would use the land.

A model of intended use was developed from the information collected in which the predominant enterprise (crops or livestock), gross sales, the opportunity cost of idling crop base acreage, and the cost of conservation compliance were significant variables explaining the operator's intentions for CRP land (Table 1). The probability that a landowner intends to retain CRP land in grass decreases from 90% for those who have livestock enterprises, sell less than $20,000 in agricultural products annually, and have no base acreage, to only 3% for cash-crop farmers with more than $200,000 in annual sales and high base acreage. The probability of keeping land in grass is 7 to 28% higher for livestock farmers than for cash-crop farmers, decreasing as sales increase. At the mean levels of the variables, livestock farmers had a 77% estimated probability of retaining CRP land in grass, while the probability for crop farmers was only 44%.

Of course, these probabilities are of farmer's intentions at the end of the contract from the perspective of 1988. Their views are dependent on 1988 expectations and will undoubtedly change as contract expiration approaches. The significance of crop base acreage in the model reflects current uncertainty about the future of commodity program benefits. It is difficult to assess whether the role of farm program benefits in land owners' decisions will increase or diminish after the 1990 Farm Bill is passed.

Characteristics of farms and farm owners in Daviess County are particular to that area and cannot be generalized to other areas. However, landowners in other areas

Table 2. Estimated CRP acreage in counties rated likely to retain CRP land in grass, by state.

State	CRP land likely to remain in grass					
	Low	High	Low	High	Low	High
	—1000 acres—		— % —		—% of CRP—	
South Dakota	727.1	951.2	16.1	10.7	2.4	3.2
Texas	641.7	1066.4	14.3	12.0	2.1	3.5
Colorado	638.1	1126.9	14.2	12.7	2.1	3.8
Kansas	632.4	933.0	14.1	10.5	2.1	3.1
Montana	439.9	958.3	10.7	9.8	1.4	3.2
Oklahoma	266.1	765.8	8.6	5.9	0.9	2.6
New Mexico	260.1	260.1	5.8	2.9	0.8	0.8
Iowa	206.9	511.4	5.8	4.6	0.7	1.7
Nebraska	149.6	526.9	5.9	3.3	0.5	1.8
North Dakota	125.6	651.0	7.3	2.8	0.4	2.2
10 states	4087.5	7751.0	91.9	87.1	13.4	25.9
Total	4491.4	8873.6	100.0	100.0	14.7	29.6

face similar utility functions and therefore must take similar factors into consideration when deciding what to do with their CRP land. The factors that affect northwest Missouri farmers' choices can help identify CRP land with similar characteristics that will likely remain in grass.

Lands Most Likely to Stay in Grass

The model suggests that smaller operators are more likely to keep CRP lands in grass, as are mixed crop and livestock producers. We know that 92% of the contracts involved crop base acreage and 64% of the acres enrolled are base acres. The model also suggests that the smaller crop base acreage enrolled in CRP, the more likely CRP land will be kept in grass.

We know very little about the owners of CRP land or their attitudes regarding future use of this land. The number of livestock operations with CRP land is not known, nor are the operations' sales. These characteristics will become more important as 1996 approaches.

Counties Most Likely to Keep CRP Lands in Grass

To develop a threshold beyond which counties were more likely to keep CRP land in grass, we used 1982 Census of Agriculture and CRP enrollment data. Counties with over 10 000 acres in the CRP with at least 20 head of cattle per farm, $<20\%$ of farms with gross sales over $100 000 and less than 0.28 acres of crop acreage base enrolled per CRP acre were considered most likely to remain in grass. The threshold values for the variables clearly affect the amount of CRP land considered likely to remain in grass. The values selected were arbitrary and intentionally conservative, so it is useful to conduct a sensitivity analysis. A second, more liberal analysis included all counties with at least 5000 acres in the CRP, at least 10 head of cattle per farm, and no more than 10% of farms with over $100 000 in sales per year.

Counties likely to retain CRP land in grass have 4.5 million acres in the CRP, 15% of all land enrolled (Table 2). Ten states have 4.1 million CRP acres, or 91% of all the CRP land likely to remain in grass. These states, for the most part, have high CRP enrollment. Most of the Corn Belt states, with the exception of Iowa, were not included, possibly due to the high levels of crop base acreage and the predominance of cash crop farms. Under the more liberal threshold, 8.9 million acres, or 30% of all CRP land is located in counties likely to remain in grass. The results suggest that the percentage of CRP land that will stay in grass is roughly equal to the 20% that remained after the Soil Bank.

INCENTIVES IN AGRICULTURAL POLICY

The imponderables of world agricultural demand, technology development and adoption, and individual landowners' perceptions and intentions, as they affect the fate of CRP land, are difficult to predict and largely impossible to influence. Agricultural policies, however, will have a major influence and are matters of political will. U.S. and world viewpoints on agricultural resource use will be reflected in both 1990 farm legislation and the Uruguay Round of General Agreement on Tariff and Trade (GATT) negotiations. Clearly, natural resources are paramount in neither situation, but resource impacts will be carefully considered both in provisions directly aimed at resources and those which have indirect effects on resources.

Implicit in the current CRP program are three disincentives to keeping enrolled land in permanent vegetation: limited term rental arrangements, no economic use, and crop acreage base loss. These disincentives are addressed in alternative legislative proposals for the conservation portion of 1990 farm legislation, Senate Bill 970 (Wyche Fowler Jr., D-GA) and Senate Bill 1063 (Richard G. Lugar, R-IN).

First, structuring CRP with a defined term and annual rental payments underlined the temporary nature of the "permanent" vegetative cover required under the program. CRP is an improvement over annual setasides featured in previous commodity policy because it reduces uncertainty, improves landowners' ability to make long-term plans for their land, and provides long-term environmental benefits. Although a permanent easement program with a one-time payment might have attracted smaller (or at least different) participation, it would have had more predictable consequences for grazing (Ervin and Blase, 1986).

Second, CRP land cannot be grazed or hayed except under emergency conditions. Prohibition of economic use probably increased rental rates over what might have been bid (Ervin and Blase, 1986). A study of CRP participants in Daviess County, Missouri, found that 70% of landowners wanted to harvest hay, seed, or graze land enrolled in CRP. In dollar terms, 44% of the respondents were willing to forego an average of $19.37 in rental payments per acre for haying or grazing use, approximately equal to cash rental rates for pasture and hayland in the area (Kula et al., 1989, unpublished data).

Farmers might be able to establish livestock enterprises to make the transition from crop production if commercial use was allowed while the land is under CRP contract. Livestock groups opposed forage production on land that was being subsidized by rental payments for conservation and feared artificial expansion of livestock

production. However, the livestock industry benefitted from increased forage supplies from emergency haying on CRP lands during the 1988–89 drought that probably reduced herd liquidation and may have reduced opposition to broader use of CRP forage. Cacek (1988) argues that limited grazing after 15 July in the ninth and tenth contract years be allowed in exchange for reduced rental payments.

Third, program crop acreage base is protected while the land is enrolled in CRP, but will be subject to commodity program rules when the contracts expire. Crop base acreage is one component of the formula on which farm income supports (deficiency payments) are based. Base protection during the life of the contract probably increased participation and reduced rental payments compared with a program where base acreage was lost. However, current rules for calculating crop base mean that 20% of protected base in the CRP will be lost every year that the land is not returned to crop production after contracts expire. High crop prices could provide a market incentive to plow out CRP land when contracts expire. However, if crop prices are low, loss of deficiency payments implied by this rule creates a powerful nonmarket incentive to plow the land once again. In theory, conservation compliance could prevent some of the most highly erodible land from being cropped. In practice, however, alternative conservation systems (ACS) are being allowed that will not necessarily require reducing erosion to soil loss tolerance levels and much CRP land will be cropped under minimum tillage or other conservation practices. The Food Security Act authorized additional payments to farmers who permanently retire base acres, but USDA has not implemented this provision (Cacek, 1988).

The Fowler Bill proposes an economic use option (Section 212[e]) for the last 3 yr of CRP contracts in return for permanent retirement of crop acreage base. Additional compensation is proposed for agreeing to a permanent easement prohibiting crop production. The Lugar Bill extends crop acreage base protection to CRP land for an additional 5 yr after contracts expire (Section 101). Both Sens. Fowler and Lugar set up 3 to 5 yr set-aside programs in which CRP land coming out of contract could be placed to avoid crop acreage base loss, but haying and grazing use is not permitted except in declared emergencies. Assessment of support for these changes is a matter of political judgement, but their effect on preserving CRP grasslands is receiving serious consideration.

RECOMMENDATIONS OF THE THIRD GRAZING LANDS FORUM

The Grazing Lands Forum (GLF) was formally organized in 1985 as a consortium of independent organizations and agencies with an interest in the impacts of livestock grazing and associated activities on the land and its natural resource potential. The third forum, "Grazing Land and the Conservation Reserve Program," identified obstacles to good grazing land stewardship and actions that forum members and others could take to overcome those obstacles.

Landowner education was identified as an important means of affecting the quality and ultimate fate of CRP plantings (Heimlich et al., 1989). Suggestions include:

- Education and extension programs to influence CRP enrollment by farmers who will be more likely to keep land in grass.
- Programs to persuade farmers to plant well-adapted native grass species that will support a viable, long-term forage base. Proper management of CRP grass stands during the life of the contract can also increase long-term forage value.
- Assist farmers in exploring options for integrating their CRP land back into the operation in the most profitable manner.

Implementation of the existing program can be better geared to long-term retention of CRP land in grass. Suggestions made by participants in the Third Grazing Lands Forum include:

- Develop multidisciplinary planning teams to promote sound production systems for conservation compliance on CRP land after contracts.
- Reevaluate and revise present CRP plans to include necessary management and additional practices to establish profitable livestock enterprises after contracts expire.
- Ask the Secretary of Agriculture to extend CRP contracts to the legislated 15-yr maximum.
- Require that stricter "sodbuster" rules apply to CRP lands.

Changes of this kind, that could be accomplished administratively, could make a difference in the ultimate fate of CRP lands.

Opening lands for haying and grazing during drought years, as was done in 1988 and 1989, could help stabilize foundation herds at this low point in the cattle cycle. Careful management of emergency grazing would prevent damage to newly-established stands and could actually encourage desireable species and improve stand viability. The third forum noted the following:

- Explore possibilities for economic use of CRP land during the last years of the contract.
- Revise cropland acreage base management to protect base acreage and allow farmers to transfer or exchange acreage base.
- Explore possibilities for extending CRP eligibility to environmentally sensitive land other than cropland.
- Ensure that Congress considers the impact of proposals to reduce or change farm income supports, such as decoupling or trade liberalization, on the ultimate use of CRP land.

CONCLUSION

Passage and implementation of the CRP constitute a major achievement for conservation and for agricultural policy to date. CRP played a major role in restoring the balance between cropland and grassland upset by the export-based expansion of the 1970s. At this stage, the remaining challenge is to ensure that CRP lands are not

returned to crop production unless they are truly needed to meet domestic and global food demands.

Fundamental economic trends do not clearly indicate whether CRP land will be needed for either crop or livestock production. Existing supplies of cropland and grazing land appear adequate to meet forseeable expansion in the 1990s, particularly if productivity increases associated with new technology materialize. Proposals for base protection, limited economic use, and selective contract extension could remove artificial incentives for plowing up CRP land. Based on a limited sample of farmers' current plans for CRP land, between 15 and 30% of the land enrolled could be retained in grass. Modeling results suggest that smaller operations with existing livestock enterprises and lower reliance on farm programs are most likely to retain CRP land in grass.

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