Conservation Reserve Program (CRP)

Waterfowl Responses to the Conservation Reserve Program in the Northern Great Plains

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Blue-winged teal (W. Hohman)

Abstract

The northern Great Plains of North America is the principal breeding area for upland nesting ducks including mallard, gadwall, blue-winged teal, northern shoveler, and northern pintail. The portion of this area called the "Prairie Pothole Region" attracts particularly large numbers of ducks during the breeding season. Extensive conversion of grasslands to cropland that has occurred since the 1960s has reduced the amount of perennial upland cover that ducks need for successful nesting; consequently, waterfowl production declined in the region. Authorization of Conservation Reserve Program (CRP) under the 1985 Food Securities Act (Public Law 99-198) allowed landowners to contract with U.S. Department of Agriculture to convert cropland to perennial cover grass in exchange for annual payments. Since the beginning of the program, more than five million acres have been enrolled in CRP in the Prairie Pothole Region. My review of published and unpublished studies clearly indicates that CRP cover is highly attractive to nesting hens and that nest success in CRP cover is higher than other common cover types. Overall, nest success in CRP fields exceeds that level considered necessary for population maintenance of the above five duck species. Waterfowl nest success in other upland nesting habitats also improved after implementation of CRP, suggesting that wildlife benefits extend beyond program areas to the entire prairie-wetland landscape. Recent research indicates that between 1992 and 1997, CRP in the Prairie Pothole Region contributed to a 30% improvement in duck production or 10.5 million additional ducks. Assuming no further conversion of grasslands to cropland, I estimate that maintenance of at least five million acres of CRP is required to achieve a positive population growth rate for waterfowl in the Prairie Pothole Region. Minor adjustments in targeting would provide additional benefits to wetland-associated wildlife.

Introduction

The northern Great Plains region of North America is the principal breeding area for upland nesting ducks including mallard, gadwall, blue-winged teal, northern shoveler, and northern pintail (Bellrose 1976). Densities of breeding ducks are particularly high in the Prairie Pothole Region (Kantrud and Stewart 1977) where pairs are attracted to the numerous, relatively small wetlands that were formed by glacial actions that ended about 10,000 years ago (Bluemle 1991). In pristine times, the landcover of this region was dominated by perennial grasses (*Gramineae*) and broad-leafed herbaceous plants or forbs that provided ideal nesting cover for upland nesting birds, including many species of ducks (Kaul 1986). During the process of settlement by Europeans, much of the prairie sod was cultivated and converted to croplands. In North Dakota, South Dakota, and Montana, for example, 50-67% of all grasslands have been converted primarily to cropland (U.S. Department of Agriculture 1994). The conversion of grassland to cropland has been even greater in the Prairie Pothole portions of these states where less than 1% (Minnesota and Iowa) to about 26% (South Dakota) of the original grasslands remain (Cowardin et al. 1995, Noss et al. 1995). Concurrent with the period of grassland conversion to cropland in the Prairie Pothole Region was a precipitous decline in duck nest success. Beauchamp et al. (1996) concluded that duck nest success exhibited a declining trend from about 33% in 1935 to about 10% in 1992. Cowardin et al. (1985) determined that nest success of about 15% is needed to maintain mallard populations in central North Dakota; 15-20% nest success is necessary to maintain populations of other species (Klett et al. 1988). Klett et al. (1988) concluded that during the early 1980s nest success was inadequate to maintain populations for most upland nesting ducks in areas of North Dakota, South Dakota, and Minnesota, and that predators were responsible for most failed nests. It was hypothesized that long-term changes in the prairie landscape due to agriculture influenced predator demographics, and this, combined with effects of reduced amounts of grass nesting cover, was responsible for the declining trend in duck nest success. Greenwood et al. (1995) found that duck nest success on study areas in prairie Canada was negatively correlated with the proportion of land that was annually cultivated. Similarly, Ball et al. (1995) reported high duck production rates on study blocks in north-central Montana where large areas of grass remained. Wildlife managers have speculated that if a substantial amount of cropland was converted to grass cover, duck nest success would improve in the Prairie Pothole Region. Efforts by the U.S. Fish and Wildlife Service to protect and plant grass cover in the U.S. Prairie Pothole Region include over 250,000 acres of uplands on National Wildlife Refuges and Waterfowl Production Areas that are managed primarily for nesting ducks. However, many of these areas are isolated in landscapes dominated by cropland, and studies have documented low nest success on such areas (Klett et al. 1988, Sargeant et al. 1995).

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Congress authorized the Conservation Reserve Program (CRP) as part of the 1985 Food Securities Act (Public Law 99-198); provisions to continue the program were included in 1990 and 1996 amendments to the 1985 Farm Bill. Under CRP, landowners contracting with U.S. Department of Agriculture to convert cropland to perennial grass or tree cover receive annual payments for 10 or 15 years. In 1993 (the peak year for cumulative enrolled acres from the 1985 Farm Bill), North Dakota had about 2.2 million acres and South Dakota and Montana each had about 1.2 million acres enrolled in the CRP within the Prairie Pothole Region (U.S. Department of Agriculture, unpublished data). In this region, most enrolled fields were planted to a mix of introduced grasses and legumes composed primarily of wheatgrasses (*Agropyron* spp.), smooth brome (*Bromus inermis*), alfalfa (*Medicago sativa*), and sweetclover (*Melilotus* spp.). In 1996, environmental criteria for ranking CRP bids were modified; expired contracts were not extended, but could be re-offered. Recent summaries of CRP acres in the Prairie Pothole Region are not available, but compared to the 1986-95 period (i.e., enrollments under 1985 Farm Bill), statewide CRP acreage increased by 14% in North Dakota and 30% in Montana, decreased by about 30% in South Dakota, and remained the same in Minnesota and Iowa (U.S. Department of Agriculture, unpublished data).

In this chapter, I summarize published and unpublished information on CRP contributions to waterfowl conservation in the northern Great Plains. I also discuss effects of emergency haying on nesting waterfowl and interrelationship of CRP to other conservation programs.

Ducklings in nest in CRP field (Ducks Unlimited)

Waterfowl Response

For a cover program to generate substantial direct benefits to nesting waterfowl it must meet three criteria: (1) provide cover that is attractive to nesting females, (2) be characterized by nest success and brood survival that is greater than other cover types in the area, and (3) be applied in areas where the cover is available to a large proportion of nesting hens.

Use of CRP Cover by Nesting Ducks

Studies have shown . . . CRP in the northern Great Plains is attractive to nesting ducks . . .

Studies have shown that idle planted cover of the type planted to CRP in the northern Great Plains is attractive to nesting ducks (Duebbert and Lokemoen 1976, Klett et al. 1988, and Greenwood et al. 1995). Klett et al. (1988) estimated for nesting mallard hens, idle perennial cover was over 100-times more attractive than cropland, four-times more attractive than hayland, and 10-times more attractive than pastureland. Other common species of upland nesting ducks demonstrated similar preferences for planted cover in the U.S. Prairie Pothole Region. Prairie nesting ducks clearly prefer undisturbed areas with tall (height ≥ one foot), dense vegetation with abundant, residual plant litter (old growth vegetation from previous growing seasons). Reynolds et al. (in review) estimated that between 1992-97 an average of 2.4 million mallard,

gadwall, blue-winged teal, northern shoveler, or northern pintail nests were initiated annually in 3.9 million acres of CRP in the Prairie Pothole Region of North Dakota, South Dakota, and northeastern Montana. Thus, although CRP cover represented only about 6% of all cover in the region during that period, it accounted for 31% of all nests initiated in the region.

Duck Nest Success

. . . duck nest success has improved since CRP was implemented in the northern Great Plains.

Studies suggest that duck nest success has improved since CRP was implemented in the northern Great Plains. Kantrud (1993) reported average duck nest success of 23.0% for all species nesting in Minnesota and North Dakota CRP fields studied from 1989 to 1991. Luttschwager et al. (1994) reported 23.4% duck nest success (species combined) for study areas in eastern South Dakota during 1989 and 1990. Nest success in North and South Dakota CRP fields during 1992 and 1993 averaged 22% for gadwall, 24% for mallard, and 25% for blue-winged teal (Reynolds et al. 1994*a*).

During 1992-95, Reynolds et al. (in review) collected data for 6,945 duck nests in over 30,000 acres of CRP on randomly selected study sites in the Prairie Pothole Region of North Dakota, South Dakota, and northeastern Montana. Regional estimates of duck nest success in CRP, weighted by breeding population size, were 19.3% for mallard, 22.1% for gadwall, 24.4% for blue-winged teal, 26.5% for northern shoveler, and 21.3% for northern pintail. They also found a positive relationship between nest success in CRP and the amount of perennial grass cover within their four-square-mile study areas. During this study, duck nest data also was collected from other cover types in the Prairie Pothole Region, and it was determined that nest success in all cover types increased after CRP fields were established with vegetative cover. In particular, nest success increased in planted cover on U.S. Fish and Wildlife Service, Waterfowl Production Areas during the CRP period. Reynolds et al. (in review) suggested that the addition of CRP cover resulted in greater dispersion of duck nests and increased the availability of alternative prey items for predators, thereby reducing nest losses to predators.

Duck Brood Survival

If habitat conditions are favorable, early nesting duck species such as mallards and northern pintails will attempt to renest if their initial attempt is unsuccessful (Cowardin et al. 1985). However, Krapu et al. (2000) found that mallard broods that hatched earlier in the breeding season survived at a higher rate than those that hatched later. To maximize the success of hens during initial nest attempts, these authors recommended management treatments that maintain a high proportion of landscapes in undisturbed perennial cover such as CRP. Additionally, undisturbed perennial cover located in close proximity to brood-rearing wetlands likely contributes to improved survival of hens and brood hens during overland movements.

Distribution Relative to Breeding Ducks

The distribution of CRP cover nationally and locally within the Prairie Pothole Region is a key factor for breeding ducks and other migratory birds. The Environmental Benefit Index (EBI) used to rank CRP bids includes bonus points for National Conservation Priority Areas (CPAs). Achievement of North American waterfowl conservation objectives is possible because the Prairie Pothole Region has been identified as a U.S. Department of Agriculture CPA critically important for waterfowl and other grassland-dependent birds. Local distribution of CRP contracts within the Prairie Pothole Region, especially with respect to wetlands, influences their value for waterfowl. Wetlands are the primary landscape feature that attract breeding hens to settle in a particular area (Johnson and Grier 1988), and the distribution of wetlands is not uniform throughout the Prairie Pothole Region. Whereas the EBI factors generally do not target specific wildlife groups, it is reasonable to assume that wildlife respond positively to improvements in soil and water conservation. Indeed, Reynolds et al. (1994*b*) reported that CRP cover targeting highly erodible lands (HEL) in the Prairie Pothole Region benefited large numbers of breeding ducks. However, they concluded that additional CRP acreage with better targeting would achieve additional soil, water, and wildlife conservation benefits.

North Dakota CRP field (R. Reynolds)

31% . . . of 47.1 million total duck nests initiated in the U.S. Prairie Pothole Region during 1992-97 were . . . in CRP . . .

In the Prairie Pothole Region of North Dakota, South Dakota, and northeastern Montana, I determined, that on average, about 60% of upland nesting ducks in the region had access to at least one CRP field during the period 1992-97 (Cowardin et al. 1995, R. Reynolds unpublished data). Further, we estimated that 31% (14.5 million nests) of 47.1 million total duck nests initiated in the U.S. Prairie Pothole Region during 1992-97 were located in 3.9 million acres of CRP cover or just 6% of the total land area of this region. Current distribution of CRP cover relative to duck populations and the importance of CRP relative to other upland habitats presently are unknown because of the redistribution of CRP contracts after the 1996 Farm Bill. The proportion of ducks nesting in CRP probably has declined to less than 31% because, although the availability of CRP to nesting hens in North Dakota was unchanged after 1996, it appears ducks may have reduced access to CRP in South Dakota.

Wetland Restoration under the Conservation Reserve Program

Because the CRP is directed toward cropland, opportunities are available to restore wetlands that were drained and farmed before CRP was created. Natural Resources Conservation Service records of conservation treatments indicate that greater than 20,000 wetland acres have been restored or created in CRP fields throughout the Northern Plains states. Based on U.S. Fish and

Wildlife Service waterfowl surveys of the Northern Plains, I estimate that these wetlands have the potential to provide habitat for an additional 22,000 pairs of breeding ducks.

Impacts of Emergency Haying

Haying, grazing, or other commercial use of CRP vegetation are not allowed during the contract period unless the Secretary of Agriculture releases it in response to drought or other agriculture emergency. Haying or grazing under the emergency clause has been allowed in some counties in Northern Plains states in all years except three since the beginning of the program.

Haying and grazing reduce . . . the use of program fields by ducks.

Haying and grazing reduce the amount of vegetation available to nesting ducks and, consequently, reduce the use of program fields by ducks. Because of the mechanical disturbance associated with haying, this form of use has greater negative impacts than grazing. The negative impacts of haying on nesting ducks can be placed in two broad categories: (1) catastrophic (those impacts that have an immediate negative impact) and (2) residual (delayed impacts). Catastrophic impacts recorded from hay fields include almost complete destruction of all active nests (Labisky 1957, Gates 1965) and 50% mortality in nesting hens (Calverley and Sankowski 1995). The timing of haying is critical relative to these impacts. U.S. Fish and Wildlife Service records for over 6,900 duck nests from CRP fields in the Prairie Pothole Region showed that 70% of nests were active on June 15, 33% on July 1, and 11% on July 15 (U.S. Fish and Wildlife Service, unpublished data). The residual impacts of haying CRP are manifested by reduced attractiveness to hens and sometimes lower nest success following haying. In North and South Dakota, CRP fields that had been partially hayed the previous summer, Renner et al. (1995) found no differences in duck nest success between hayed and unhayed portions of fields; however, nest and hatchling density were over two times higher in unhayed than in hayed areas. Luttschwager et al. (1994) studied duck nest success relative to different patterns of haying and found that nest success was lower in strips of CRP cover remaining after haying compared to blocks of cover.

Bales of native grass (W. Hohman)

Summary

In general, the evidence indicates that CRP cover has directly and indirectly contributed to improved duck production in the northern Great Plains region. I estimate that between 1992 and 1997, CRP in the Prairie Pothole Region contributed to a 30% improvement in duck production or 10.5 million additional ducks. Assuming no further conversion of grasslands to cropland in the Prairie Pothole Region, we will need to maintain at least five million acres of CRP to achieve positive population growth rates in the region. Minor adjustments in targeting (e.g., giving priority to CRP contracts in the Prairie Pothole Region counties that have abundant wetlands) would provide addi-

tional benefits to wetland-associated wildlife (Reynolds et al. 1996). GIS applications have been shown to be a particularly powerful tool in determining priority locations for waterfowl and other migratory bird conservation work. Such GIS maps identifying sites with the greatest potential for wetland wildlife enhancement are available for many portions of the Prairie Pothole Region through the U.S. Fish and Wildlife Service's Habitat and Population Evaluation Team Office in Bismarck, North Dakota.

GIS applications . . . a powerful tool in determining priority locations for waterfowl . . .

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