Outdoor Facts

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A LIFE-TABLE FOR MANAGING DEER POPULATIONS[1]

Big game seasons are established several months prior to the actual hunt. This practice necessitates setting harvest objectives and seasons and estimating the number of permits to issue without knowing the size or composition of the population that will be hunted.

As an aid in establishing seasons and numbers of permits, life-tables can prove valuable in predicting pre-hunting-season population size and composition. Life-tables for mammals have been developed by Deevey (1947), Brown (1961), and Smith et al. (1969). Since 1968, life-tables for deer in Middle Park have been used to predict pre-hunting-season population size and composition in order to establish appropriate hunting seasons.

This leaflet shows an example of the life-table used in Middle Park. Fundamental to the process are measurements of population size, composition, mortality, and reproduction. Data presented regarding mortality and reproduction may not apply to other areas of Colorado. However, this example illustrates the types of data needed to construct a life-table.

To construct the life-table, the following procedure was used (see Table 1):

A. Winter Population Estimate. Each January deer were censused using a quadrat sampling system (Gill 1969a). The composition of the estimated winter population was based on the composition of deer classified from a helicopter during the previous December. For example, if 1,500 deer were classified in December as 30 percent bucks, 40 percent does, and 30 percent fawns, these percentages would be projected onto the population estimate (Table 1). Fawns were allocated as 55 percent bucks and 45 percent does, based on composition of fawns killed by hunters during regular hunting seasons.

B. Winter Mortality. Winter mortality was estimated each year by walking randomly located strip-transects and counting the number of dead deer on these transects (Gill 1969b). Number of dead deer found was projected to the entire winter range to estimate the total number of deer dying, which was computed as a percentage of the winter population estimate (Table 1). Sex and age composition of winter mortality was based on dead deer found on transects. Winter mortality was then subtracted from the winter population estimate to arrive at a **Spring Population** estimate (Table 1).

C. Pre-Fawning Population. At this point, fawns were incorporated into the adult population as yearlings (Table 1). Buck and doe fawns were added to the existing adult buck and doe fractions. Percentages of yearling bucks and does were calculated by dividing number of buck fawns by number of adult bucks, etc. (Table 1). These percentages can be compared to the percent yearlings harvested during hunting seasons.

D. Fawn Production. This estimate was for net fawn production, that is, after mortality on fawns during summer and hunting seasons had occurred. The theoretically best time to obtain this estimate is prior to hunting seasons through sex and age classification counts. However, in many parts of Colorado, including Middle Park, sample sizes obtained during pre-season counts are usually inadequate because insufficient snow precludes finding ample deer to classify. This not only results in a small sample but also can provide a biased estimate of the fawn:doe ratio. A reasonable alternative is to conduct classification counts in December after the hunting season, when sufficient snow is present. Thus, fawn production was measured several months after the fawning period. The ratio of fawns:100 does measured in December was used to estimate the net fawn crop. A ratio of 80 fawns:100 does in December, applied to approximately 5,000 does in the pre-fawning population, resulted in an estimated increment of about 4,000 fawns (Table 1). Allocating this fawn increment at 55 percent bucks and 45 percent does and adding the incre-

[1]*Contribution from Federal Aid Project W-38-R.*

TABLE 1. Life-table for deer in Middle Park, Colorado

Population Data	Bucks	Does	Buck Fawns	Doe Fawns	Total	Percent Yearling Bucks-Does
Winter Population (January census)	3,000 (30.0%)	4,000 (40.0%)	1,650 (16.5%)	1,350 (13.5%)	10,000 (100%)	
Winter Mortality (8.0% of winter pop.)	218 (27.3%)	213 (26.6%)	203 (25.4%)	166 (10.7%)	800 (100%)	
Spring Population	2,782 (30.2%)	3,787 (41.2%)	1,447 (15.7%)	1,184 (12.9%)	9,200 (100%)	
Pre-Fawning Population	4,229 (46.0%)	4,971 (54.0%)			9,200 (100%)	34.2-23.8
Fawn Production (0.80 fawns:doe)			2,187 (55.0%)	1,790 (45.0%)	3,977 (100%)	
Pre-Hunt Population	4,229 (32.1%)	4,971 (37.7%)	2,187 (16.6%)	1,790 (13.6%)	13,177 (100%)	
Harvest - Early Seasons	50 (50.0%)	40 (40.0%)	6 (6.0%)	4 (4.0%)	100 (100%)	
Wounding Loss (20% of harvest)	10 (50.0%)	8 (40.0%)	1 (6.0%)	1 (4.0%)	20 (100%)	
Harvest - Regular Season	780 (65.0%)	300 (25.0%)	84 (7.0%)	36 (3.0%)	1,200 (100%)	
Wounding Loss (20% of harvest)	156 (65.0%)	60 (25.0%)	17 (7.0%)	7 (3.0%)	240 (100%)	
December Post-Season Population	3,233 (27.8%)	4,563 (39.3%)	2,079 (17.9%)	1,742 (15.0%)	11,617 (100%)	

ment to the pre-fawning population resulted in estimates of the **Pre-Hunting-Season** population size and composition (Table 1).

E. Harvest and Wounding Loss. Harvest estimates were based on results of hunter surveys. Wounding loss was arbitrarily set at 20 percent of the legal harvest, based on limited information in the literature and from hunter surveys. This value may vary between areas and seasons. Composition of the wounding loss was allocated in the same proportion as animals that were legally harvested (Table 1).

F. Post-Season Population. The post-season population was estimated by subtracting the harvest and wounding loss from the pre-hunting population (Table 1). The calculated composition of this population could be compared to the composition measured during ensuing sex- and age-classification counts in December. The calculated population size could be compared to the ensuing January census estimate.

DISCUSSION

Initially, imprecise estimates of population size, composition, mortality, and reproduction may be used to generate a first approximation of a life-table. After a few years of gathering the necessary biological information, reasonable estimates of mortality and reproduction can be generated using averages from several years. Thus, after estimating the size of the winter population in January or February, a life-table could be constructed by March to predict fall population size and aid in establishing harvest objectives, seasons, and type and quanitity of permits.

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