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Potential Economic Effects of Post-CRP Land Management in Southwest North Dakota

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Abstract

The uncertain future of the Conservation Reserve Program has created substantial interest for agricultural producers, rural businesses, community leaders, sportsmen, and wildlife organizations. Many regions of the upper Great Plains have participated heavily in the CRP as evidenced by program acreage reaching land enrollment limits; however, current enrollment and re-enrollment criterion are expected to substantially reduce CRP acreage in many parts of the Great Plains. The divergence of interests between pursuing post-CRP lands for agricultural production versus retaining the wildlife habitat and wildlife populations supported on CRP lands presents land owners and agricultural producers with important land management decisions over the next several years. This research examines the regional economic implications of post-CRP land use among traditional agricultural uses, wildlife production, and multiple-use practices. Of particular interest is whether multiple-use management on post-CRP lands can produce similar returns to landowners and producers as traditional land uses, and determine the effects of multiple-use management on post-CRP lands on regional economic output. A multiple-use system implemented on post-CRP lands based primarily on beef grazing while producing corn and barley for forage and retaining a portion of acreage in dedicated wildlife habitat would not compete economically with other conventional land uses. The net change in gross receipts within the regional economy from agricultural uses of post-CRP lands exceeded lost recreational expenditures in all scenarios evaluated.

Key words: North Dakota, Conservation Reserve Program, Recreation, Agriculture, Land Management

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Potential Economic Effects of Post-CRP Land Management in Southwest North Dakota

Dean A. Bangsund, Nancy M. Hodur, F. Larry Leistritz, and Dan Nudell*

Introduction

The Conservation Reserve Program (CRP) is one of several long-term land retirement programs over the last half century that have been an integral part of U.S. farm policy. The primary focus of the program, when enacted in 1985, was to retire marginal and erodible crop land, provide income stability to landowners, bolster supply control efforts, and increase land- and water-based conservation benefits. Subsequent rounds of Federal legislation have emphasized greater environmental and wildlife benefits, reduced average payment rates, and changed enrollment criteria. Despite these changes, the program has remained popular with North Dakota landowners.

Large-scale, long-term land retirement programs produce, to varying degrees, negative effects on those businesses and economic sectors that provide agricultural inputs and services. However, the CRP, by creating substantial wildlife habitat, has helped bolster upland bird, waterfowl, and big game populations and those growing wildlife populations in the 1990s have contributed to increased consumptive and non-consumptive wildlife-based recreation. The net economic effects of decreased agricultural activity and increased recreational activity associated with the CRP have not been thoroughly examined in the United States; although those effects were estimated and discussed for North Dakota in 2002 (Bangsund et al. 2002).

Substantial CRP acreage is scheduled for expiration over the next several years. Questions surrounding the rural economic effects of returning CRP lands to agricultural production have again been raised. After a decade of increased wildlife populations and increased recreational activity associated with the CRP, the issue of multiple use has been proposed as a means to retain some wildlife benefits while providing agricultural revenues to landowners. This paper is part of a larger research effort to examine multiple-use of post CRP lands, post CRP land management objectives of local and non-local land owners, and the potential regional economic effects of post CRP land management.

Procedure

The approach in this study was to examine the differences in regional economic activity between land enrolled in the CRP and various post-CRP land use alternatives. Regional economic activity included changes in revenues and expenditures from agricultural and recreational sources.

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Estimating the changes to regional economic activity involved subtracting the CRP contract payments from the economic activity generated under alternative uses for post-CRP lands. In the case of crop and hay production, the economic activity was based on gross revenues, of which a substantial portion represented production outlays and the remainder represented returns to unpaid labor, management, equity, and land. For lands returning to grazing production, the non-feed expenditures and net returns from an expansion of the region's cow-calf herd were included in the analysis. It was assumed that other feedstocks were already produced in the region and would not count towards a change in regional economic activity. For land dedicated to multiple-use, all expenditures and returns from cow-calf production were included, as well as expenditures for forage production. Net returns were not estimated for forage production in the multiple-use system since all forages produced were matched to an increase in cow-calf operations. Therefore, forage production expenses were charged against the cow calf operation.

Another change in regional economic activity was recreational expenditures for pheasant, deer, and waterfowl hunting. The loss of CRP was expected to have negative effects on hunting participation levels, which in turn would result in less hunting-based expenditures in the regional economy.

Methods

The analysis simulated the changes in regional economic activity for acreage leaving the CRP and for changes in hunting-based expenditures over a ten-year period from 2010 through 2019. The changes in regional economic activity were estimated annually, although the changes in each year included estimating changes for acreage released in prior years.

Study Region

Geographic focus for this paper was a 12-county region in western North Dakota (Figure 1). The 12-county region was part of a larger research effort involving field trials (Geaumont 2009; Sebesta 2010), land ownership patterns (Nudell 2011), and landowner attitudes and issues relating to post-CRP land management (Hodur 2011).

Agricultural Effects

Agricultural use of post-CRP lands included crop production, hay production, and grazing. Multiple use of post-CRP lands included livestock grazing, hay production, and forage production from various annual crops, combined with idled land for wildlife production. Gross revenues, production expenses, and net returns for crop production, hay production, grazing, and multiple-use were projected from 2010 through 2019.

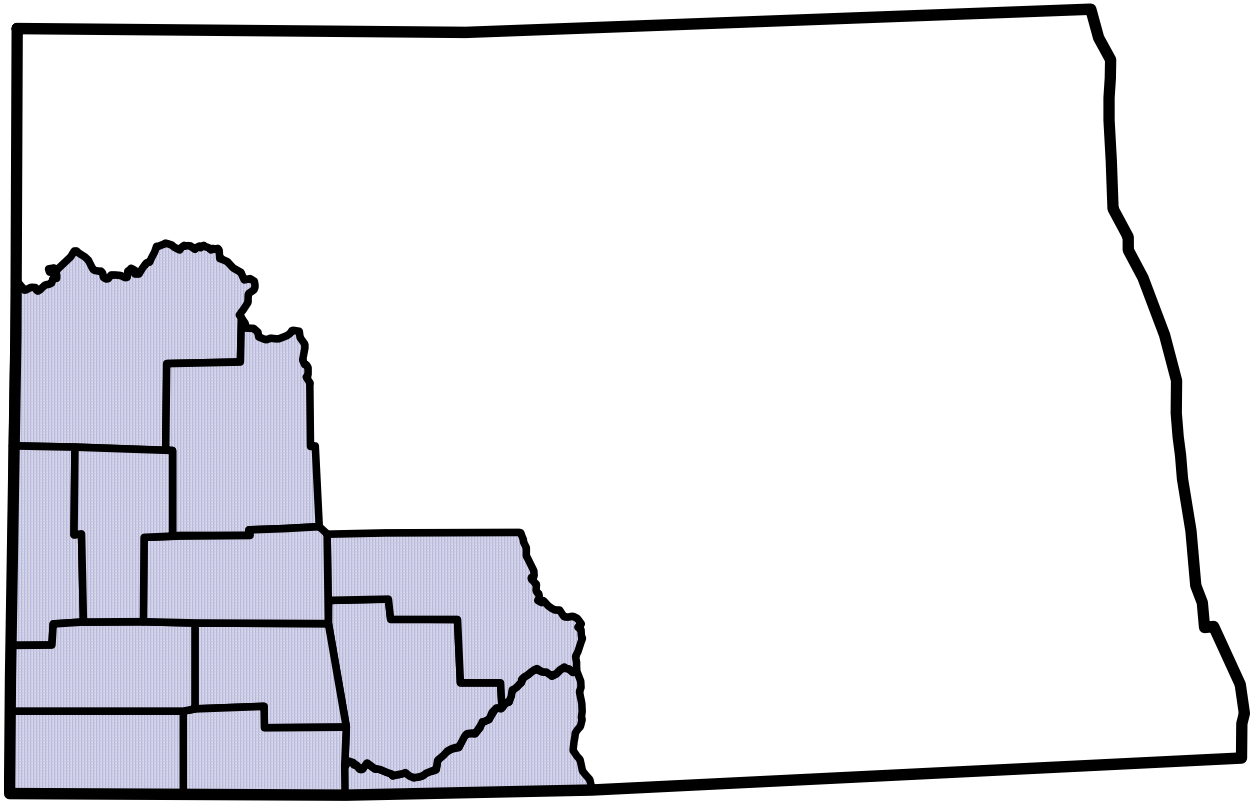


Figure 1. Study Region

Forecasted production expenses, future price expectations, and anticipated future crop yields were used to project net returns for CRP lands returning to crop production. Crops composing 3 percent or more of the region's crop mix over the 2005-2009 period were modeled, and included spring wheat, durum wheat, alfalfa, barely, corn, and sunflowers (North Dakota Agricultural Statistics Service 2010). Future projections of revenues and expenses also were made for post CRP lands placed into hay production or used for grazing. For lands returning to grazing production, the non-feed expenditures and net returns from an expansion of the region's cow-calf herd was included in the analysis. It was assumed that other feedstocks were already produced in the region and would not count towards a change in regional economic activity.

Regression analysis was used on enterprise budget data from 1993 through 2009 to estimate trends in crop yields and expenses (North Dakota Farm and Ranch Business Management 2010). Regression equations were used to project future yields for crops and grass hay. Five-year averages were used when time trends for yields and expenses were not statistically significant. Future crop prices were obtained from Haugen et al. (2011). Future crops were expected to receive government payments per acre equal to the five-year average from 2005 through 2009.

A cow-calf enterprise model was developed using trends for production expenses, calving rates, weaning weights, and other key parameters of cow-calf production based on data for 200-head cow-calf operations in Southwest North Dakota from 1993 through 2009 (North Dakota Farm and Ranch Business Management 2010). Trends in production parameters, future price expectations, and trends in production expenses were used to project net returns from cow-calf enterprises.

Recreational Effects

Projected changes in participation levels for pheasant hunting, deer hunting, and waterfowl hunting were used to estimate changes in recreational expenditures associated with post-CRP land use in the study region. Data on hunter numbers for the study region were obtained from the North Dakota Game and Fish Department (2010). Expenditures by pheasant, waterfowl, and deer hunters were obtained from Bangsund and Leistritz (2003) and adjusted for inflation using the Consumer Price Index.

CRP created wildlife habitat, which resulted in increased wildlife populations (Figure 2). Over the history of the program, hunter participation increased in North Dakota as wildlife populations increased. Reduction in CRP acreage is expected to have the opposite effect on wildlife populations. A key consideration is how hunting participation might be affected under the premise that a loss of CRP acreage eliminates or greatly reduces wildlife populations. Hunter participation in pheasant hunting, the primary hunting activity in the study region, appears to follow bird populations over the last 10-years of the CRP (Figure 3).

Three relationships were postulated to model changes in hunting participation associated with losses of wildlife habitat. Since post-CRP lands could be used in a capacity that retains wildlife habitat, the relationships were based on changes in permanent cover expressed as percentage of 2009 CRP acreage in the study region. The degree of loss in wildlife habitat was a function of post-CRP land management. As wildlife habitat is lost, hunter participation was modeled to also decrease based on a percentage of the average number of hunters in the study region from 2007 through 2009 (Figure 4).

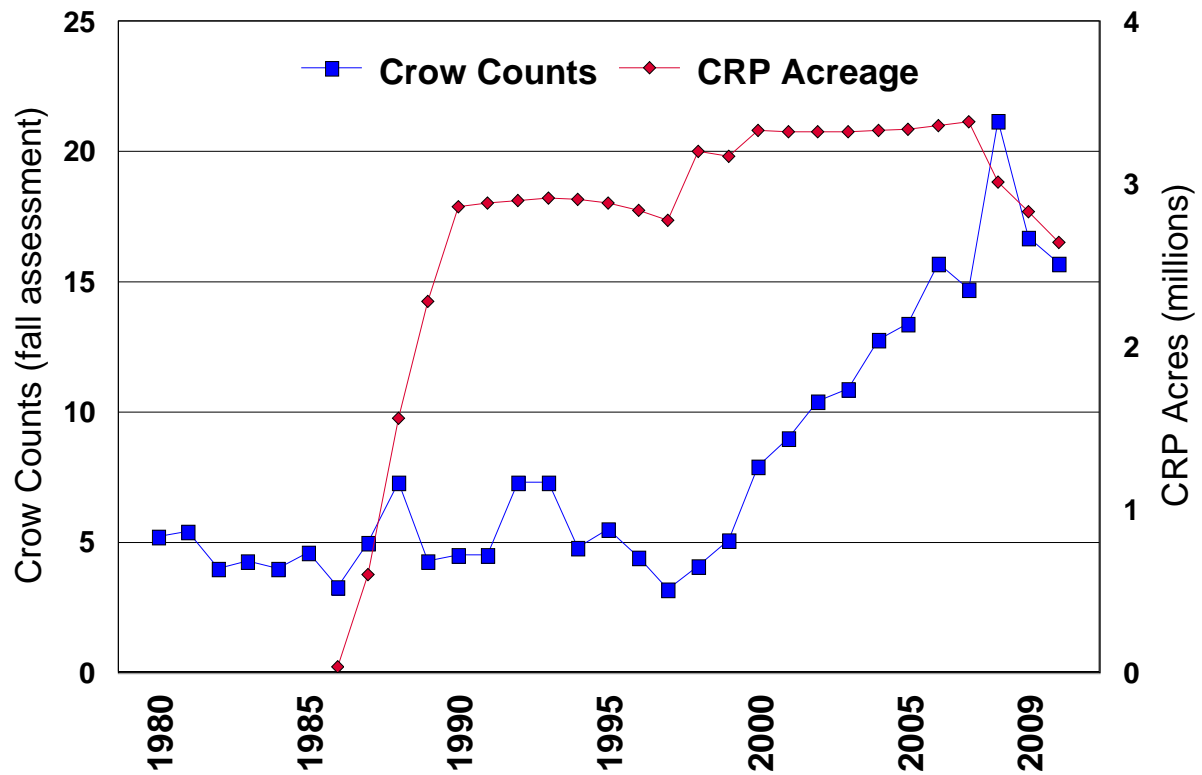


Figure 2. CRP and Pheasant Populations, North Dakota, 1980 to 2009

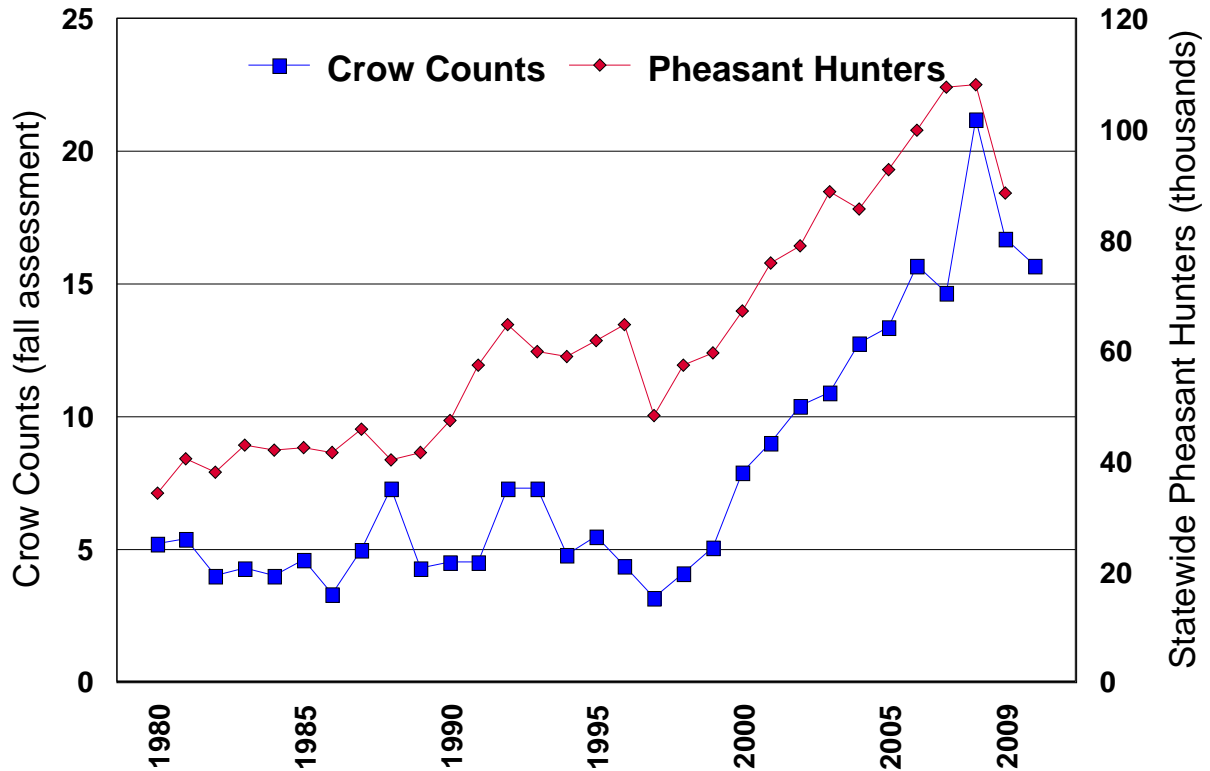


Figure 3. Pheasant Populations and Hunter Participation, North Dakota, 1980 to 2009

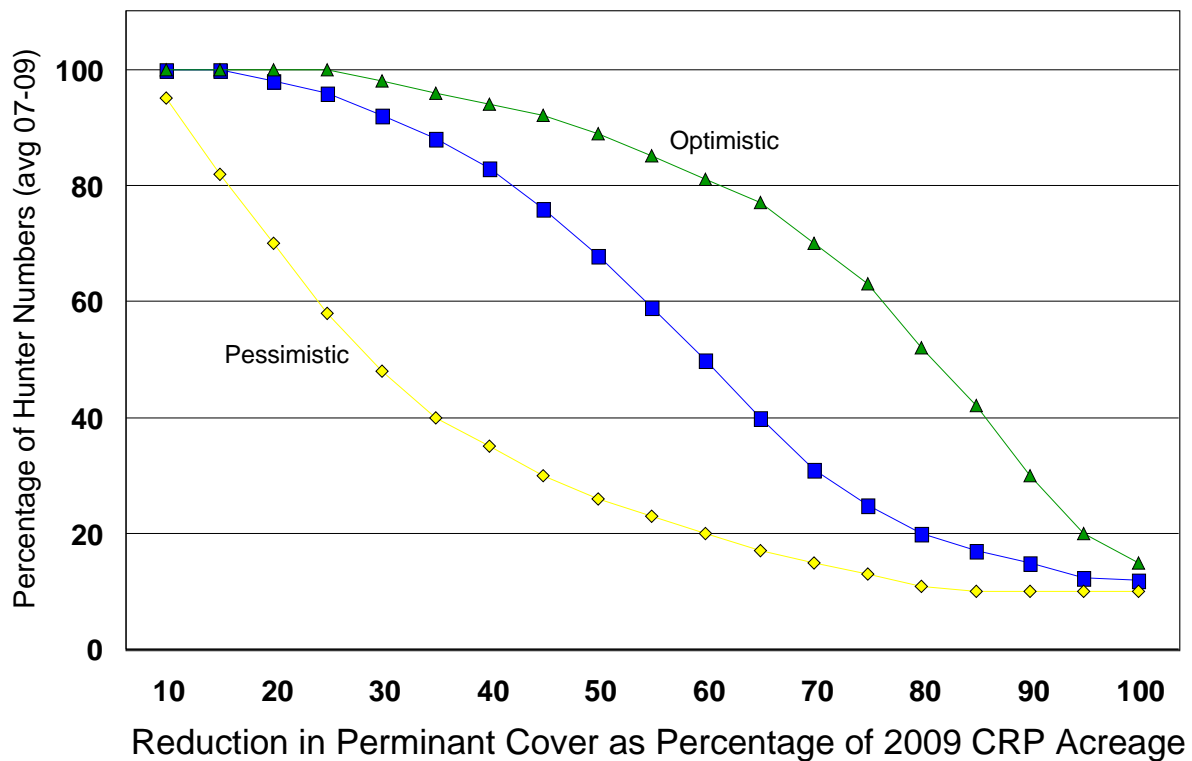


Figure 4. Hunter Participation Response (postulated) to Loss of Conservation Reserve Program Lands, Study Region.

Post-CRP Land Use

Three potential scenarios were examined for post-CRP land use in the study region. The first situation is that all land leaving the CRP would return to crop production. Anecdotal evidence suggests that the majority of land that has come out of the program in recent years is returning to crop production. The second scenario is that post-CRP lands would be managed in multiple-use systems similar to those of the research field trials (Geaumont 2009). In the multiple-use system, 50.4 percent of the land was summer grazed, 24.8 percent was planted to forage crops (corn and barley), 12.4 percent was used for grass hay production, and the remaining 12.4 percent was left in grass for wildlife habitat. The third scenario uses data obtained from a survey of CRP contract holders in North Dakota in 2002 (Hodur et al. 2002). In that survey, CRP contract holders in Adams, Bowman, and Hettinger Counties indicated that land leaving the program would be used for crops (66.7 percent of land), hay (17.4 percent), grazing (10.4 percent), and permanent cover (5.4 percent).

Rate of Loss of CRP Acreage

Considerable uncertainty exists over the future scope and size of the Conservation Reserve Program. Rising commodity prices, federal budget concerns, potentially changing

enrollment criteria, and a scheduled new farm bill in 2012 could all influence the future composition of the CRP. A new general sign-up was offered in 2010, the first general enrollment since 2006, in an attempt to address the loss of approximately 4.4 million acres that were scheduled to expire on September 30, 2010 (Farm Service Agency 2011). The result of sign-up number 39 was that net loss of CRP acreage was less than scheduled acreage expirations. Another general sign-up in the beginning months of 2011 was designed to address the potential loss of 14.2 million acres of CRP scheduled to expire in the fall of 2011. In 2010, about 57 percent of the CRP acreage expiring was gained back with new enrollments in the study counties (Farm Service Agency 2011). As a result of the new general sign-ups it is possible that the CRP will not lose acreage as precipitously as forecasted prior to the implementation of new general sign-ups. To account for the uncertainty over the change in program acreage, two scenarios were modeled (Figure 5).

The first scenario reduces CRP acreage in the study counties assuming no additional or new contract acreage. This scenario uses existing contract expirations as the rate of loss of CRP acreage. The second scenario assumes future CRP acreage reductions will be less than contract expirations, and the rate of loss will be approximate to that observed in the general sign-up number 39 (i.e., 57 percent of expiring acreage was added back to the CRP) (Figure 5).

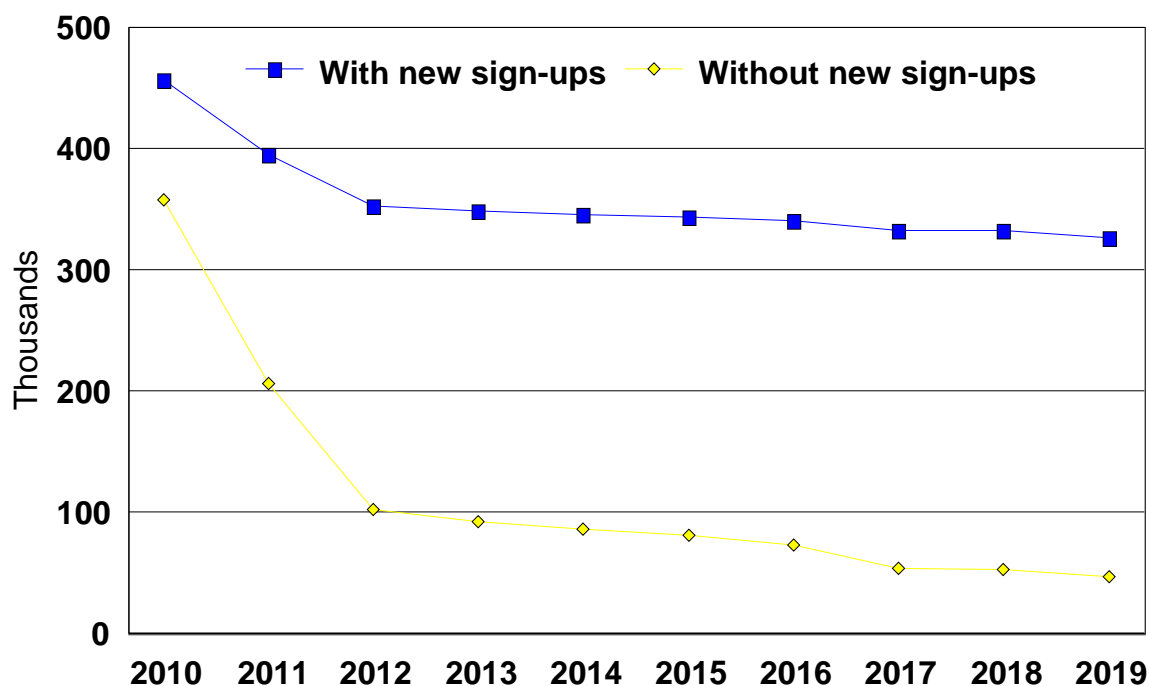


Figure 5. Projected Regional Conservation Reserve Acreage in Study Counties, 2010 Through 2019

Results

The goal of this work was to provide a brief examination of the economic viability of multiple-use of post-CRP lands and examine the regional economic effects of alternative uses of post-CRP lands. The economics of multiple-use were based on producer net returns, whereas the analysis of regional economic effects focused on changes in gross receipts to the region.

Multiple Use of Post-CRP Lands

The economic analysis of multiple-use of post-CRP lands was limited to evaluating a grazing dominated production system described by Geaumont (2009). The ratio of land use in the grazing system was 50.4 percent summer grazed, 24.8 percent forage crops (corn and barley), 12.4 percent grass hay production, and the remaining 12.4 percent left in grass for wildlife habitat. Cattle stocking rates, based on a 640-acre tract, ranged from 30 to 37 cow-calf pairs. Using projections from a 200-head cow herd, the gross revenue per cow was estimated at \$696 per year over a five-year period (2010 through 2014). Excluding feed costs, variable and fixed expenses were estimated to be \$126 and \$64 per cow, respectively, over the five-year period. Net returns, without feed expenses, were estimated at \$505 per cow. By comparison, the average annual net return without feed expenses for the 2005 through 2009 period (five-year historic average based on producer enterprise data) was estimated at \$333 per cow.

Adjustments to crop production expenditures were made to account for the use of corn and barley as forage for the cow herd. Corn was unharvested, and left standing for the cows to graze/forage for three months after being removed from grazing grass. Also over this period, the cows were allowed to graze the barley stubble. Therefore, harvest, drying, hauling, and some pesticide and crop insurance expenses were eliminated from the production costs for corn. Similar adjustments were made to enterprise budgets for barley. Production expenses were projected at \$131 per acre for corn and \$109 per acre for barley over the 2010 through 2014 period. Grass hay production was estimated at \$30 per acre over the period. Grazing expenses, excluding any development expenses for fencing and water, were estimated at \$1.53 per acre. Land charges were excluded from the corn, barley, grass hay, and grazing expenses.

The multiple-use grazing system could be expected to produce \$17,668 in revenues from the cow-calf pairs for the 640-acre tract.² The expenses for the corn, barley, hay, and grazing were estimated at \$21,123, which would produce a negative net return of (\$3,455). One of the goals of the multiple-use system was to retain wildlife producing capacities and that hunting-related incomes would be an important consideration in the adoption of a multiple-use system. In order for the multiple-use system to provide returns equal to those likely available from crop production, assuming the entire 640-acre tract was planted to crops, hunting revenues (i.e., leases, fee hunting) would have to exceed \$40,000 per year or be equivalent to \$63 per acre.

²While the stocking rates for the field trials varied from 30 to 37 cow-calf pairs, this analysis assumed 35 cow-calf pairs.

Hunting revenues for landowners/producers are unlikely to provide sufficient additional revenue for multiple-use grazing systems to compete with crop production³. Therefore, it is unlikely to expect multiple-use grazing systems, as structured in this study, to be adopted in any meaningful scale on post-CRP land by land owners or producers in the study region.

An additional thought on the multiple-use system in this study was that corn and barley are simply too expensive to be used as dedicated grazing forage for beef cow production. Both crops are considerably more expensive per acre than hay for forage for beef cattle. The multiple-use concept would have benefitted from the sale of grain from the corn and barley stands, or the use of other cash crops within the grazing system to provide some additional revenues to the producer/landowner. Perhaps a system that relied more on aftermath grazing would be more economical.

Regional Economic Implications of Post-CRP Land Use

Land enrolled in the CRP generates a return to landowners in the form of a government payment, and landowners can receive additional revenues through hunting leases or fee hunting activities. In addition to the revenues received by the landowner, hunting activities will result in additional expenditures in the regional economy. Therefore, a combination of program payments and recreational expenditures represent the economic stimuli to the regional economy from the CRP.

Within the study region, post-CRP lands are generally returned to agricultural production (e.g., crop, hay, grazing) or remain in grass and left unharvested (e.g., dedicated wildlife habitat) when land is not re-enrolled or does not qualify for re-enrollment. Regional economic stimuli from post-CRP lands are likely to be based on agricultural revenues, from which production inputs and expenses are paid and a portion remains with the landowner or producer in the form of net returns. While recreational revenues may still be available to landowners when post-CRP land is returned to agricultural production, a larger potential impact to the regional economy may stem from the change in hunter expenditures associated with changes in wildlife populations and hunter participation rates in the region. These changes are expected to occur as wildlife habitat is either lost or greatly reduced when land is converted to agricultural production. Therefore, a tradeoff exists between economic stimuli associated with agricultural production and economic stimuli produced from hunting and/or recreational expenditures.

A number of scenarios was developed to track the potential economic implications of post-CRP land use by examining the amount of land leaving the program, the types of agricultural enterprises adopted on the lands, and the regional consequences to hunter participation rates and expenditures.

Direct impacts were estimated over a 10-year period. However, impacts in years 2 through 10 represented an estimation of the annual effects on post-CRP lands from previous years and impacts on land leaving the program in that year. For example, if 1,000 acres are leaving the program annually over a 10-year period, then the direct impacts in year 1 would

³Reference made only to the multiple-use grazing system evaluated in this study.

represent the activities (e.g., crop production, grazing) on the 1,000 acres leaving the program that year. In year 2, the regional impacts would be based on land use on the 1,000 acres leaving the program in year 2 and the activities occurring in year 2 on land that left the program in year 1. Similarly, in year 3, the regional impacts would be based on the activities occurring on the 1,000 acres leaving the program that year and the land use occurring in year 3 on land that left the program in year 1 and year 2.

Gradual CRP Reduction–Mixed Land Use

In this scenario the reduction of CRP land is expected to be less than scheduled expirations. Post-CRP land use is consistent with data obtained from a survey of CRP contract holders in North Dakota in 2002 (Hodur et al. 2002).

In this situation, annual direct effects⁴ to the regional economy varied from \$7.9 million to \$18.2 million (Figure 6). Reductions in recreational activities were relatively minor compared to the gains with agricultural activities. The overall net effect of returning the majority of post-CRP lands to agricultural production was positive in the regional economy.

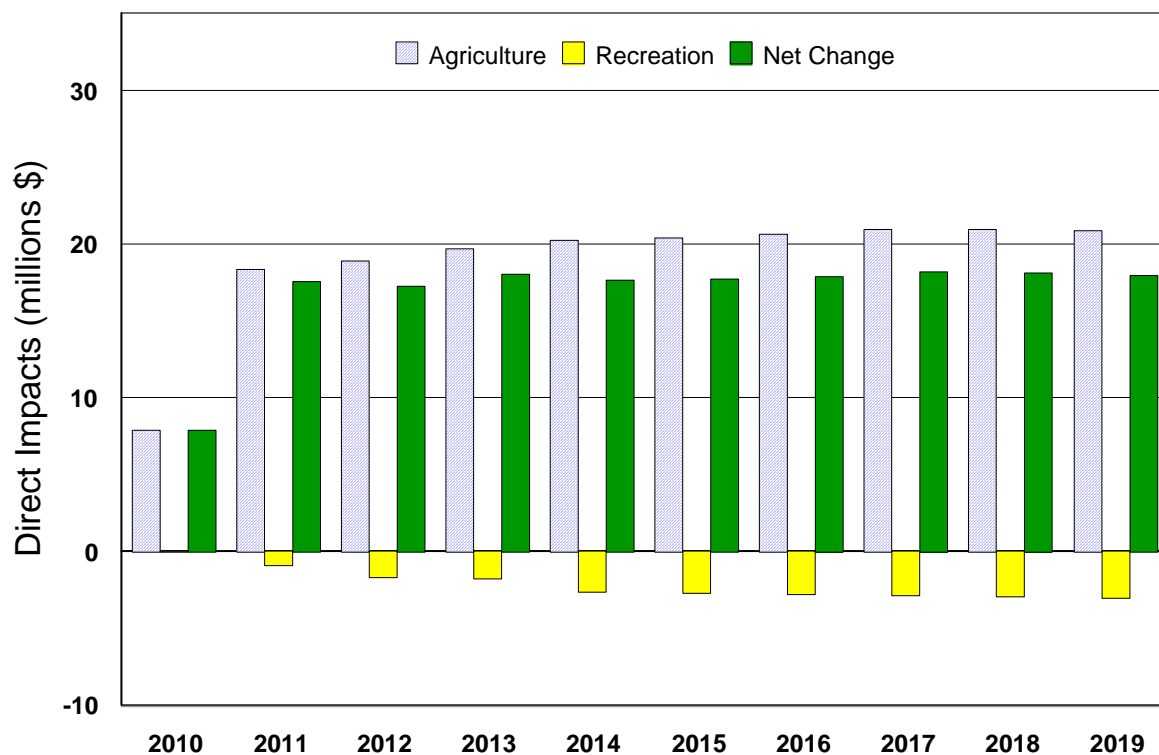


Figure 6. Direct Impacts from Post-CRP land Use in Study Counties Assuming Gradual CRP Reduction and Mixed Use of Post-CRP Lands, 2010 Through 2019

⁴Impacts can be defined as direct and secondary economic effects. Only direct effects are measured in this study.

Gradual CRP Reduction–Multiple-Use Systems

In this scenario the reduction of CRP land is expected to be less than scheduled expirations. All post-CRP land is modeled to go into multiple-use grazing systems.

In this situation, the direct impacts were relatively minor compared to the other two scenarios. Annual direct effects to the regional economy varied from \$2.3 million to \$6.1 million (Figure 7). Losses in recreational expenditures were the smallest of the scenarios with a gradual loss of CRP; however, agricultural impacts were considerably smaller than found in the other two scenarios. Multiple-use grazing systems retain the greatest amount of recreational revenues since a greater proportion of CRP lands are retained in wildlife habitat, but multiple-use grazing also produces the lowest amount of agricultural revenues. The net result is that multiple-use results in less direct impact than the scenarios with greater amounts of crop production.

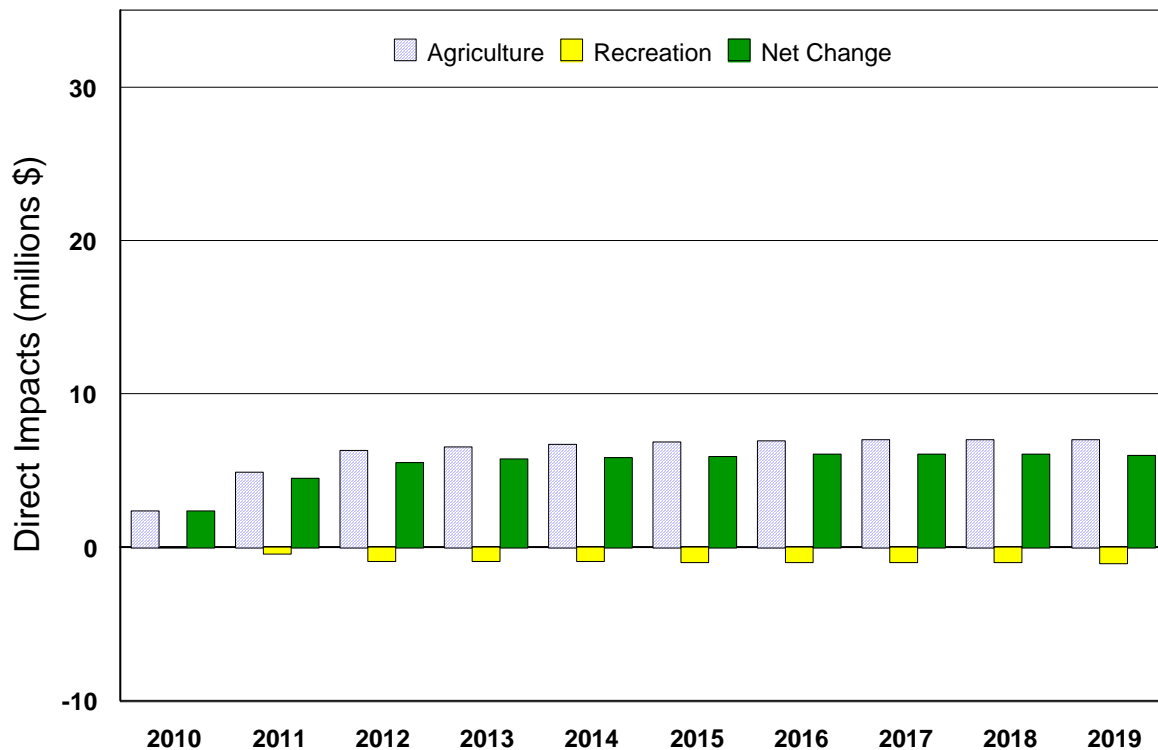


Figure 7. Direct Impacts from Post-CRP land Use in Study Counties Assuming Gradual CRP Reduction and 100 Percent Multiple-use of Post-CRP Lands, 2010 Through 2019

Gradual CRP Reduction–100 Percent Crop Production

In this scenario the reduction of CRP land is expected to be less than scheduled expirations. All post-CRP land is modeled to go to crop production.

In this situation, annual direct effects to the regional economy varied from \$11 million to \$25.9 million (Figure 8). Reductions in recreational activities were relatively minor compared to the gains with agricultural activities. Direct impacts from agricultural activities were higher in this scenario than the mixed land use or multiple-use grazing system. Reductions in recreational impacts remained low despite the conversion of post-CRP land into crop production largely because of the relative acreage of CRP lost. The difference in acreage lost in this scenario compared to the mixed land use scenario resulted in similar percentage decreases in permanent cover (see Figure 4) and therefore was expected to have similar effects on hunter participation and expenditures.

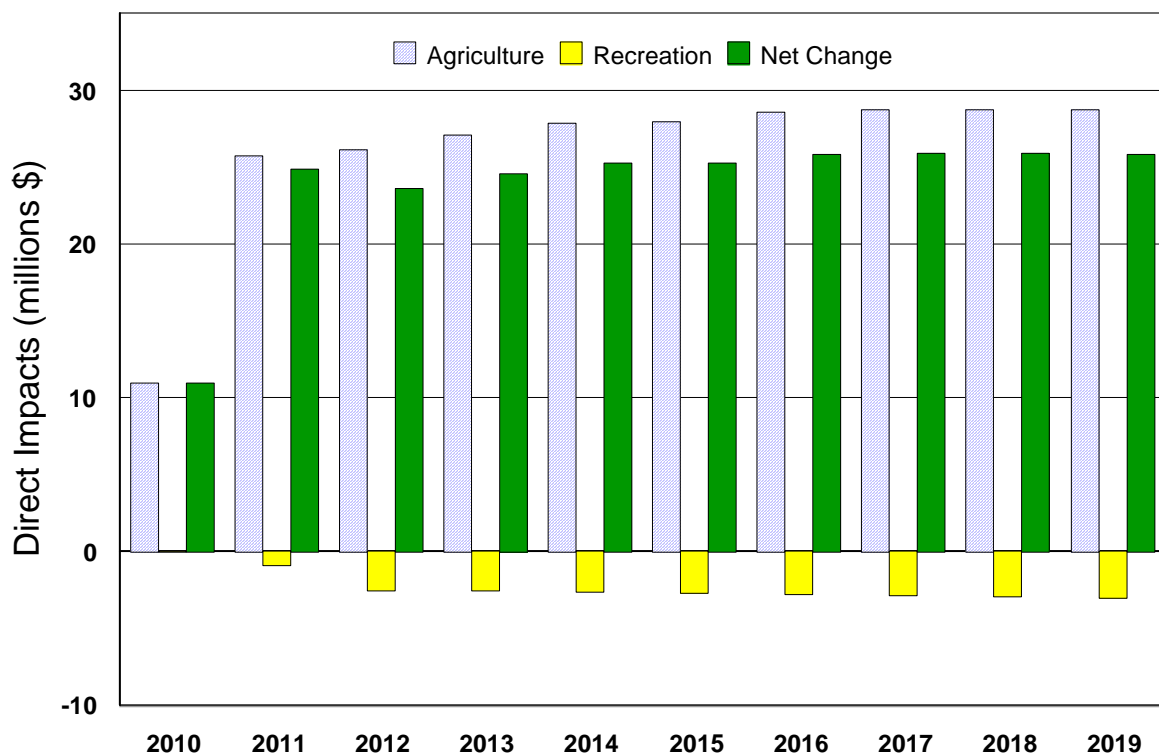


Figure 8. Direct Impacts from Post-CRP land Use in Study Counties Assuming Gradual CRP Reduction and 100 Percent Crop Production on Post-CRP Lands, 2010 Through 2019

Rapid Loss of CRP–Mixed Land Use

In this scenario the reduction of CRP land is expected to be equal to the scheduled expirations. The rate of loss in CRP is much higher in this scenario than in the situation where substantial re-enrollments and new enrollments limit the overall loss of CRP acreage (see Figure 5). Post-CRP land use is consistent with data obtained from a survey of CRP contract holders in North Dakota in 2002 (Hodur et al. 2002).

Annual direct effects to the regional economy varied from \$7.9 million to \$25.6 million (Figure 9). Reductions in recreational activities were considerably larger than the three scenarios with gradual reduction in CRP. Conversely, the agricultural impacts were larger than found in the three scenarios with gradual reduction in CRP. The net gains between agriculture and recreation resulted in direct impacts to the regional economy that were similar to those with gradual reduction in CRP acreage.

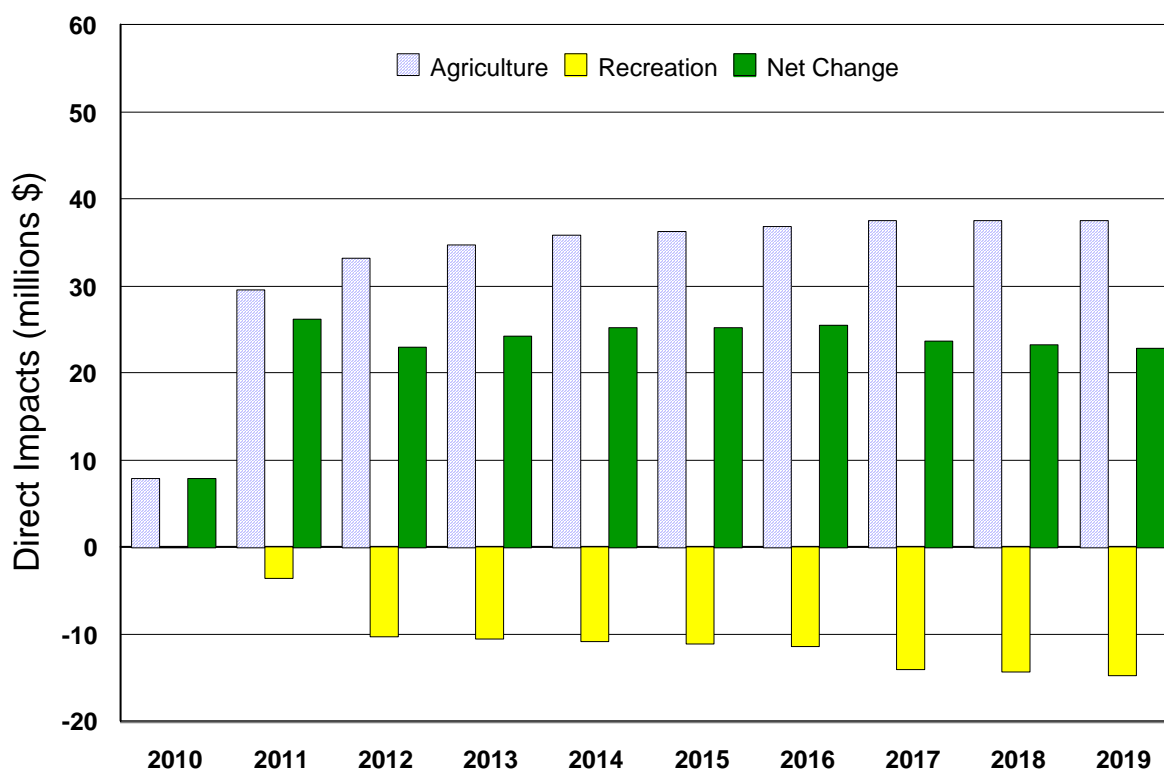


Figure 9. Direct Impacts from Post-CRP land Use in Study Counties Assuming Rapid Reduction in CRP and Mixed Use of Post-CRP Lands, 2010 Through 2019

Rapid Loss of CRP–Multiple-Use Systems

In this scenario the reduction of CRP land is expected to be equal to the scheduled expirations. All post-CRP land is modeled to go into multiple-use grazing systems.

In this situation, the direct impacts were relatively minor compared to the other two rapid-loss scenarios. Annual direct effects to the regional economy varied from \$2.4 million to \$6.8 million (Figure 10). Losses in recreational expenditures were relatively small, despite the increased acreage lost from the CRP. However, agricultural impacts were considerably smaller than found in the other two scenarios—a pattern also found with the three scenarios for gradual reduction of CRP. Consistent with results from the scenarios with gradual loss of CRP, the multiple-use grazing system retain the greatest amount of recreational revenues since a greater proportion of CRP lands are retained in wildlife habitat, but multiple-use grazing produced the lowest amount of agricultural revenues. The net result is that multiple-use results in less direct impact than the scenarios with greater amounts of crop production.

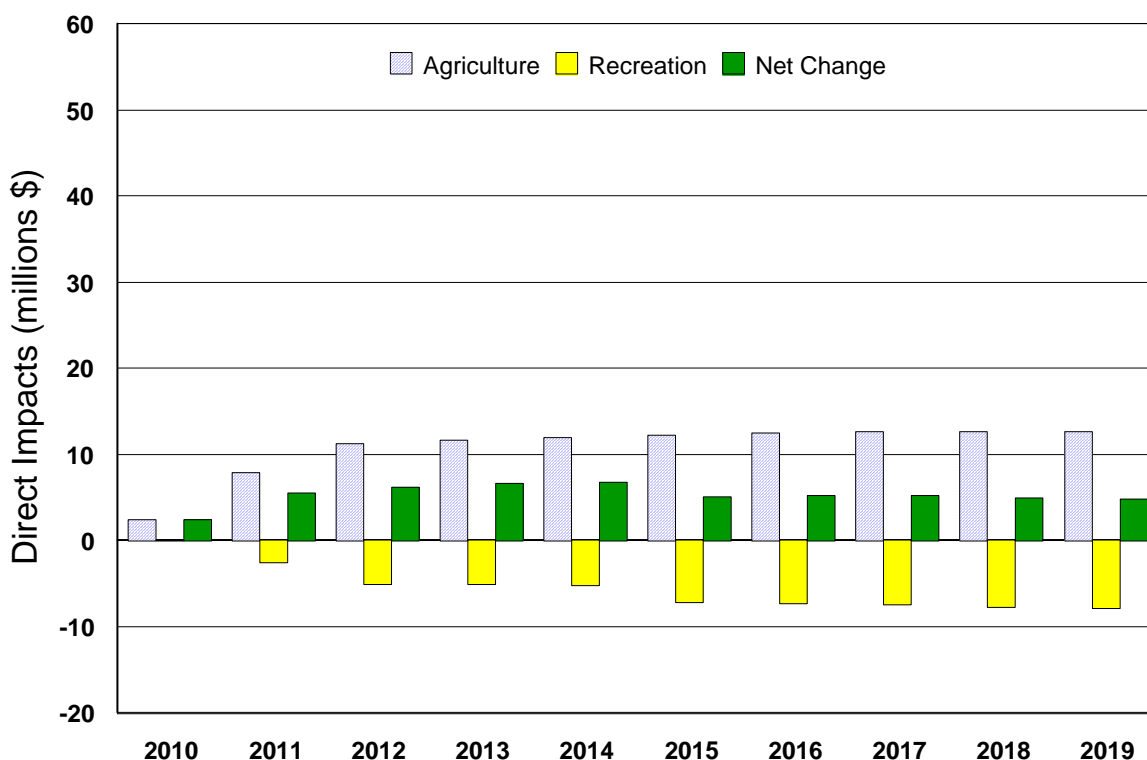


Figure 10. Direct Impacts from Post-CRP land Use in Study Counties Assuming Rapid Reduction in CRP and 100 Percent Multiple-use of Post-CRP Lands, 2010 Through 2019

Rapid Loss of CRP–100% crop production

In this scenario the reduction of CRP land is expected to be equal to the scheduled expirations. All post-CRP land is modeled to go to crop production

Annual direct effects to the regional economy varied from \$11 million to \$37.6 million (Figure 11). Reductions in recreational activities were considerably larger than the three scenarios with gradual reduction in CRP. The agricultural impacts were the largest of all the scenarios evaluated. The net gains between agriculture and recreation resulted in direct impacts to the regional economy that were the largest of all the scenarios evaluated.

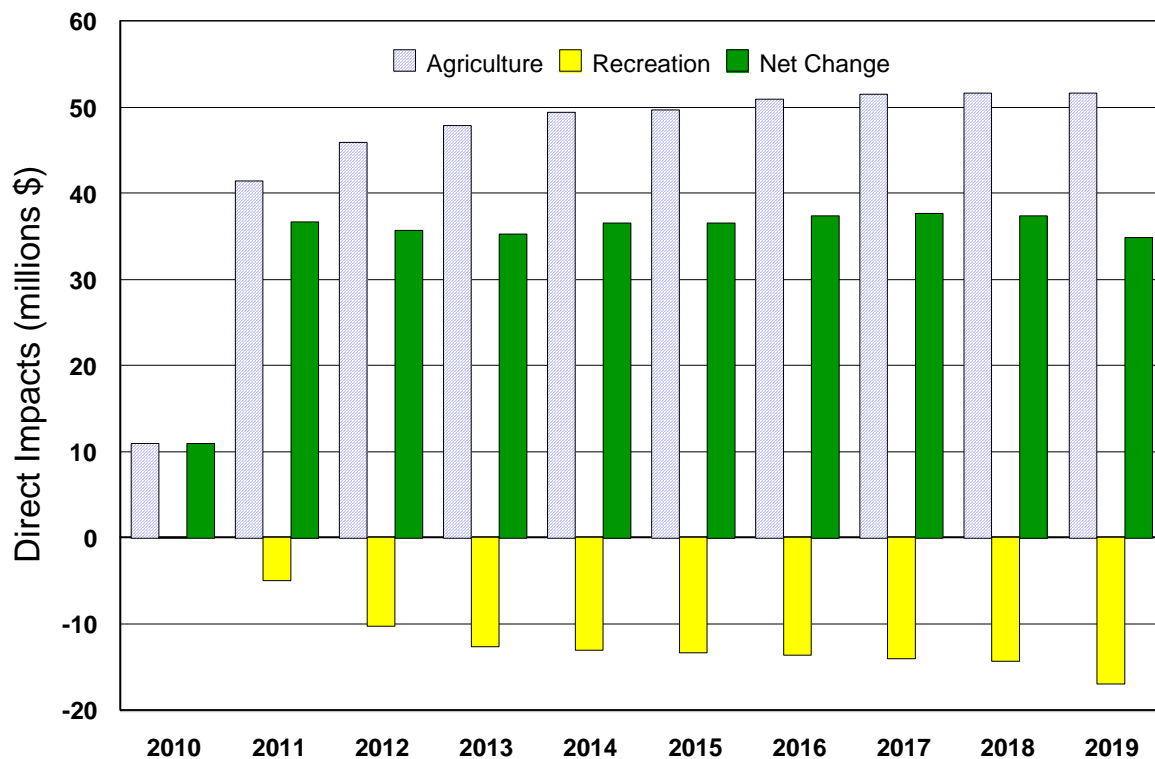


Figure 11. Direct Impacts from Post-CRP land Use in Study Counties Assuming Rapid Reduction in CRP and 100 Percent Crop Production on Post-CRP Lands, 2010 Through 2019

Discussion

Considering that much of the hunter response to a loss of CRP acreage is based on a set of postulated relationships, additional analysis was conducted using modifications to hunter spending and hunter numbers to evaluate alternative levels of recreational losses in the region. Also, the net economic effects in each scenario were averaged over the 10-year period and compared to the economic base for the region in 2009 to gauge the relative importance of those outcomes to the regional economy.

One way to modify the recreational component of the study was to use seasonal expenditures (i.e., per-hunter values) instead of per-hunter spending in rural areas. Seasonal expenditures represent the amount of money spent during an entire season and can include expenditures incurred in non-rural areas of the state (e.g., Bismarck). Applying seasonal expenditures for upland, deer, and waterfowl hunter participation for each of the scenarios reduced the net gain in the regional economy as the loss of recreational spending was larger than estimates using only rural spending. However, in each situation, agricultural gains remained larger than the loss of recreational spending.

Another modification on the recreational component of the study was to use a trend in hunter participation to estimating lost hunter participation. The trend in hunter participation in the region was increasing, and would require a key assumption that hunter numbers would continue to increase into the future if existing CRP acreage remained unchanged in the study region. This approach resulted in a greater number of lost hunters as a result of decreased CRP acreage and increased the level of lost recreational spending. However, as was the case with changing per-hunter spending levels, the recreational impacts were insufficient to offset the gains in agricultural impacts.

The combination of greater losses in hunter numbers and the use of seasonal expenditure levels for hunters produced recreational impacts that remained less than agricultural impacts. The difference between those estimated changes in the regional economy were less than found in the study's main scenarios, but insufficient to change the conclusions about the regional economic effects associated with post-CRP land use.

The analysis showed that the regional economy would likely increase with a reduction in CRP acreage; however, the relative importance of those gains were not presented in the study results. The average annual net change to the regional economy over the 10-year study period for each scenario was compared to the agricultural portion of the region's economic base⁵ in 2009 (last year for which data were available). Agriculture comprised 16 percent of the region's economic base in 2009, compared to the region's largest industry, energy, at 56 percent. The six scenarios represented from 0.6 percent to 3.6 percent of the region's agricultural economic base—the percentages would be even smaller if compared to the overall economy. In terms of change to the regional economy, while the conversion of CRP acreage to agricultural production

⁵ Economic base is a measure of the revenue an industry brings into an economy.

would result in net positive changes to the economy, those changes would be relatively small compared to the overall size of the regional economy.

While not specifically addressed in this study, the loss of CRP acreage is likely to have a bigger effect on individual landowners, producers, sportsmen, and certain businesses than the economy as a whole. The loss of recreational opportunities is likely to affect those landowners and businesses that rely on recreational spending; however, businesses that provide inputs and services to the agriculture sector will likely benefit. Producers will be able to expand their operations as CRP acreage is converted to agricultural production. Conversely, sportsmen, who rely on wildlife produced by the habitat created by the CRP, will likely find less opportunity as land is converted to agricultural use and wildlife populations decrease.

Conclusions

This study attempted to answer the question of how multiple-use of post-CRP lands would compete with other land use systems and examine the regional economic consequences of a reduction in CRP acreage. The economics of multiple-use were based on producer net returns, whereas the analysis of regional economic effects focused on changes in gross receipts to the region.

Multiple Use of Post-CRP Lands

The multiple-use of combining grazing, crop production, and dedicated wildlife habitat on post-CRP lands has been proposed as a means to provide landowners with agricultural revenues while retaining wildlife producing capabilities. The multiple-use concept evaluated in this paper was weighted heavily towards livestock grazing. While the field trials showed this system of land management accomplished its wildlife production goals, the system of using post-CRP lands primarily for beef grazing while producing corn and barley for forage and retaining a portion of acreage in dedicated wildlife habitat would not compete economically with other conventional land uses.

Agricultural revenues from the multiple-use system evaluated in this paper were limited to about 35 cow-calf pairs on a section (640 acres) of post-CRP land. Forage production for the cow-calf pairs included the use of standing, unharvested corn and chopped barley for silage, as well as traditional hay production. The net returns to the beef cow enterprise were negative over the forecasted period despite omitting additional expenses for water development and necessary fencing on post-CRP lands. The multiple-use concept would have benefitted from the sale of grain from the corn and barley stands, or the use of other cash crops within the grazing system to provide some additional revenues to the producer/landowner. Perhaps a system that relied more on aftermath grazing would have been more economical. However, it is unlikely that a high percent of post-CRP land would return to grazing production given current commodity prices and given that most of the CRP land in Southwest North Dakota was used for crop production prior to enrollment in the CRP.

Given that the cow-calf grazing regime produced negative net returns, an analysis of the amount of recreational revenues necessary to breakeven with crop production revealed that it is improbable for hunting revenues to provide sufficient additional revenue for this multiple-use system to compete with crop production. Therefore, it is unlikely to expect multiple-use grazing systems, as structured in this study, to be adopted in any meaningful scale on post-CRP land by land owners or producers in the study region.

Regional Economic Implications of Post-CRP Land Use

The regional economic implications of post-CRP land use also were evaluated by examining agricultural and recreational impacts associated with reductions in CRP acreage. Agricultural impacts were estimated to include the direct effects of the net change in regional expenditures and retained earnings between land in the CRP and various post-CRP land management. Recreational impacts were based on several postulated responses of hunter participation and corresponding changes in recreational expenditures linked to the loss of wildlife habitat between land remaining in the CRP and various post-CRP land use options.

The economic impacts of a reduction in CRP acreage produced net positive changes in the regional economy when examined over a 10-year period from 2010 to 2019. The net change in gross receipts within the regional economy from agricultural uses of post-CRP lands (i.e., crops, grazing, hay) exceeded lost recreational expenditures in the regional economy in all scenarios evaluated.

Under the assumption that all post-CRP lands were managed for multiple use consistent with the system evaluated in this study, that scenario did produce lower (relative to other post-CRP land use options) rates of loss in recreational activity compared to the other scenarios. However, agricultural revenues from multiple-use options were the lowest of all scenarios evaluated, and the management of post-CRP lands using multiple-use as defined in this study would produce the least increase in regional activity of all the scenarios examined.

A key consideration in the regional economic implications of post-CRP land use is the rate of loss of CRP acreage. Long-term recreational values within the regional economy were much lower with a rapid loss of CRP compared to slower rates of loss of CRP acreage. However, among all the variations considered, conversion of post-CRP lands to crop production in the scenarios with rapid CRP loss produced the greatest net change in regional economic activity.

Much concern exists over the future of the CRP in southwestern North Dakota. In the scenarios examined in this study, the regional economy would benefit slightly as acreage is removed from the CRP. However, just as when the program was initiated, the loss of CRP acreage is likely to create another set of 'winners' and 'losers' in southwest North Dakota.

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