The National Wild Pheasant Conservation Plan

Key Literature:
Landscape effects on pheasant habitat, abundance, and demographics

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Note: The literature cited below represents a subset of the information used when making pheasant management decisions related to this topic. It is intended to provide a general sense of the primary research available on the subject, but is not comprehensive. Other information on the topic may also be available in books and technical bulletins that do not lend themselves well to this form of summarization. The list will be periodically updated upon request by National Wild Pheasant Technical Committee members.

Jorgensen, C. F, L. A. Powell, J. J. Lusk, A. A. Bishop, and J. J. Fontaine. 2014. Assessing landscape constraints on species abundance: does the neighborhood limit species response to local habitat conservation programs? PLoS ONE 9(6): e99339. doi:10.1371/journal.pone.0099339.

Abstract: Landscapes in agricultural systems continue to undergo significant change, and the loss of biodiversity is an ever-increasing threat. Although habitat restoration is beneficial, management actions do not always result in the desired outcome. Managers must understand why management actions fail; yet, past studies have focused on assessing habitat attributes at a single spatial scale, and often fail to consider the importance of ecological mechanisms that act across spatial scales. We located survey sites across southern Nebraska, USA and conducted point counts to estimate Ring-necked Pheasant abundance, an economically important species to the region, while simultaneously quantifying landscape effects using a geographic information system. To identify suitable areas for allocating limited management resources, we assessed land cover relationships to our counts using a Bayesian binomial-Poisson hierarchical model to construct predictive Species Distribution Models of relative abundance. Our results indicated that landscape scale land cover variables severely constrained or, alternatively, facilitated the positive effects of local land management for Ring-necked Pheasants.

Haroldson, K. J., R. O. Kimmel, M. R. Riggs, and A. H. Berner. 2006. Association of ring-necked pheasant, gray partridge, and meadowlark abundance to Conservation Reserve Program grasslands. Journal of Wildlife Management 70:1276–1284.

Abstract: Wildlife managers and farm program administrators need information on how much habitat grassland birds need to support or expand their populations. We quantified the relationships between the amount of Conservation Reserve Program (CRP) habitat in 15 agricultural landscapes and relative abundance of ring-necked pheasants (*Phasianus colchicus*), gray partridge (*Perdix perdix*), and meadowlarks (*Sturnella* spp.) in south-central Minnesota, USA, over a 10-year CRP enrollment cycle. For each 10% increase of grass in the landscape, pheasant survey counts increased by an average of 12.4 birds per route in spring and by 32.9 birds per route in summer. Pheasant indices also varied by year,

and the magnitude of year effects were equivalent to a change in grass abundance of 26-36%. Regardless of the amount of grass habitat available, partridge indices in our study declined dramatically from a peak in 1990 to a low in 1994-1995. Meadowlark indices increased by an average of 11.7 birds per route in summer for each 10% increase of grass in the landscape, while indices simultaneously declined from 1990 to 1998. Our results indicate that conversion of cropland to CRP grassland in intensively cultivated landscapes is associated with higher population indices of pheasants and meadowlarks, but not partridge. Managers should assess the success of habitat programs over periods of >5 years because population indices may fluctuate dramatically over time with little apparent change in habitat abundance

Nielson, R. M., L. L. McDonald, J. P. Sullivan, C. Burgess, D. S. Johnson, D. H. Johnson, S. Bucholtz, S. Hyberg, and S. Howlin. 2008. Estimating the response of ring-necked pheasants (*Phasianus colchicus*) to the Conservation Reserve Program. Auk 125:434-444.

Abstract: We evaluated associations between the Conservation Reserve Program (CRP) and Ring-necked Pheasant (*Phasianus colchicus*) populations by modeling Breeding Bird Survey (BBS) counts of Ring-necked Pheasants during 1987–2005 along 388 routes in nine states. Ring-necked Pheasant counts were analyzed as overdispersed Poisson counts in a Bayesian hierarchical model estimated with Markov-chain Monte Carlo methods. This approach allowed for simultaneous estimation of the relationships between BBS counts and various habitat types, including CRP habitat types, for multiple regions and across the entire study area. The predictor variables included at a time trend and percentages of major National Land Cover Dataset 1992 and CRP habitat types within a 1,000-m buffer around each route, along with other patch metrics. The deviance information criterion was used as a guide to help identify the most parsimonious model. We estimated that, on average, there was a positive association of Ring-necked Pheasant counts with the amount of CRP herbaceous vegetation within a 1,000-m buffer around a route. The analysis can be repeated periodically to model changes in Ring-necked Pheasant populations associated with new CRP enrollments and expiration of existing CRP contracts on a large scale. Our methodology can also be extended to other species and to other states and regions.

Riley, T. Z. 1995. Association of the Conservation Reserve Program with ring-necked pheasant survey counts in Iowa. Wildlife Society Bulletin 23: 386-390.

Abstract: More than 880,000 ha of Iowa farmland were enrolled in the Conservation Reserve Program (CRP) from 1986-1991. I evaluated the relationship between CRP enrollment and ring-necked pheasants (*Phasianus colchicus*) in Iowa and how cropland and weather affected that relationship. Six percent of the land area in Iowa was enrolled in the CRP between 1986 and 1991. Pheasant numbers in Iowa increased 30% during the first 5 years of the CRP compared to a similar period before the program began ($P = 0.026$). Numbers increased 34% ($P < 0.018$) in counties with >70% cropland and 26% ($P= 0.12$) in counties with 50-70% cropland. I did not detect increases in pheasant numbers in counties with <50% cropland ($P > 0.71$). Pheasant numbers were positively related to the CRP, but this function was also influenced by percent cropland and cumulative snowfall.

Schmitz, R. A. and Clark, W. R. 1999. Survival of ring-necked pheasant hens during spring in relation to landscape features. Journal of Wildlife Management 63:147-154.

Abstract: Management of ring-necked pheasants (*Phasianus colchicus*) in agricultural landscapes would be enhanced by knowledge of the relation between survival and habitat composition and configuration. We related survival and habitat use of hen pheasants during spring in Iowa with landscape characteristics in an area of high habitat diversity with 25.0% grassland and an area of low habitat diversity with 9.3% grassland. Survival of 215 radiomarked hens from 1 April to 3 June 1992-94 averaged 0.81 and did not differ between areas (P = 0.756). Predation was the cause of death in 87.5% of the cases, with 66.7% of all deaths attributed to mammals, especially red fox (*Vulpes vulpes*). Home ranges of 57 hens averaged 36.6 ha in the high diversity area and 47.7 ha in the low diversity area and did not differ between areas (P = 0.603). Density of edge between grassland and other habitats was predictive of the hazard rate, and the odds of mortality increased 2% for every 10 m/ha of additional edge in the home range. Hens with home ranges characterized by small patches of grassland within the cropland matrix survived as well as those with large blocks of grassland in their home range. Understanding how changes in composition and configuration of landscapes affects wildlife demographics at multiple scales can improve managers' ability to take advantage of agricultural conservation programs.

Taylor, M. W., C. W. Wolfe, and W. L. Baxter. 1978. Land-use change and ring-necked pheasants in Nebraska. Wildlife Society Bulletin 6:226-230.

Abstract: Changes in land use and ring-necked pheasant (*Phasianus colchicus*) density were documented for a 41.4-km^2 (16 mi^2) area in south-central Nebraska. Significant land-use changes included the loss of noncropland areas and a shift in crop types from pasture, hay, and small grains to row crops. Interspersion of cover types declined in conjunction with the observed land-use changes. The rate of most changes was higher from 1964 to 1976 than from 1955 to 1964.

Vandel III, G. M., and R. L. Linder. 1981. Pheasants decline but cover-type acreages unchanged on South Dakota study area. Wildlife Society Bulletin 9:299-302.

Abstract: The pheasant population decreased >90% on the study area between 1958-59 and 1978. Nesting density decreased in about the same proportion. Potential nesting cover on the study area was similar for all years. Acreage of oats, barley, and flax decreased, but acreage of wheat increased resulting in about the same percentage of small grain during both periods. Average field size on the study area was 7 ha in 1957, 7 ha in 1958, 10 ha in 1977, and 8 ha in 1978. The mean field size for 1977 was the only significant difference (P < 0.01) among the 4 years. Although acreage of potential nesting cover may not have changed, the quality of that cover for nesting pheasants may have decreased. Although characteristics indicating cover quality could not be quantified, differences between the 2 periods appeared obvious to the junior author who searched for pheasant nests during both decades. Perhaps game managers should emphasize quality of game cover in farmlands as well as quantity.