The National Wild Pheasant Conservation Plan

Key Literature:
Pheasant nesting 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.

Bartmann, R. M. 1969. Pheasant nesting on soil bank land in northern Utah. Journal of Wildlife Management 33:1020-1023.

Abstract: Pheasant (*Phasianus colchicus*) nesting use of soil bank land was observed on a 37719-acre dryland study area in northern Utah during 1964 and 1965. A projected 85 percent of all successful nests were produced on 43 percent of the area retired under the Conservation Reserve Program of the Soil Bank. Absence of nests both years on sample plots in grainfields suggests low nesting use of this type which, together with summer fallow, comprised 41 percent of the area. Recommendations for future land retirement programs in similar dryland situations include early developing plant species and provision for residual cover carry-over for early nesting, long-term contracts, and emphasis within established pheasant range.

Clark, W. R., and T. R. Bogenschutz. 1999. Grassland cover and reproductive success of ring-necked pheasants in northern Iowa. Journal of Field Ornithology 70:380–392.

Abstract: We used radio telemetry from 1990-1994 to compare reproduction of 185 female pheasants in a diverse landscape with 25% perennial grassland habitat in Palo Alto County, Iowa, with that of 72 pheasants on an intensively farmed landscape with 9% grassland in Kossuth County, Iowa. Median dates of the beginning of incubation of first nests were almost identical on the areas, but median incubation date of renests was earlier at Palo Alto (22 June) than at Kossuth (5 July). Mean clutch size in first nests was 12.6 eggs, which was greater than clutch size of 9.9 for renesting attempts. Success of first nests was 57.3% at Palo Alto and 44.8% at Kossuth, whereas success of renests was 45.6% at Palo Alto but only 26.9% at Kossuth. Linear logistic regression revealed that nest success averaged 62.3% in undisturbed blocks of habitat such as CRP versus 44.8% in small, linear, or disturbed habitats, regardless of the study landscape. Hen success averaged 70.6% at Palo Alto and 52.2% at Kossuth, and it varied more among years at Kossuth. Pheasant nest success was higher in a diversified agricultural landscape with large blocks of undisturbed habitat. When nesting is restricted to small or disturbed habitat

fragments pheasant reproduction is probably reduced enough to limit the potential rate of population increase.

Clark, W. R., R. A. Schmitz, and T. R. Bogenschutz. 1999. Site selection and nest success of ring-necked pheasants as a function of location in Iowa landscapes. Journal of Wildlife Management 63:976–989.

Abstract: Wildlife managers in the midwestern United States implicitly recognize that large-scale changes in land use have been a major factor in the nesting ecology of the ring-necked pheasant (*Phasianus colchicus*), but they have lacked models that quantify the relation between nest success and landscape variables at multiple scales. We used data from 288 nests of radiomarked female pheasants during the 1990-94 breeding seasons in Iowa to study nest-site selection and nest success. We quantified habitat and landscape metrics within the 485-m radius of a home range around nests by using aerial imagery and FRAGSTATS. We screened potential landscape variables by using principal component and classification and regression tree (CART) analyses before developing logistic regression models to predict nest-site selection and success as a function of landscape conditions. A 5-variable logistic regression model incorporating nesting patch size, mean grassland patch size, landscape core area, landscape shape index, and distance to edge predicted nest-site locations at a 77% posterior concordant rate. The CART analyses suggested nest success was best modeled by splitting nest observations into nests in patches ≤15.6 ha and >15.6 ha. For nests in patches ≤15.6 ha, a logistic regression model with site cover type and mean core area index predicted nest success with a 73% posterior concordant rate ($P < 0.001$). For nests in patches >15.6 ha, a model with site cover type, core area standard deviation, and distance from the nest to the edge predicted nest success best (concordant rate = 64%, $P = 0.069$), although the effect of distance to edge was very slight (conditional odds ratio = 1.003, 95% CI = 0.997-1.009). Our models suggest managers should strive to provide undisturbed grassland blocks ≥15 ha for nesting pheasants, but our observation was that success was highest in fields 4 times that size. Furthermore, cover in several large grassland blocks within the nesting home range is preferable to concentrating cover in 1 large block. Landscape models like ours could be used to project the consequences of changes in agricultural policy on ring-necked pheasant populations.

Eggebo, S. L., K. F. Higgins, D. E. Naugle, and F. R. Quamen. 2003. Effects of CRP field age and cover type on ring-necked pheasants in eastern South Dakota. Wildlife Society Bulletin 31: 779-785.

Abstract: Loss of native grasslands to tillage has increased the importance of Conservation Reserve Program (CRP) grasslands to maintain ring-necked pheasant (*Phasianus colchicus*) populations. Despite the importance of CRP to pheasants, little is known about the effects of CRP field age and cover type on pheasant abundance and productivity in the northern Great Plains. Therefore, we assessed effects of these characteristics on pheasant use of CRP fields. We stratified CRP grasslands (n=42) by CRP stand age (old [10-13 yrs] vs. new [1-3 yrs] grasslands) and cover type (CP1 [cool-season grasslands] vs. CP2 [warm-season grass-lands]) in eastern South Dakota and used crowing counts and roadside brood counts to index ring-necked pheasant abundance and productivity. Field-age and cover-type effects on pheasant abundance and productivity were largely the result of differences in vegetation structure among fields. More crowing pheasants were recorded in old cool-season CRP fields than any other age or cover type, and more broods were recorded in cool- than warm-season CRP fields. Extending existing CRP contracts another 5-10 years would provide the time necessary for new fields to acquire the vegetative structure used most by pheasants without a gap in habitat availability. Cool-season grass-legume mixtures (CP1) that support higher pheasant productivity should be given equal or higher ratings than warm-season (CP2) grass stands. We also recommend that United States Department of Agriculture administrators and field staff provide broader and more flexible guidelines on what seed mixtures can be used in CRP grassland plantings in the northern Great Plains. This would allow landowners and natural resource professionals who manage pheasant habitat to plant a mosaic of cool- and warm-season CRP grassland habitats.

Francis, W. J. 1968. Temperature and humidity conditions in potential pheasant nesting habitat. Journal of Wildlife Management 32:36-46.

Abstract: Measurements of temperature and humidity within different vegetative cover types in Illinois pheasant range were made, and absolute humidity parameters calculated. Preferred nesting cover of pheasants (*Phasianus colchicus*) has been found to be strip cover (such as fencerows and roadsides) and hayfields. Within these cover types summertime maximum temperatures remained lower than in other cover types. Saturation deficits were also lower in the preferred cover types than in other cover types, and were very high in cornfields and certain grasses. Success of pheasant reproduction appears to be related to placement of nests in vegetative types offering a favorable microclimate. Temperature and humidity variations among cover types exceed the mean geographical variation over a wide area.

Gates, J. M., and G. E. Ostrom. 1966. Feed grain program related to pheasant production in Wisconsin. Journal of Wildlife Management 30:612-617.

Abstract: A pheasant (*Phasianus colchicus*) nesting study was conducted on 12 square miles of intensively farmed land in east-central Wisconsin during 1961-64. Under the Government Feed Grain Program during this period, 4.3 percent of the area was retired from agricultural production, of which about half was occupied by cover types suitable for pheasant nesting. At least a 10-percent increase in pheasant production could be attributed to the Program. Nest densities and hatching success on Program lands equaled or exceeded those in other cover types. On the average, 17 percent of the area's successful nests were located in retired cropland. To improve pheasant production on such lands, it is recommended (1) that quantity and quality of nesting cover be increased; (2) that clipping be delayed until after mid-July and only necessary clipping be done; and (3) that longer-term contracts for land retirement be provided.

George, R. R., A. L. Farris, C. C. Schwartz, D. D. Humburg, and J. C. Coffey. 1979. Native prairie grass pastures as nest cover for upland birds. Wildlife Society Bulletin 7:4-9.

Abstract: Pastures seeded to pure stands of switchgrass (*Panicum virgatum*), Indian grass (*Sor-ghastrum nutans*), and big bluestem (*Andropogon gerardi*) and properly managed as warm-season livestock forage provided suitable nest cover for ring-necked pheasants (*Phasianus colchicus*) and other species of upland birds. Under good management, switchgrass plots produced 3.1 successful pheasant nests/10 ha. Privately owned switchgrass pastures produced 0.7 successful pheasant nests/10 ha even when grazed early due to drought. In contrast, privately owned alfalfa (*Medicago sativa*) and orchard grass (*Dactylis glomerata*) hay meadows (typical of existing nest cover in Iowa) produced no successful pheasant nests in 1976 due to early season hay cutting. Bobwhite quail (*Colinus virginianus*), mourning doves (*Zenaida macroura*), and several species of passerine birds also nested in native grasses.

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.

Nelson, M. M., R. A. Chesness, and S. W. Harris. 1960. Relationship of pheasant nests to hayfield edges. Journal of Wildlife Management 24:430.

Abstract: The authors obtained information on the placement of 508 pheasant nests in 644 acres of hay in Martin County, Minnesota during 1957 and 1958. Over 85 percent of the acreage represented alfalfa with smaller amounts of red clover and grass types. A total of 56.1 percent of all nests was located within 100 feet of the field edges, while only 28.5 percent was located in the next 100 feet. At first glance, this may seem like evidence of an "edge effect," but 55.7 percent of the total acreage was also within 100 feet of the field edges and 30.8 percent of the acreage was in the next 100 feet. In fact, when the percentage of nests found in any given zone is compared with the percentage of the acreage in the same zone, it is apparent that there was no tendency for the hens to nest in any one zone in greater proportion on the basis of acreage than in any other zone. Data considered for either year alone led to this same conclusion – nests are placed at random in the fields without reference to an edge. There would be no greater management value, therefore, in delaying mowing on the outside edge of the fields than delaying it on a similar acreage located in any other portion of the fields.

Robertson, P. A. 1996. Does nesting cover limit abundance of ring-necked pheasants in North America? Wildlife Society Bulletin 24:98-106.

Abstract: I examined the hypothesis that availability of suitable nesting cover is a major limiting factor for North American pheasant (*Phasianus colchicus*) populations. North American technical publications about pheasant nesting for 1 933-1 990 were reviewed and categorized to 8 habitat types and 3 methods of nest detection. I extracted comparable variables for available habitat, nesting, and hatching. Occurrence of pheasant nests in different habitats relative to habitat availability differed among methods used to locate nests. High-and low-density pheasant populations did not differ in proportion of

nests in different habitats or proportion of successful nests among habitats. Analyses did not support the hypothesis examined. An alternative hypothesis of territory cover as a limiting factor is discussed.

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.