The National Wild Pheasant Conservation Plan

Key Literature:
Pheasant brood-rearing habitat effects on 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.

Doxon, E. D., and J. P. Carroll. 2010. Feeding ecology of ring-necked pheasant and northern bobwhite chicks in Conservation Reserve Program fields. Journal of Wildlife Management 74:249-256.

Abstract: Gamebird chick survival is dependent on invertebrate availability, and the ability to access insect prey is an important characteristic defining brood habitat quality. Different mixes of warm-season grasses and forbs were established to improve the habitat quality of fields enrolled in the Conservation Reserve Program (CRP) for gamebirds in the Southern Plains. We analyzed the feeding ecology of human-imprinted, 4- to 10-day-old ring-necked pheasant (*Phasianus colchicus*) and northern bobwhite (*Colinus virginianus*) chicks in wheat fields and 4 types of conservation practices (CP) fields enrolled in CRP (CP10, improved CP10, CP2, and CP25) in western Kansas, USA, during June and July, 2004 and 2005. Foraging rates were greatest for bobwhite chicks in improved CP10 and CP25 fields and greatest for pheasant chicks in CP10 and CP25 fields. Vegetation characteristics such as bare ground cover appear to have a significant impact on insect selection, because the diet was more diverse for both species in fields with more bare ground. The CP25 fields provided the best combination of mobility and diet breadth for both species. Although herbicide-treated wheat fields had low feeding rates, we determined non-herbicide-treated fields (i.e., weedy wheat) provided easy mobility and feeding rates similar to CRP fields. We suggest that management of vegetation to benefit gamebirds does not affect species equally. Feeding rates of bobwhite chicks were sensitive to vegetation-influenced mobility. Management of CRP fields for both pheasant and bobwhite chicks can be reconciled by practices that permit more open space at ground level, such as light disking or burning, to permit easier movement for chicks.

Matthews, T. W., J. S. Taylor, and L. A. Powell. 2012. Mid-contract management of Conservation Reserve Program grasslands provides benefits for ring-necked pheasant nest and brood survival. Journal of Wildlife Management 76(8):1643-1652.

Abstract: Conservation Reserve Program (CRP) fields may provide good habitat for nesting and brood rearing ring-necked pheasants (*Phasianus colchicus*) during early stages of succession. But, the success

of hens in early successional CRP, relative to late successional CRP and other grassland habitats, has yet to be evaluated. The reproductive period is especially critical for populations of pheasants, and CRP's benefits to hens and chicks may decrease as fields age because of loss of vegetative diversity, decrease in vegetation density, and accumulation of residual litter. During 2005-2006, we evaluated spatial and temporal variation in nest and brood survival for radio-marked hen pheasants in areas of northeastern Nebraska where portions of CRP fields had been recently disced and interseeded (DICRP) with legumes. Nests in DICRP tended to have a higher daily survival rate (0.984; 95% CI: 0.957-0.994) than nests in grasslands (including CRP) that were unmanaged (0.951; 95% CI: 0.941-0.972). The probability of 23-day nest success was 0.696 (95% CI: 0.631-0.762) for DICRP and 0.314 (95% CI: 0.240-0.389) for unmanaged grasslands. Daily brood survival rates varied by habitat type, brood age, and date of hatch. The probability of a brood surviving to day 21 was 0.710 (95% CI: 0.610-0.856). Brood survival rates increased with time spent in DICRP and as the brood aged. Survival decreased as broods spent more time in cropland and peaked seasonally with broods that hatched on 15 June. Brood survival probability, to 21 days, would be reduced to 0.36 (95% CI: 0.100-0.701) if broods in our sample had not used DICRP. We combined nest and brood survival in a productivity model that suggested 2,000 hens, in a landscape with no DICRP, would produce 1,826 chicks, whereas the same hens in a landscape of 100% DICRP would produce 5,398 chicks. Production of first-year roosters more than doubled when hens nested in DICRP. Without DICRP, population growth rates of pheasant populations usually declined; with DICRP, populations stabilized with an annual survival rates of 0.3 or greater. The positive response of nest and brood survival to discing and interseeding CRP provides further evidence that CRP fields must be managed to optimize wildlife benefits.

Matthews, T. W., J. S. Taylor, and L. A. Powell. 2012. Ring-necked pheasant hens select managed Conservation Reserve Program grasslands for nesting and brood-rearing. Journal of Wildlife Management 76:1653-1660.

Abstract: The Conservation Reserve Program (CRP) has provided critical wildlife habitat for many species since 1985. However, the quality of this habitat for early successional species, such as ring-necked pheasant (*Phasianus colchicus*), may decrease with field age. Late successional grasslands may lack valuable vegetative and structural diversity needed by pheasants, especially during nesting and brood-rearing stages. Since 2004, the United States Department of Agriculture has required new CRP contracts to include plans for mid-contract management, which could include discing and interseeding. The benefits of such practices have not been assessed, and continuation of current policy could be affected by the lack of information to support such practices. During 2005-2006 we evaluated nesting and brood-rearing habitat used by radio marked hen pheasants in areas of northeastern Nebraska where portions of CRP fields had been recently disced and interseeded with legumes. Pheasant hens selected managed portions of CRP fields for both nesting and brood-rearing. Hens selected nest sites with greater forb cover and vertical density. Hens with broods also selected sites with greater forb composition. Discing and legume interseeding appeared to be an effective strategy for increasing pheasant use of CRP fields.

Riley, T. Z., W. R. Clark, D. E. Ewing, and P. A. Vohs. 1998. Survival of pheasant chicks during brood rearing. Journal of Wildlife Management 62:36-44.

Abstract: Survival of chicks is an important and poorly understood component of ring-necked pheasant (*Phasianus colchicus*) population dynamics. We implanted transmitters in day-old chicks (*n* = 332) with

brooding hens (n = 117) during 1990-94 in northern Iowa and calculated survival to 28 days of age. We contrasted survival among years and between an area in Palo Alto County with >25% grassland habitat and an area in Kossuth County with <10% grassland. Average survival ($\hat{S}_{28}$) of pheasant chicks in Palo Alto County was 0.46 $\pm$ 0.11 and did not differ (P = 0.355) from Kossuth County ($\hat{S}_{28}$ = 0.37 $\pm$ 0.17). The lowest survival was observed in Kossuth County in 1993 ($\hat{S}_{28}$ = 0.11 $\pm$ 0.13, P = 0.039). Weasel (*Mustela erminea*), red fox (*Vulpes vulpes*), and mink (*Mustela vison*) together accounted for >85% of the mortality. Twenty-three chicks died of exposure on days when at least a trace of rainfall fell, and 11 of 23 (48%) died on days when rainfall was >0.6 cm ($\bar{x}$ = 0.96 cm, range = 0.68-3.38 cm). Age of the hen did not influence chick survival. Chick mortality rate was increased by 2.3% for each day chicks hatched after the median date of hatch (15 Jun) and was decreased by 10% for each gram of mass above the average chick mass at hatch (18.5 + 0.13 g). Habitat management to improve chick survival of pheasants on agricultural landscapes should emphasize perennial grass and legume cover dispersed among crop fields. Grassland cover should remain undisturbed, particularly early in the nesting season (15 Apr-1 Jun), to improve the chances of successful first-nest attempts.

Warner, R. E. 1979. Use of cover by pheasant broods in east-central Illinois. Journal of Wildlife Management 43:334-346.

Abstract: During summers 1972 and 1973, 8 pheasant (*Phasianus colchicus*) hens with broods from 1 to 12 weeks of age were monitored by radiotelemetry for movements and use of cover Illinois, in an area intensively farmed for production of corn and soybeans. Activity of all broods primarily in oats during day and night. Most young pheasants roosted in oats and hay, and did active until after sunrise. The daytime activity in oats and hay suggested that areas of suitable cover also served as primary feeding areas. Use of cover did not appear to change in response changes in wind and temperature. However, broods tended to use corn and soybeans to a greater during precipitation. Changes in use of cover by broods over the summer appeared to be more of brood age than of crop phenology or harvest. There was an apparent exponential increase of broods during the 1st 9 weeks of age. Brood counts for the Sibley area suggested that rates of pheasant chicks during the 1st 12 weeks of life have increased significantly in recent postulated that because of the virtual elimination of small grains, forage grasses, and legumes, of insects and weedy forbs as food for pheasant chicks may be approaching

Warner, R. E., P. C. Mankin, L. M. David and S. L. Etter. 1999. Declining survival of ring-necked pheasant chicks in Illinois during the late 1900s. Journal of Wildlife Management 63:705-710.

Abstract: Previous studies indicated that survival of ring-necked pheasant (*Phasianus colchicus*) chicks during the first 6 weeks of life declined from the early 1950s through early 1980s in Illinois with the expansion of corn and soybean production and associated clean farming practices. From the early 1980s through mid-1990s, intensive row-crop production was moderated by farm programs such as the Conservation Reserve Program (CRP) and annual set-aside, which diverted millions of hectares of cropland from production. We evaluated the survival of pheasant chicks in Illinois in relation to these recent land-use practices. Specifically, our objectives were to determine if there were changes in chick survival during the 1980s and 1990s, and if there were regional differences in chick survival related to land-use practices. We observed 574 broods along transect road routes on the Sibley Study Area (SSA) in eastcentral Illinois, and 964 broods on routes throughout the pheasant range in Illinois. In spite of the increase in potential brood habitat on set-aside farmland, chick survival remained low from 1982 to 1996. For example, there was a 5-fold increase in the amount of forage legumes and small grains on the

SSA from 1987-91 compared to 1975-81, with the average number of chicks per brood at 4.3 (1987-91) and 4.2 (1975-81). For survey routes throughout the Illinois pheasant range, the number of grassy fields (primarily narrow, linear tracts) in 1990 was positively correlated ($r^2 = 0.15$, $P < 0.02$, $n = 37$) with chicks per brood, but this relation explained only 15% of the variation. The lack of improvement in chick survival in recent decades relates to the pervasive clean farming practices in the Illinois pheasant range. Moreover, most of the set-aside land in the Illinois pheasant range was under annual contract and seeded late to monotypic oats, which is cover of marginal value to foraging pheasant chicks.