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STATE OF NEBRASKA
GAME AND PARKS COMMISSION

PHEASANT MANAGEMENT RECOMMENDATIONS

by

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February, 1974

A Contribution From Federal Aid in Wildlife Restoration Act
Pittman-Robertson Projects W-28-R and W-38-R

I N T R O D U C T I O N

Information on the life history and ecology of the ring-necked pheasant was collected on two, nine-square-mile study areas in Clay County, Nebraska, from 1954 through 1964. The study was designed to provide basic data that would allow scientifically based management decisions to be made for the maintenance and enhancement of ringneck populations.

Findings indicate certain steps should be taken to improve pheasant populations on state-owned or controlled lands, as well as recommendations to improve habitat for pheasant populations on land not controlled by the Game Commission. These secondary proposals have statewide ramifications and offer potential for significantly improving pheasant populations on land not controlled by the Commission. Recommendations include:

COMMISSION-CONTROLLED LANDS

1. Incorporate legumes and/or cool-season grass stands in large blocks of warm-season grasses.
2. Utilize state lands to obtain pheasant management and recreation on private lands.
3. Increase leasing of cropland on state areas.
4. Interseed native grass stands with alfalfa and/or other legumes.
5. Controlled burning.

ROADSIDES

1. Expand lines of communication with Department of Roads to influence management of roadsides under their control.
2. Provide legume and/or grass seed to counties that do not utilize federal funds.
3. Encourage counties to curtail or delay mowing of roadsides.
4. Controlled burning.
5. Initiate an intensive public relations campaign to sell local governments and the general public on the total benefits of a roadside management program.

SAFETY CORNERS

1. Initiate a program to establish one acre plantings of legumes and cool season grasses on field corners at secondary road intersections as a safety measure and to provide pheasant nesting cover.

BACKGROUND

To be effective, any pheasant management program must deal with the factor or factors which tend to limit the population. Data from the Clay County pheasant study shows that two factors, weather and habitat, singly or in concert, limit pheasant populations in most of Nebraska's pheasant range.

Weather can have a limiting influence at any season during the year. However, its greatest impact is exerted during the nesting season.

Deviations from normal precipitation and temperature during this season exert the greatest influence on reproduction. Unfortunately, our technology has not advanced to the point that we can control the weather.

The second basic factor, habitat, can be manipulated when the segment(s) which actually limit the biotic potential of this bird are defined. Our data has consistently shown that one habitat element, secure nesting cover, limits pheasant numbers.

At this point, a brief review is needed of trends in agriculture and pheasant populations as well as the outlook for cover types used for nesting cover by pheasants.

When pheasants were introduced into this state they found a man-made interspersion of cover types that was near optimum for their reproduction and dispersal. The birds responded to these favorable conditions, and pheasant populations reached their peak in the 1940's. Since that time, improved technology has led to dramatic changes in agriculture. The trend for the last three decades has been toward larger fields stressing the monoculture of row crops. This trend has resulted in a loss of nesting cover and reduced interspersion of cover types.

Pheasant populations responded to the trend of intensified agriculture by exhibiting a definite downward trend during this same period. There have been a few upsurges in the trend line to coincide with favorable weather or the "Soil Bank", but the long-term trend has been steadily downward.

Pheasants utilized seven basic cover types for nesting in Clay County. A review of the importance of these cover types and their outlook for the future follows:

- (1) Roadsides -- Roadsides comprised a small portion (1.4%) of the total land area. However, nest densities were high (2 per acre), and more than 25 percent of all chicks were produced in this cover type. There has been some agricultural encroachment on this cover type, but the outlook is good and acreage should remain fairly static. This cover type offers great potential for a management program.
- (2) Winter Wheat -- Winter wheat is a major crop in the state and important pheasant nesting cover. Although nest densities are low (0.2 nests/acre) in wheat, success is high and approximately 50 percent of the chick production occurs here. Due to high demand and a favorable economic return, the acreage devoted to wheat should remain constant or increase in the immediate future.
- (3) Alfalfa -- Alfalfa is a preferred nesting cover with densities approaching one nest per acre and 25 percent of all nests in this cover type. Nest success is extremely low due to nest destruction (99 percent) associated with harvest operations. The outlook for alfalfa production appears to be static.
- (4) Unused areas -- Unused areas, especially rain basins in the south-central portion of the state play an important role in pheasant ecology. They serve as important nesting, brooding, loafing, roosting, and winter cover where they occur. Up to 25 percent of all chicks were hatched in these areas on the Clay Center Study Area during dry years. The future looks bleak for any privately owned rain basins. There has been a trend in the region to encroach on these areas to intensify agricultural operations.
- (5) Pasture -- Pheasant production in pastures was relatively low (9 percent) due to intensive grazing. We can expect a continued downward trend in acreages used for pasture and an intensification of grazing on remaining areas.
- (6) Fencerow -- Fencerows rank third in nest densities (0.63 nests/acre), but contribute virtually no chicks to the population because of predation and abandonment. However, this cover type plays an important role as brood and loafing cover. Fencerows should continue to decline in both numbers and size.
- (7) Conserving Acres -- In recent years this cover type was known as "diverted acres" in the Federal Farm Program. These acres offered great potential if planted with a cover crop of grass or a grass-legume mixture. Legislation

was passed by Congress in 1973 enabling long-term contracts (3-5 years) and permanent vegetation. As written, the program offered the best hope for significantly enhancing pheasant numbers statewide. Unfortunately, this legislation came too late. Record worldwide demand for American agricultural produce coupled with emphasis on a balance of trade is leading to a trend of increased production and fewer diverted acres.

While the future seems to call for a continuing decline in nesting cover and declining pheasant population numbers, one way to arrest the downward trend or at least make the trend less severe is to improve the cover on areas we control or on areas where we can influence management. Pheasants, ducks, and other upland game birds demonstrate a definite preference for cool-season grasses and legumes. This has been documented in Nebraska (Baxter and Wolfe, 1972, 1973, and Grode, 1972) in Illinois (Labisky, 1968) and in South Dakota (Duebert, 1969). Cool-season grasses and legumes provide more vegetative canopy, and increased canopy is correlated with an increased number of successful nests (Linder and Agee, 1963 and Baxter and Wolfe, 1973). Francis (1968) concluded that legumes and cool season grasses provided a more favorable micro-climate for nesting pheasants because of lower temperatures and higher humidity.

PHEASANT MANAGEMENT ON STATE LANDS

The Nebraska Game and Parks Commission has more than 125,000 acres under its direct control that are subject to manipulation for the benefit of our wildlife resource and wildlife-based recreation. This acreage, however, has only a localized effect upon wildlife numbers. To significantly affect pheasant or other wildlife populations on a statewide basis our ultimate goal must be a management program that puts cover on private lands without affecting the landowner's income. However, state-managed lands make a contribution to hunting-based recreation that far outweighs its impact on pheasant populations, because of concentrated use of these areas by sportsmen. Therefore, it is essential that our management of these lands be directed towards providing optimum habitat conditions to maximize wildlife production.

Management of state wildlife areas strains our physical and economic capacity, and we have been unable to maintain an optimum combination of cover types to provide maximum wildlife benefit. In spite of money and manpower limitations, area managers have done a good job of putting vegetation on the land, considering the vast acreage they are responsible for and that their areas are distributed over several hundred miles.

On state areas where it is feasible to manage for pheasants and/or quail, we are faced with two basic needs to attain maximum numbers. They are high-quality nesting cover and an interspersion of other cover types that meet the birds' basic needs.

Vegetation now existing on state lands generally consists of large blocks of cover that are basically monotypic, and monotypes of any kind do not produce maximum numbers of pheasants. Many of these large blocks were planted with from one to three species of warm-season grasses that are now in a climax stage of succession. Warm-season grasses are not preferred pheasant nesting cover, and maximum numbers cannot be produced there, especially when stands of these grasses have reached the climax stage of succession. This does not mean that the warm-season grass complexes do not play an important role in the ecology of pheasants on these areas. Such complexes do provide roosting and winter cover and may tend to concentrate birds in the fall.

Therefore, a major management objective for these state lands should be to provide a favorable interspersion of high quality nesting cover and cropland with cover that currently exists on these areas. This must be accomplished without overtaxing staff or budgetary capabilities. It is with these goals and limitations in mind that the following recommendations are made:

- I. Incorporate legumes and/or cool-season grass stands in large blocks of warm-season grasses.

Establish 30 to 150-foot-wide strips of alfalfa or other legumes or cool season grasses in large blocks of native grasses to provide a preferred pheasant nesting cover and a beneficial pattern of vegetative interspersion.

Alfalfa is the preferred legume because it grows well in Nebraska, has a relatively long stand life (5-7 years), provides excellent pheasant nesting cover, and produces a good seed crop which can be harvested after the nesting season.

Obtaining the desired establishment of alfalfa without excessive demands on our manpower and budget could be accomplished in the following manner:

The selected fields could be planted by Commission personnel in lieu of food plot work. The alfalfa would then be managed for seed production. Harvest of the seed crops could be accomplished by a contract arrangement with local farmers on a share basis. Dr. W. J. Moline, professor of agronomy at the University of Nebraska, has indicated that harvest of alfalfa could be accomplished in late August to September with a combine. A different set of sieves would be the only modifications necessary. He also indicated that it should be relatively easy to find farmers willing to harvest the crop on a share basis with the current market value of alfalfa seed.

An alternative to this plan of utilizing Commission personnel to establish the stand and annual contracts for the harvest would be a 3-5 year lease with private individuals that requires the leasee to plant the stand. The Commission would still take their share of the crop in seed.

The state's share of harvested seed could then be used for other management programs. For example, it could be a seed source for co-operative management of roadsides or for distribution to participants in the Acres for Wildlife Program.

The Commission would benefit from the program in the following ways:

- A. It would place high-quality nesting cover preferred by pheasants on state-owned land.
- B. It would provide needed interspersion of cover types, thus increasing carrying capacity of these lands.
- C. It would benefit other game and non-game species of wildlife. Species deriving benefit from planting of alfalfa include bobwhite quail, cottontail rabbits, ground-nesting songbirds, and white-tailed deer.

- D. It would provide a source of seed for use on state areas and for distribution to other agencies and individuals for nesting-cover plantings.
 - E. It would provide sportsmen increased recreational opportunity on and adjacent to state lands.
 - F. Public relations benefits would derive from an action program which stresses maximizing wildlife production and recreational benefits on state lands and the distribution of seed to improve production of other lands.
- II. Utilize state lands to obtain pheasant management and recreation on private lands.

This proposal is a modification of an informal suggestion made by C. P. Agee, former chief of the Research Division, Nebraska Game and Parks Commission. The purpose of the program is to provide a better combination of cover types (interspersed) on state lands and to increase the production and harvest of pheasants on state and private lands.

We propose the Game and Parks Commission develop a program whereby landowners near state lands would be allowed to produce row crops on designated areas of state lands in return for favorable game management and reasonable public hunting on their lands.

The distribution of areas to be farmed on the state lands could be arranged in contour fashion or in strips to provide a favorable interspersed of cover types and to protect the land from erosion. The strips would also have to be large enough to allow the farmer to use conventional equipment. Provisions of each agreement could also call for leaving a portion of the crop in the field to replace annually planted food plots.

The farmer participating in this agreement would agree to plant a portion of his own land to high-quality nesting cover favorably interspersed with his cropland. For example field borders could be expanded and planted to alfalfa or alfalfa cool-season grass mixtures. He would also agree to permit a reasonable amount of public access on his farm for hunting.

The Game Commission would post the participating farms. The trade-off in land use need not be on an acre for acre basis, since he would be required to make concessions regarding the management of his lands, and he would incur increased labor and decreased efficiency. As an added incentive, the landowner should also be allowed to utilize the nesting cover on his land for seed, hay, or grazing after the nesting season.

Benefits accruing to the Game Commission would include:

- A. Creation of a more favorable environment on state and nearby private lands through an increased interspersed cover types to meet wildlife needs.
- B. Increased pheasant harvest on state and private lands.
- C. Increased hunting opportunity for Nebraska hunters by providing public access on private lands. Conceivably, this could open an area to recreational hunting on state lands equal to the acreage we control.
- D. Enhancement of other game and non-game species of wildlife on both state and private lands.
- E. Public relations benefits from an action program stressing enhancement of wildlife populations and improved landowner-sportsman relations.
- F. Field personnel would be freed from the annual planting of flood plots to concentrate on other duties which often have a higher priority.

III. Increased interspersed cover on state lands through increased leasing for row-crop production.

The leasing of crop lands on state areas is a program that is currently being utilized to increase habitat interspersed cover, provide feed for wildlife, and produce income for the agency.

Interspersed cover could be favorably increased on many of our areas by increasing the acreage under lease for the production of row crops. Additional leases should be planted as strips in existing large blocks of cover as this would provide more interspersed cover than blocks of cropland.

This suggestion is offered as an alternate for recommendation number II. While this does provide interspersed cover and possible cash income, it does not get secure nesting cover on private lands or open these lands to hunting.

IV. Interseed native grass stands with alfalfa and/or other legumes.

Interseeding of warm season grass stands with a legume would improve the quality of these stands as pheasant nesting cover. They would provide a better micro-climate for nesting, and the results should be higher pheasant production without destroying the other values of these stands.

Preferably this recommendation would be used to compliment recommendation number I and recommendation number III or IV. This would assure a maximum amount of high quality nesting cover and other habitat types for pheasants and should permit maximum reproduction on these areas.

Establishment of legumes in warm-season grass stands would probably require the use of controlled burning or other range management practices.

V. Controlled burning.

Controlled burning is a management practice that is commonly used by game managers in other states. When properly utilized it can be an inexpensive and highly effective tool for the land manager. Grange (1948) stated, "How to use fire wisely is a matter of game management technique. The principle of such use should be accepted as necessary, with any debate on the matter limited to methods of application."

Native grass stands which are in a climax stage of succession should be burned to increase plant diversity and thus improve these stands as pheasant habitat. Burning would also remove dense tangles of mixed dead and living vegetation which can physically restrict wildlife. It can also reduce the very real danger of wild fire.

Solid stands (climax) of cool season grasses should also be burned periodically to increase plant vigor and plant diversity. Smooth brome grass is a classic example. Brome grass provides relatively high-quality nesting cover until it becomes what is commonly referred to as "sod bound". In this condition the vigor of the stand is reduced by unavailability of nutrients. The condition is characterized by a dense litter accumulation from previous years' growth, low plant vigor, and poor vegetative growth. Controlled use of fire in such a situation can remove the litter and make essential nutrients available, thereby rejuvenating the stand as quality nesting cover.

A third use for fire on state areas is to control the encroachment of woody vegetation into grassland areas. This is a real problem on some state lands in the higher rainfall region of southeast Nebraska.

The controlled use of fire could also be put to beneficial use on state-owned wetlands in the south-central portion of the state. These wetlands provide essential interspersions of plant communities in this extensively farmed region of the state. They are used extensively by pheasants as nesting, loafing, roosting, and winter cover especially during dry years.

An effort should also be expended by the Commission to cooperatively use fire to manage the uplands and marsh areas on

federal waterfowl production areas. This seems logical because these areas are so important to pheasants and because they provide considerable hunting opportunity to Nebraska sportsmen.

Benefits of controlled burning include:

- A. Setting back ecological succession from climax vegetation to early seral stages which are more productive wildlife habitat.
- B. Removal of litter and other ground debris, thus providing protection against wild fires.
- C. Maintenance of grassland vegetation by eliminating or retarding the encroachment of woody vegetation.
- D. Prevention of debris buildup in marshlands and maintenance of these areas in a condition that provides nesting and winter cover for pheasants.
- E. Increased insect biomass. Insects make up a major portion of the diet of pheasant and bobwhite quail chicks. Hurst (1970) found insect biomass greatest in burned versus unburned grass plots.
- F. Manipulation of rodent populations. McWhorter (1973) states that rodents reach their greatest density and species diversity in dense mulch accumulation. In the absence of cultivated crops they can be serious competitors with pheasants and quail for winter food supplies.

ROADSIDE MANAGEMENT

Background

Roadsides are one of the most important cover types utilized by pheasants for nesting. The life history and ecology study showed that roadsides had higher nest densities (1.91 per acre) than any other cover type and 25.2 percent of all chicks produced were hatched there. The importance of this cover type to nesting game birds will increase as agricultural land use becomes progressively more intensive.

Management of this cover type is not under Game and Parks Commission control. However, its importance as nesting cover makes it worthy of our attention, and there is a need for an agency-sponsored program to influence management of these areas. In fact, roadsides offer the only significant land acreages available for nesting-cover management.

In intensively farmed south-central Nebraska, roadsides constitute less than 1.4 percent of the total landscape. On a statewide basis, however, this small percentage constitutes a worthwhile resource that is well distributed throughout an intensively farmed environment. Records from the Nebraska Department of Roads indicate that there are 82,361 miles of secondary (county) roads in the state. The exact acreage of roadsides is unknown because of differing widths and differing degrees of utilization by adjacent landowners. However, a reasonable estimate would seem to range between 225,000 and 400,000 acres of which 175,000 to 300,000 acres would occur in fair to excellent pheasant range.

The Nebraska Department of Roads controls an additional 10,880 acres of roadsides along state and federal highways. While these acres are currently being managed in a manner that is beneficial to pheasants and other wildlife, improvements could be made in their program by including more cool-season grasses and legumes in their mixture. They also have a limited mowing policy which saves the taxpayers in the neighborhood of three quarters of a million dollars per year while providing good wildlife habitat.

Data from our study and from studies in other states indicate that management of the vegetation in roadsides could significantly increase pheasant populations. Nest density and chick production in roadsides are related to the quality of cover as measured by the vegetative canopy (Linder and Agee, 1963, and Baxter and Wolfe, 1973). Joselyn et al (1968) reported that they were able to nearly double the number of successful nests by managing roadside vegetation. Their best results were obtained on areas seeded with a mixture of alfalfa and brome grass. Increased production was obtained on other roadsides by curtailing mowing.

Doubling chick production on 100,000 acres or 20,825 miles of roadsides would add from 254,000 to 287,000 birds to the population. Assuming normal

juvenile mortality and harvest rates (30 and 50% respectively), this would produce an additional 45,000 to 50,000 cock birds in the hunter's bag, or a 5 to 6 percent increase in the harvest.

There is reason to believe that a management program for roadsides could result in a greater than two-fold increase in production in this cover type. There was a considerable difference in nest densities in individual roadsides on our study areas. The density figure of 1.91 nests per acre is an average figure for all roadsides for all 10 years of the study. Nest densities in roadsides varied from zero to 10 nests per acre depending on the quality of cover in the roadside. The best example of the importance of quality nesting cover in roadsides was observed on the Clay Center study area in 1959 where one plot contained 10 pheasant nests and 15 duck nests per acre.

Other wildlife species that would benefit from a roadside improvement program include: bobwhite quail, cottontail rabbits, and ground nesting songbirds.

Recommendations:

Because of the importance of roadsides to pheasants and other wildlife, it is recommended that the Nebraska Game and Parks Commission initiate a program to establish a multiple-use management program for the state's primary and secondary roads systems.

Since most roadsides in the state are under the jurisdiction of other agencies of state and local government, a management program for these areas must be a co-operative venture between our department and the controlling agency. Therefore, the following steps are suggested:

- I. Expand lines of communication with the Department of Roads to influence management of roadsides under their control.

The Department of Roads has direct control of all right-of-ways along state and federal highways and indirect control of roadsides on many county roads. Their control over county roads exists because they prepare specifications for all county roads developed with federal cost sharing. One requirement compels the county to seed the roadside on all federally funded projects with permanent vegetation.

Preliminary work with Richard Gray, agronomist for the Roads Department, indicates that they would be willing to work with our agency to improve the wildlife value of roadside plantings. For example, he indicates that they would be willing to include more legumes and cool-season grasses in mixtures used on their lands and in the recommendations for county roads receiving federal aid.

- II. Provide seed to counties. First priority would be counties in the state not participating in federal aid road programs, but paying the cost of construction or renovation themselves. Compliance with all federal specifications and requirements frequently requires more funds to meet the cost-shared portion of the job than doing all of the work themselves.

In these instances, if the ditches are seeded, it is with the least expensive grass seed that is adapted to the area. In Nebraska that grass is frequently smooth brome grass. To get high-quality nesting cover and prolong the useful life of that cover, the Commission should provide those counties with alfalfa seed grown on state game lands. It would also be desirable to provide seed of cool-season grasses that provide attractive pheasant nesting cover, such as western wheat grass. Grass seed could be purchased with P-R funds.

III. Encourage counties to curtail mowing of roadsides.

Pheasant production in roadside vegetation can be increased substantially by delaying mowing until after the peak of the nesting season. If mowing is to take place after that time, it is preferable to mow only the shoulder of the roads.

County residents save money through reduced maintenance costs, fuel savings, improved weed control, erosion control, lessened snow removal problems, and a reduced risk of wildfires. They also achieve a higher quality environment through increased numbers of game and non-game wildlife and more aesthetically pleasing roadways.

IV. Controlled Burning.

Controlled burning is a management tool that can be utilized as an alternative to or in conjunction with recommendations II and III.

Controlled burning can improve the composition and quality of roadside vegetation as nesting cover. This is especially true in roadsides which are dominated by smooth brome grass.

Brome grass provides good pheasant nesting cover by itself or in combination with other grasses or legumes for the first few years after the stand is established. In the eastern portion of the state, brome generally will dominate a stand and become what is commonly referred to as "sod bound" during the fourth or fifth year after establishment. What has actually occurred is a tying up of the elements essential for plant growth. This results in a large litter buildup and decreased plant vigor.

Controlled fire can set back succession, remove the large layer of duff, and release the nutrients. The results include increased plant diversity and vigor, which in turn produces a denser canopy and improved nesting cover.

A burning program for roadsides would be a cooperative program between the Game Commission and the counties or Natural Resource Districts. The role of the Commission in this program could range from advisory to actually burning those roadsides needing rejuvenation. Efforts should be concentrated in the eastern

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The Commission's role in implementation should consist of the following steps:

- (1) Sell the program to other interested agencies and groups.
- (2) Provide legume seed grown on state areas for planting on these plots.
- (3) Make enrollment in the Acres for Wildlife program automatic with enrollment in this program.
- (4) Coordinate activities with other agencies and provide them with technical assistance.

The agency would receive positive public relations benefits from this highly visible action program and, at the same time, get nesting cover placed on private lands.

Funding of this project to insure significant participation to attain our goals of reduced traffic accidents and increased production could be accomplished in several ways.

Because this project is primarily a safety measure designed to benefit all citizens of the state through a reduction in the loss of life, health, and property, General Fund monies could be appropriated by the Legislature. These funds could be used singly or in combination with P-R funds or funds from other agencies. Sponsorship and support for the necessary legislation could be drawn from state agencies such as the Nebraska Safety Council, Department of Roads, State Office of Planning and Programming, and the Governor's Council for Highway Safety. The Natural Resource Districts, County Commission, and other branches of local government could assist in achieving the necessary legislation. Support could also be drawn from private groups such as the Nebraska Women for Highway Safety, the Grange Safety Committee, Nebraska Council of Sportsmen, and the Audubon Society.

The Natural Resource Districts are another possible source of funding. Several of these districts are considering land retirement programs to benefit wildlife. A multi-purpose safety corners program could be worked into their program quite easily. The interspersed nesting cover provided by several safety corners would be more beneficial to pheasants and other wildlife than a few large block plantings.

A third source of funding for this project could be the U.S. Department of Agriculture's Farm Program which is administered by the ASCS. This has potential, if this practice can be included under the diverted acres program. However, with the current national emphasis on maximum production, the diverted acres program will probably be suspended for 1974. An administrative change in policy or legislation would be required to allow land diversion payments for safety corners during the 1974 crop year.

Additional incentive could be made available to participating farmers by allowing them to utilize the vegetation on these areas after the major portion of the nesting season. Therefore, the agency should recommend that the farmer be allowed to harvest seed, hay, or graze these plots after July 15 regardless of the source of funds.

Table 2: Summary of traffic accidents occurring at intersections on county roads in Nebraska from June 1 through September 30, 1973.

	Fatal		Injury		Property Damage		Total Accidents	
	No.	%*	No.	%*	No.	%*	No.	%*
2-Car	9	75.0	149	61.1	177	45.8	335	52.2
1-Car	2	100.0	63	64.3	43	53.1	108	59.7
Car-Ped.	<u>0</u>	<u>000.0</u>	<u>1</u>	<u>50.0</u>	<u>--</u>	<u>--</u>	<u>1</u>	<u>33.3</u>
TOTAL	11	73.3	213	61.9	220	47.1	444	53.8

* Indicates percent of total accidents in that group for nine months January-September, 1973, calculated by author.

A secondary benefit would accrue for pheasants and thus to the Commission by providing additional nesting cover interspersed with cropland over a broad area of the state. This interspersion would be especially important in intensively farmed regions of the state. In theory, this practice has the potential for adding four acres of nesting cover to each section of land in some areas.

While four acres of additional nesting cover per square mile may seem to be an insignificant amount, implementation of this program on a wide scale could exert an effect on both pheasant populations and harvest.

Based on our data, planting these areas to a mixture alfalfa and western wheat grass or alfalfa and brome grass would have a positive affect on pheasant production and harvest (Table 3).

Table 3: Calculated contribution of one acre safety corners to pheasant production.

Number of Acre Plots	Increase In Population	Percent Increase ^{1/}	Increase In Harvest ^{2/}	Percent Increase ^{2/}
1,000	7,258	0.18 - 0.23	1,270	0.13 - 0.16
3,000	21,744	0.54 - 0.69	3,810	0.39 - 0.48
5,000	36,290	0.9 - 1.15	6,350	0.65 - 0.80
10,000	72,580	1.80 - 2.30	12,700	1.30 - 1.60
15,000	108,870	2.70 - 3.45	19,050	1.95 - 2.40
20,000	145,160	3.60 - 4.60	25,400	2.60 - 3.20
25,000	181,450	4.50 - 5.75	31,750	3.25 - 4.00
30,000	217,740	5.40 - 6.90	38,100	3.90 - 4.80

^{1/} Based on a population of 3,200,000 to 4,000,000 birds

^{2/} Based on a harvest rate of 50 percent of males present in the fall population. Computations were made after allowing for a juvenile mortality rate of 30 percent.

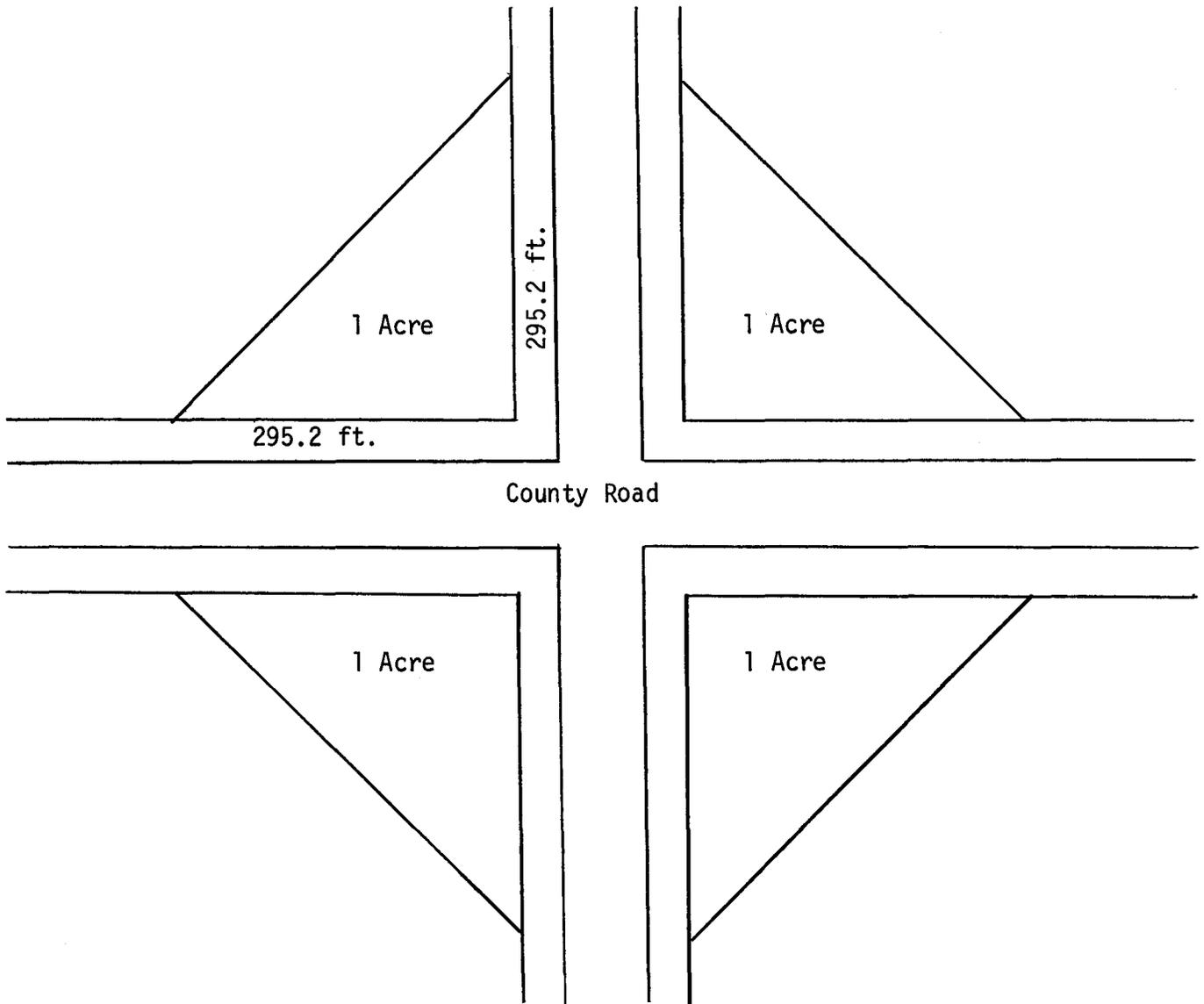


Figure 1. Proposed safety corners at intersections of secondary roads.

SAFETY CORNERS

It is recommended that the Commission initiate a program to establish one-acre plantings of a mixture of legumes and cool-season grasses on field corners at secondary road intersections as a safety measure and to provide pheasant nesting cover (Figure 1).

A major problem with a project of this type is providing the farmer with enough economic incentive to remove this land from production.

This practice is similar to the former Farm Program, H-2 Practice (corner grass plots), which was discontinued because of a lack of participation by Nebraska landowners. The poor participation in this practice was probably due to the following factors: (1) a lack of economic incentive (\$8.00 per plot) when compared to other practices and (2) a lack of awareness by the public that this practice existed.

The primary benefit and main selling point of a program of this nature is its inherent potential for reducing automobile accidents which result in death, injury, and property loss to the citizens of Nebraska. It is this benefit that should appeal to other state agencies, federal agencies, and private citizen groups in the state. This benefit should also make outside funding a reality, and thereby achieve Commission goals with a minimum expenditure of funds.

Data derived from Standard Summaries of Nebraska Motor Vehicle Traffic Accidents prepared by the Accident Record Bureau of the Nebraska Department of Roads show that 15 fatal and 344 injury accidents occurred at intersections on county roads from January 1 through September 30, 1973 (Table No. 1). This means that a minimum of 15 Nebraskans lost their lives and a minimum of 344 others were injured at intersections on county roads during this period. An additional 467 property damage accidents (no fatalities or injuries) occurred at these intersections in the same time period.

Table 1: Summary of traffic accidents occurring at intersections on county roads in Nebraska from January 1 through September 30, 1973.

	Fatal	Injury	Prop. Damage	Total
2-Car Accident	12	244	386	642
1-Car Accident	2	98	81	181
Car-Pedestrian	1	2	--	3
TOTAL	15	344	467	826

To determine if crops exert an influence on accident rates at intersections on county roads, available data was summarized for the June 1 through September 30, 1973, period which coincides with the crop-growing season (Table 2). This data indicates that agricultural crops do influence accident rates. Approximately 73 percent of all fatal accidents and 62 percent of all injury accidents occurred during this time period.

portion of the state where the problem is more acute because of higher rainfall. This is also the region with the greatest hunting pressure because of a concentration of hunters.

Funding of any Game Commission participation would be eligible for federal cost sharing under the P-R program.

- V. Initiate an intensive program to sell county governments, Natural Resource Districts, and the general public on the total benefits of a roadside management program.

The Game Commission currently cooperates with the Nebraska Forage and Grassland Council in distributing a pamphlet on roadside management to all counties in the state. This pamphlet is well written and quite educational. However, the importance of this cover type to our pheasant resource calls for more than a passive program to enhance management in this cover type.

We need a program involving personal contact and all the modern communications techniques available to this agency.*

The program should be directed at the general public as well as agencies controlling the vast acreage of roadsides.

A sound management program should not be a problem to sell because, as noted previously, the other agencies involved would receive direct benefits that could result in a considerable savings of money.

*A meeting has been arranged for early 1974 with Department of Roads Personnel and Game Commission Personnel from the Research and I & E Divisions to prepare a film that will show most of the benefits of proper roadside management. This film is to be used for television and public viewing.