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Causes of Mortality and Factors Affecting Survival of Ruffed Grouse (Bonasa umbellus) in Northern Michigan

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Allison Gormley

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Scott R. Winterstein
Major professor

Date May 29, 1996

# CAUSES OF MORTALITY AND FACTORS AFFECTING SURVIVAL OF RUFFED GROUSE (BONASA UMBELLUS) IN NORTHERN MICHIGAN

By

Allison Gormley

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# ABSTRACT

## CAUSES OF MORTALITY AND FACTORS AFFECTING SURVIVAL OF RUFFED GROUSE (BONASA UMBELLUS) IN NORTHERN MICHIGAN

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Concerns about the declining numbers of ruffed grouse (Bonasa umbellus) led to the initiation of the Michigan Ruffed Grouse Project. Objectives were to determine causes of mortality and grouse survival rates. Research was conducted May 1993-August 1995 on 2 areas in Michigan. Each area was composed of a site closed to hunting and one open to hunting under normal harvest regulations. Ruffed grouse were fitted with radio transmitters on each site each year and the Kaplan-Meier estimator (Pollock et al. 1989) was used to determine survival rates. Factors that could cause survival to differ between paired sites were quantified and evaluated. Avian predation was the greatest cause of grouse mortality. Survival was significantly greater for birds on the closed sites in 1993 ($P < 0.05$), but not in 1994. Hunting appeared to have little or no effect on grouse survival.

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# INTRODUCTION

The ruffed grouse (Bonasa umbellus) is a very important gamebird throughout Michigan. Since 1958 it has been pursued by an average of 175,000 hunters each year. As many as 843,000 grouse have been harvested statewide in a single year (J. Urbain, Michigan Department of Natural Resources, pers. commun.).

It has long been known that grouse populations are cyclic. Work done by Criddle (1930), Leopold and Ball (1933), Marshall and Gullion (1965), and Moulton (1975) showed that the average grouse cycle lasts from 6 to 10 years. Schorger (1945) noted that attempts to discover the causes of death or decline of the ruffed grouse began around 1880. Since that time numerous mechanisms have been proposed and studied to explain the known cyclic pattern of grouse populations (Criddle 1930, Leopold and Ball 1933, Schorger 1945, Allin 1964, Gullion 1970, Archibald 1977, Rusch et al. 1978, Keith and Rusch 1986). No mechanism has yet been proven to be the cause of fluctuations in grouse numbers.

Studies have shown that natural mortality factors affect sex and age classes of ruffed grouse differentially and cause seasonal variations in mortality rates. In central Wisconsin, Small et al. (1991, 1993) determined annual survival rates for adults to be higher than for juveniles. In Rochester, Alberta, Rusch and Keith (1971) found the average rate of survival from hatching to the following spring to be 28% and the average

annual survival rate of adults to be 29%. They also found that females suffer higher mortality than males during late summer, while males suffer higher mortality than females during the fall and spring.

On the Ashland Wildlife Research Area, Missouri, Thompson and Fritzell (1989) found mean survival during the spring-summer interval to be greater than survival during the fall-winter interval. Small et al. (1991) observed mortality rates to be highest during winter and early spring in central Wisconsin. Conversely, Rusch et al. (1978) found highest rates of mortality to occur during the summer and fall on the Narcisse Wildlife Management Area, Manitoba.

It is known that the Michigan grouse population has undergone a severe decline and that during 1992-1993 was at an extremely low point in its current cycle, which began with a peak in 1989 (J. Urbain, Michigan DNR, pers. commun.). Drumming surveys statewide showed a decrease from 1.26 average drums/stop in 1990 to 0.66 average drums/stop in 1993. Data collected from hunting cooperators showed a steady decrease in hunting success from 1989 to 1993. The flush rate per hour of ruffed grouse hunting in 1993 was 0.92, this is the lowest flush rate since the Michigan DNR began record keeping in 1958. In addition, the number of grouse harvested statewide in 1993 was the lowest for the 36 years and the 1992 statewide harvest was the second lowest (J. Urbain, Michigan DNR, pers. commun.). In 1993 the harvest was 63% below the 36-year average, and in 1992 it was 48% below the average. The lack of knowledge about Michigan's grouse population and the concern of hunters, wildlife managers, and other conservationists about the diminishing numbers of grouse led to the initiation of the Michigan Ruffed Grouse

Research Project in 1993. The project is a 5-year study and will examine numerous aspects of ruffed grouse survival, movements, and habitat requirements.

## OBJECTIVES

The specific objectives of this study are to determine for populations in northern Michigan:

1. The primary causes of ruffed grouse mortality;
2. If causes of mortality change seasonally; and
3. The impacts of age and gender on mortality.

## STUDY AREA AND SITE DESCRIPTION

Research was conducted on 2 study areas, in the northeast lower peninsula of Michigan, from May 1993 to August 1995. One area was located within the Pigeon River Country State Forest (PRCSF), and the other was in the Maltby Hills region of the Huron National Forest (HNF). Criteria used in selecting study areas included: 1) that there must be a predominance of good quality grouse habitat on the area, and 2) that historical hunting efforts in these areas must be average or above average for the State.

The PRCSF overlaps Cheboygan and Otsego counties, and is approximately 80 km northwest of the HNF area, which extends into Oscoda, Alcona, and Ogemaw counties (Figure 1). Both study areas have a similar climate, due to their geographical proximity. PRCSF is at 45°10'N latitude, 84°27'W longitude, and has an elevation of 282 m. HNF is at 44°25'N latitude, 84°1'W longitude, and has an elevation of 274 m. The mean summer temperature for PRCSF is 21.2 C; the mean winter temperature is -6.3 C. The known temperature extremes for the period of 1982 through 1992 are 37.8 C and -36.7 C (NOAA 1982-1992). In HNF the mean summer temperature is 22.5 C, the mean winter temperature is -5.3 C, and the recorded extreme temperatures between 1982 and 1992 are 38.9 C and -35 C (NOAA 1982-1992).

Each area was composed of 2 sites, one closed to grouse hunting and one open to hunting under normal harvest regulations. Each site was roughly 100 $km^2$. In each area

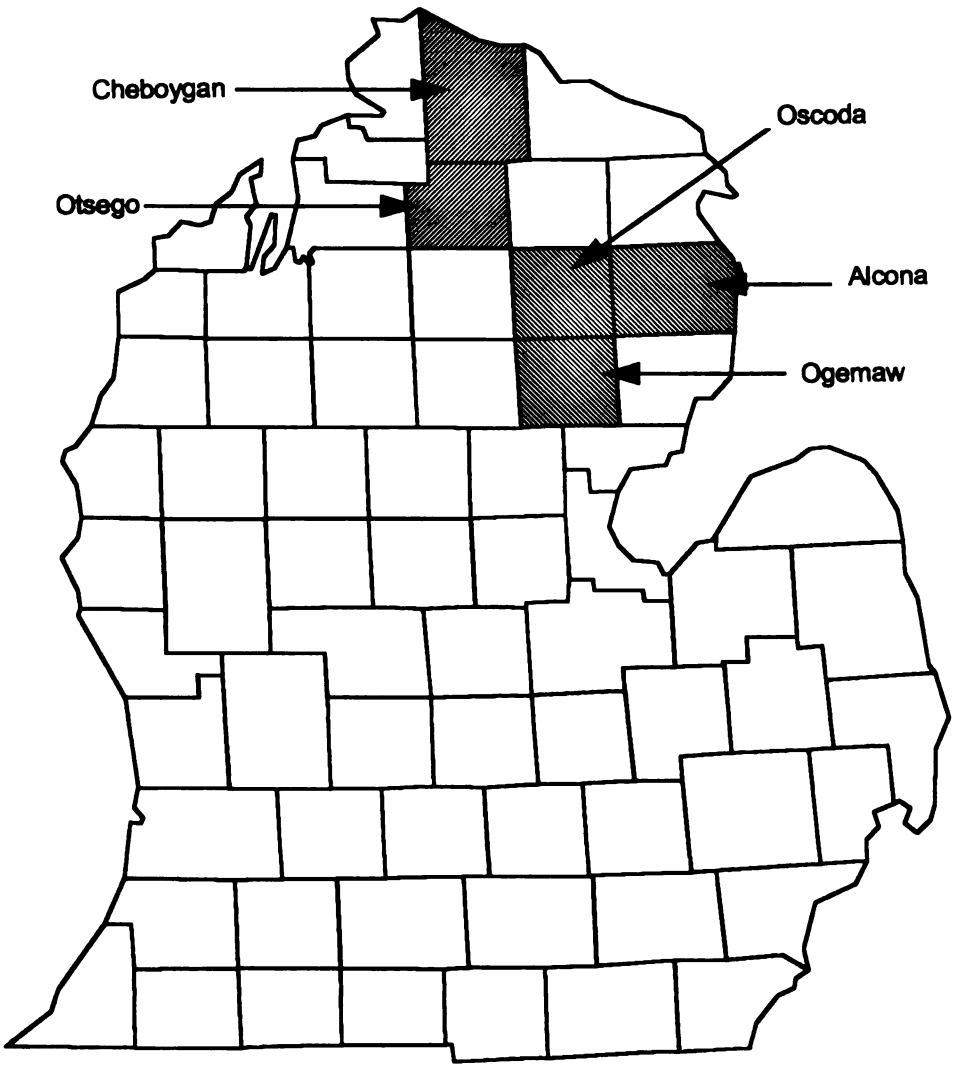



Figure 1. Location of Michigan ruffed grouse research project study areas.

the open and closed sites were within approximately 3 km of each other to minimize geographic, soil, and climatic differences (Figure 2). This positioning also expedited travel between a pair of sites by project field personnel. Within a pair, the site selected to be closed to hunting was the one which had the greater number of county roads, rivers, and surrounding private lands which could be conveniently used to denote the boundaries of the site. The boundaries of the closed sites were posted in compliance with all appropriate laws and regulations prior to the start of the 1993 hunting season. Since the initial posting, signs were replaced as necessary.

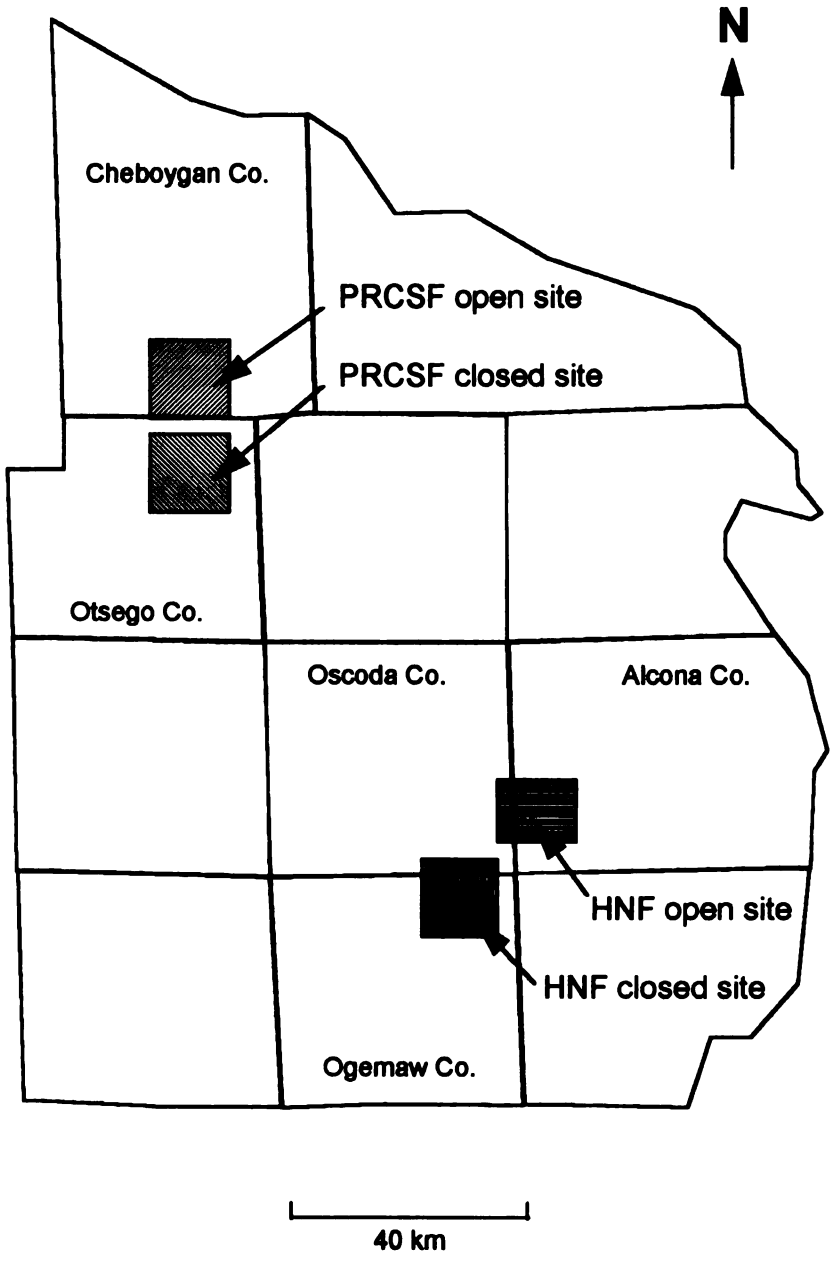



Figure 2. Location of open and closed sites on HNF and PRCSF study areas.

# METHODS

## Vegetation Analysis

An analysis of vegetation types on the study sites was conducted to assess the habitat quality of each site for ruffed grouse and to measure the degree of similarity of the paired sites in relation to quantity and quality of ruffed grouse habitat. Data collected were also used to compare paired sites with respect to habitat quality for nesting woodland hawks.

The 4 study sites were stratified based on compartment map cover types and grouse ecology. Eight vegetation types were defined (Table 1). The Aspen cover type was sampled in 3 age classes: Young Aspen (1-10 years old), Medium-Aged Aspen (11-29 years old), and Old Aspen ( ≥30 years old). On the HNF sites the Jack Pine vegetation type was divided into 2 age classes: Young Jack Pine (≤30 years old) and Old Jack Pine (>30 years old). Due to the small amount of Jack Pine present in PRCSF, a single Jack Pine vegetation type encompassing all ages was sampled there. On all sites the Pines cover type was divided into 2 age classes: Young Pines (≤30 years old) and Old Pines (>30 years old). Since there is no Oak cover type on the PRCSF sites, this category was not sampled there. Only Upland Hardwoods >30 years old were sampled on all sites, because there were no young Upland Hardwoods. The cover type Other was not sampled on any site, because it does not include grouse habitat. Therefore, 11 categories of

Table 1. Vegetation types and dominant tree species within each type sampled on HNF and PRCSF study areas.

| Aspen | Upland Hardwoods | Oaks | Lowland Conifers |
|---|---|---|---|
| quaking aspen (Populus tremuloides) | paper birch (Betula papyrifera) | mixed oaks (Quercus spp.) | northern white-cedar (Thuja occidentalis) |
| bigtooth aspen (Populus grandidentata) | balsam poplar (Populus balsamifera) | | paper birch (Betula papyrifera) |
| | sugar maple (Acer saccharum) | | balsam fir (Abies balsamea) |
| | black cherry (Prunus serotina) | | tamarack (Larix laricina) |
| | white ash (Fraxinus americana) | | black spruce (Picea mariana) |
| | red maple (Acer rubrum) | | |
| | American beech (Fagus grandifolia) | | |
| | mixed hardwoods | | |

| Jack Pine | Pines | Lowland Hardwoods | Other |
|---|---|---|---|
| jack pine (Pinus banksiana) | red pine (Pinus resinosa) | lowland brush | open |
| jack pine/oak (P. banksiana / Quercus spp.) | white pine (Pinus strobus) | marsh | upland brush |
| | eastern hemlock (Tsuga canadensis) | swamp hardwoods | grass |
| | | bog | rock |
| | | | sand dunes |
| | | | water |

vegetation were sampled on the HNF sites and 9 categories were sampled on the PRCSF sites. Ages of all vegetation stands sampled were obtained from forest inventory data sheets provided by the U.S. Forest Service and the Michigan DNR.

Vegetation sampling was based on the Michigan HSI model for ruffed grouse (Hammill and Moran 1986) and incorporated some aspects of a model for predicting nesting habitat of woodland hawks (Mosher et al. 1986). Measurements taken for the ruffed grouse model included: stem densities of deciduous trees, conifers, aspen, and deciduous shrubs; height of deciduous trees and shrubs; height of lowest branch on coniferous trees; and distance from center of stand to nearest winter food source (mature aspen). Variables measured for the woodland hawks nesting habitat model included: log distance to water, log distance to forest opening, canopy height, and number of trees dbh $\geq$ 21 cm.

The Michigan ruffed grouse HSI model is composed of 5 variables ($V_1$-$V_5$). $V_1$ is the equivalent stem density (ESD) of the stand. The ESD is calculated using the equation:

$$ESD = d + 4c + 0.5s,$$

in which d = number of deciduous stems/ha, c = number of conifer stems/ha, and s = number of deciduous shrub stems/ha. $V_2$ is the height of deciduous trees. $V_3$ is the height of lowest conifer branches. $V_4$ is the height of deciduous shrubs. $V_5$ is interspersion, i.e. the distance between the stand and a source of winter food (mature aspen). Deciduous trees are defined as having a woody, single-stemmed growth form and a height $\geq$ 0.9 m. Deciduous shrubs are defined as having a woody, multi-stemmed growth form, a dbh $\leq$ 2.54 cm, and a height $\geq$ 0.9 m. Conifers are defined as having a single-stemmed growth form and a height $\geq$ 0.9 m.

To calculate the HSI for a stand the value for each variable is converted to a suitability index (SI) value using figures provided in the model. The HSI is then calculated from the equation:

$$HSI = SI_1\left[\frac{d(SI_2) + 4c(SI_3) + 0.5s(SI_4)}{d + 4c + 0.5s}\right]SI_5,$$

in which d, c, and s are the same values used in the ESD equation. The model gives the greatest weight equally to the ESD variable ($V_1$) and to the interspersion variable ($V_5$).

The nesting woodland hawks habitat model consists of 2 individual models, an ecological model and a management model. Although it contains fewer variables, Mosher et al. found the management model to be nearly as accurate as the ecological model. Therefore, the management model is the more practical and efficient model to use.

This study used the following variables from the management model to compare paired sites with respect to nesting habitat for woodland hawks: log distance to water, log distance to forest opening, canopy height, number of trees with dbh 21-40 cm, and number of trees with dbh > 41 cm. The variable water was defined as a permanent water source of any size. Forest opening was defined as a break in the stand continuity, such as a clearing, trail, or stream. The geographical location of the 2 study areas and amount of recreational use they receive results in each of them having a large number of roads and trails and permanent water sources. Therefore, the variables water and forest opening were not considered to be limiting to woodland hawks on the sites and were not directly measured.

The model required a minimum value of 10 m for the canopy height variable for a stand to be considered useful to nesting woodland hawks. An average canopy height

value was calculated for each stand sampled using height measurements recorded for trees ≥ 10 m. If there were no tree heights ≥ 10 m recorded for a stand, then that stand received a zero for the average canopy height value. An average canopy height value was calculated for each vegetation category on each site by averaging the values of all stands within the vegetation category. If the average canopy height value for a vegetation category was < 10 m, then that category was noted as having an inadequate average canopy height value. Height measurements were taken of deciduous trees only using a Haga altimeter. Because the density of both medium- and large-sized trees were equally important in the model, the size classes were lumped together for ease of data collection. Stem density was determined for trees with dbh ≥ 21 cm.

Sampling was conducted from May to October 1994 and May to August 1995. Ten to 22 stands of each aspen age class were sampled on each site. Two to 10 stands of all other vegetation types were sampled. The number of stands sampled in a given category depended on how many stands of that type were present on a site. All stands were randomly selected. Three randomly selected plots were used to sample each stand. Plot sizes varied according to vegetation type. However, for a given vegetation type plot size was consistent for paired sites. The number of stands sampled and plot size used for each vegetation type on each site are given in Table 2.

The ruffed grouse HSI was calculated for each stand sampled. An average HSI score was calculated for each vegetation type on each site. One stand sampled in the Old Aspen category in the HNF closed site was not used in the average HSI calculation, because the age of the stand was not precisely known. Three stands sampled in the Old Aspen category in the PRCSF open site and 2 stands in this category in the closed site

Table 2. Number of stands sampled and plot sizes used on HNF and PRCSF areas, 1994 and 1995.

| HNF | | | | PRCSF | | | |
|---|---|---|---|---|---|---|---|
| | No. of stands sampled | | Plot | | No. of stands sampled | | Plot |
| Vegetation type | Open | Closed | size (m) | Vegetation type | Open | Closed | size (m) |
| Young Aspen | 10 | 16 | 2 x 25 | Young Aspen | 19 | 16 | 2 x 25 |
| Medium-Aged Aspen | 18 | 21 | 2 x 25 | Medium-Aged Aspen | 18 | 22 | 2 x 25 |
| Old Aspen | 13 | 20 | 10 x 25 | Old Aspen | 21 | 18 | 10 x 25 |
| Upland Hardwoods | 9 | 10 | 10 x 25 | Upland Hardwoods | 9 | 10 | 10 x 25 |
| Oaks | 8 | 8 | 10 x 25 | Lowland Conifers | 4 | 8 | 4 x 25 |
| Lowland Conifers | 5 | 7 | 10 x 25 | Jack Pine | 7 | 10 | 4 x 25 |
| Young Jack Pine | 3 | 10 | 10 x 25 | Young Pines | 2 | 8 | 4 x 25 |
| Old Jack Pine | 10 | 10 | 10 x 25 | Old Pines | 10 | 10 | 10 x 25 |
| Young Pines | 7 | 8 | 4 x 25 | Lowland Hardwoods | 4 | 4 | 2 x 25 |
| Old Pines | 8 | 7 | 10 x 25 | Total | 94 | 106 | |
| Lowland Hardwoods | 4 | 3 | 2 x 25 | | | | |
| Total | 95 | 120 | | | | | |

were not used in average HSI calculations, because the stands consisted of mixed-aged aspen. In the HNF closed site 1 Upland Hardwoods stand and 1 Old Pines stand were of unknown age, however, these stands were used to calculate average HSI values, because the stands were known to be at least 30 years old. Similarly, in the PRCSF, 1 Young Pines and 2 Old Pines mixed-aged stands in the open site and 2 Young Pines mixed-aged stands in the closed site were used in calculations, because the dominant vegetation was of the assigned category. An overall HSI for each site was calculated by multiplying the average HSI for each vegetation type by the percent area of the vegetation type and summing over all vegetation types on the site.

**Determination of Raptor Populations**

Raptors have been found to be a major predator of ruffed grouse (Eng and Gullion 1962, Marshall and Gullion 1965, Gullion and Marshall 1968, Rusch et al. 1978, Gullion 1981, Bergerud 1985). Therefore, a survey of the raptor population in each of the 4 study sites was conducted.

Based on a review of raptor census work done by Nice and Nice (1921), Craighead and Craighead (1956), Winterbottom (1972), Vian and Bliese (1974), and Bart (1977) the following survey procedure was used in each of the 4 sites. A 45-km fixed route was driven weekly between 9am and 12noon at a speed of 24 km/h. There were 2 observers (the driver and the data recorder) per route. Each person was responsible for observing 1 side of the road, however, each was not restricted to viewing only their designated side. Brief stops and binoculars were used as necessary to identify unknown birds. The number of raptors observed perched and flying during each route was recorded. Whenever possible the species was determined and recorded.

The survey was conducted from mid-May to mid-December in 1994 on all sites, and in 1995 on the PRCSF sites. In 1995 on the HNF sites the survey was terminated in mid-November, because heavy snowfall made roads inaccessible. Due to the effect of weather on raptor behavior, surveys were conducted only during fair weather. Surveys were postponed one day when inclement weather, such as rain or snow showers, occurred on a scheduled survey day.

The collected data were used to create an index of the raptor population on each of the 4 sites. This index was the number of raptors seen per week and was used to compare paired sites with respect to potential predation on grouse by raptors. It should be noted that this survey method did not specifically provide data on the numbers of northern goshawks (Accipiter gentilis) and great horned owls (Bubo virginianus) present on each site. These 2 species are known to be the primary avian predators of ruffed grouse.

**Trapping Grouse**

Grouse were trapped from 1 August to 15 October of each year. The purpose of trapping was to radio-tag approximately 60 birds in each of the 4 study sites.

Grouse were trapped using modified cloverleaf traps (Figure 3). Each trap consisted of: (1) two 15 m leads constructed from poultry wire 46 cm high, (2) 4 funnels made of 2.5 cm square woven light poultry wire on 30x41 cm steel frames, (3) 4 kidney-shaped bodies constructed of either 2.5 cm square heavy poultry wire or 5x10 cm welded wire, and (4) 4 lids made from 2.5 cm square heavy poultry wire on 91x91 cm steel frames.

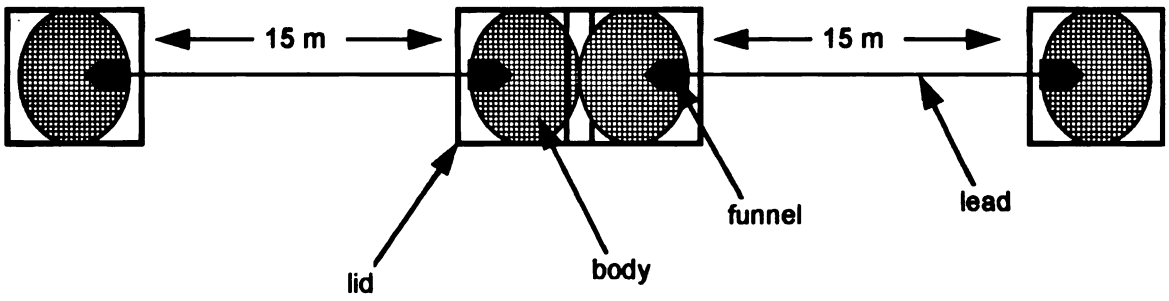



Figure 3. Modified cloverleaf trap, not drawn to scale.

Traps were placed primarily in 10-30-year-old aspen (Populus spp.) stands. These stands were selected during a period of habitat scouting conducted each summer. Older aspen stands and mixed hardwood stands were also used for trapping. Due to the tendency of grouse to travel along edges, traps were positioned perpendicular to stand edges. When it was not possible to place a trap perpendicular to an edge, due to such things as landscape contours or heavy slash being present, the trap was placed parallel to the edge in an attempt to intercept birds moving toward the edge. Traps were also placed parallel to an edge bordering a road if birds were observed crossing the road to enter the stand.

During the trapping period, 1-3 traplines consisting of 12-22 traps were placed in each of the 4 study sites. The exact number of traplines and traps depended on the location of individual traps within each site. Each trap line was monitored by a team of 2 persons. The traps were checked daily. Because the birds are most active just before sunset, the traps were checked during the period 1 hour before sunset to 1 hour after sunset. This minimized the time birds spent in the traps, which reduced the amount of stress and injury sustained by the birds, and it also reduced the risk of predation in the

trap. When traps were checked for birds, minor repairs (e.g., adjusting funnels or lids) were made and any trap requiring major repairs (e.g., wire needing to be reattached to frames) was noted on the data sheet. Major repairs were made on the following day.

The length of time a trap was set in a particular location depended on a combination of several factors. These included: productivity of the trap, location, weather, and how long the trap had already been set in its present location. In general, if a trap had been set for 10 days during fair-good weather and had not caught a bird it was moved. However, if a trap was set in what was considered to be a stand with high trapping potential it may have been left up for longer than 10 days, even if it did not catch a bird within the first 10 days. Traps that were productive, catching birds every 5-10 days, were left up for longer time periods. The time period a trap was set in any location depended ultimately on the researcher's judgment, having considered all factors affecting the traps success or failure.

**Handling Birds**

When birds were caught a standard protocol for handling them and recording data was followed. For each bird trapped the procedure was as follows: (1) a leg band was placed on the bird and its number recorded, (2) weight (to nearest 5 g), gender, age (HY-hatch year or AHY-after hatch year), and wing cord length (to nearest mm) were recorded, (3) if the bird's weight was greater than 350 g, it was fitted with a radio transmitter, (4) the condition of the bird was also noted (e.g., injured by trap). A body weight of 350 g was chosen for radio-tagging, because this ensured that radio transmitters were <5% of a bird's body weight. Transmitters (Lotek Engineering, Inc., Ontario and Advanced Telemetry Systems, Inc., Isanti, Minnesota) were of a collar design, were

equipped with an 8-hour mortality sensor, and weighed 10-12 g. All data were taken as quickly and efficiently as possible to minimize handling time and stress caused to the birds. All trapping , handling, and marking procedures were reviewed and approved by the All-University Committee on Animal Use and Care (AUF # 10/93-400-03).

**Radio Telemetry**

Each grouse fitted with a radio transmitter was tracked starting on the day following capture. Triangulation (White and Garrott 1990) and U.S. Forest Service or Michigan DNR compartment maps were used to determine each bird's location and the vegetation type occupied. Bearings were taken from 2 points to determine the location of each bird. Birds were monitored at least every other day from the time of capture through mid-December. During the winter and early spring (mid-December through April) the birds were tracked weekly. Winter tracking involved determining only general locations of the birds, due to frequent poor weather conditions and many roads on the study sites being inaccessible. From 1 May until the radios ceased functioning the birds were located 3-4 times each week. At this time triangulation was again used to determine more precise locations and cover types occupied.

**Mortality Diagnostics**

As soon as a mortality signal was received from a radio transmitter, the remains of the bird were located and collected. This procedure was followed at all times of the year. The location of the bird and a description of the site were recorded. The site description included such things as: distance to nearest perching tree, standing water, road, or mammal den(s); presence of tracks or raptor whitewash; and vegetation type. At the mortality site any fur, foreign feathers, raptor pellets, and/or scat present were also

collected to aid in determining cause of death. The remains were sent to the Michigan DNR Rose Lake Wildlife Research Area for necropsy. Cause of death was determined when possible.

**Statistical Analysis**

Paired sites were evaluated with regard to quality and quantity of grouse habitat. A Wilcoxon-Mann-Whitney test was used to compare each vegetation type between paired sites based on HSI scores of sampled stands. For this and all other tests, $\alpha = 0.05$. Overall comparability was determined based on the average ruffed grouse HSI score and corresponding amount (ha) of each vegetation type.

Each pair of sites was also evaluated for their comparability of potential predation on grouse by raptors. This was accomplished through the use of the raptor survey data and woodland hawks nesting habitat data collected on each site. A Wilcoxon-Mann-Whitney test was used to compare raptor indices of paired sites within years and of same sites between years.

The Wilcoxon-Mann-Whitney test was used to compare the woodland hawks nesting habitat variables canopy height and stem density within vegetation categories between paired sites. All stands sampled were used in these comparisons. Overall comparison of paired sites was based on calculated averages for each variable in each vegetation category on each site.

A chi-square test was used to compare causes of mortality between paired sites within years and same sites between years. Survival probabilities were calculated for ruffed grouse on each study site using the Kaplan-Meier product limit estimator (Pollock et al. 1989). Actual calculations were carried out using the program KAPLAN ( T. G.

Kulowiec, Missouri Department. of Conservation). The log-rank test was used to compare survival curves of paired sites within years and of same sites between years. Survival curves of paired sites were also compared by gender and by age within years. These comparisons were also done for same sites between years.

# RESULTS

## Vegetation Analysis

Two-hundred-fifteen stands were sampled in the HNF study area and 200 stands were sampled in the PRCSF area. Data collected on each stand are given in Appendix A. The SI values and HSI score calculated for each stand sampled are given in Appendix B.

Michigan Ruffed Grouse HSI Model.--

HSI scores range in value from 0 to 1; quality increases as the HSI score approaches 1. In this study a high quality vegetation category on a site would have an average HSI score $\geq 0.50$.

The quality of grouse habitat within vegetation categories was found to be similar on the 2 HNF sites. Open and closed site average HSI scores for the 3 aspen types were, respectively, 0.22 and 0.14 for Young Aspen, 0.62 and 0.50 for Medium-Aged Aspen, and 0.06 and 0.07 for Old Aspen (Table 3). The open site received a relatively higher average HSI score than the closed site for Young Jack Pine (0.52 vs. 0.16) and a lower average score for Lowland Hardwoods (0.06 vs. 0.22). All other vegetation types received comparable average HSI scores. Results of a Wilcoxon-Mann-Whitney test on HSI values within each vegetation type between the paired sites showed no significant differences at $\alpha = 0.05$ (Table 3).

The quantity (% area) of quality grouse habitat is not equivalent between the HNF

Table 3. Average ruffed grouse HSI and range of HSI values for vegetation categories sampled on HNF and PRCSF areas, 1994 and 1995.

| HNF | | | | | PRCSF | | | | |
|---|---|---|---|---|---|---|---|---|---|
| Vegetation category | Average HSI (range) Open | Closed | Z[a] or $W_x$ | P | Vegetation category | Average HSI (range) Open | Closed | Z[a] or $W_x$ | P |
| Young Aspen | 0.22 (0.00-1.00) | 0.14 (0.00-1.00) | 0[z] | 1.000 | Young Aspen | 0.20 (0.00-0.93) | 0.16 (0.00-0.83) | 0.74[z] | 0.459 |
| Medium-Aged Aspen | 0.62 (0.00-1.00) | 0.50 (0.00-1.00) | 0.95[z] | 0.342 | Medium-Aged Aspen | 0.52 (0.00-1.00) | 0.35 (0.00-1.00) | 1.44[z] | 0.150 |
| Old Aspen | 0.06 (0.00-0.37) | 0.07 (0.00-0.90) | -0.31[z] | 0.757 | Old Aspen | 0.47 (0.00-1.00) | 0.16 (0.00-0.95) | -2.95[z] | 0.003 |
| Upland Hardwoods | 0.19 (0.00-0.52) | 0.06 (0.00-0.49) | 110.50 | 0.095 | Upland Hardwoods | 0.05 (0.00-0.35) | 0.03 (0.00-0.17) | 95.00 | 0.720 |
| Oaks | 0.07 (0.00-0.40) | 0.01 (0.00-0.09) | 66.00 | 1.000 | Lowland Conifers | 0.53 (0.06-0.99) | 0.35 (0.01-0.96) | 30.50 | 0.461 |
| Lowland Conifers | 0.39 (0.00-0.99) | 0.26 (0.00-0.60) | 33.00 | 1.000 | Jack Pine | 0.27 (0.00-0.74) | 0.25 (0.00-0.92) | 69.50 | 0.536 |
| Young Jack Pine | 0.52 (0.09-0.94) | 0.16 (0.00-0.88) | 32.00 | 0.077 | Young Pines | 0.09 (0.02-0.16) | 0.41 (0.00-0.97) | 8.00 | 1.000 |
| Old Jack Pine | 0.04 (0.00-0.18) | 0.01 (0.00-0.07) | 120.00 | 0.280 | Old Pines | 0.19 (0.00-0.49) | 0.21 (0.00-0.97) | 100.50 | 0.739 |
| Young Pines | 0.20 (0.00-0.91) | 0.19 (0.00-0.50) | 52.00 | 1.000 | Lowland Hardwoods | 0.12 (0.00-0.17) | 0.40 (0.00-0.74) | 16.50 | 1.000 |
| Old Pines | 0.02 (0.00-0.08) | 0.10 (0.00-0.63) | 58.50 | 0.779 | | | | | |
| Lowland Hardwoods | 0.06 (0.00-0.11) | 0.22 (0.02-0.56) | 14.00 | 0.629 | | | | | |

[a] Wilcoxon-Mann-Whitney test. Z values are given when $n_1+n_2 > 20$ and are indicated by the superscript Z. $W_x$ values are given when $n1+n2 \leq 20$ and have no superscript. See Table 2 for values for $n_1$ and $n_2$.

open and closed sites. On the open site the categories Medium-Aged Aspen and Young Jack Pine had an average HSI score ≥ 0.50 (Table 3). These 2 vegetation categories comprise 40.9% of the total open site area (Table 4). On the closed site only Medium-Aged Aspen had an average HSI score ≥ 0.50; this category comprises 14.4% of the total closed site area. The quantity of the open and closed site that had an average HSI value ≥ 0.30 was 43.3% and 14.4%, respectively.

Table 4. Vegetation composition (% area) of HNF and PRCSF study areas.

| HNF | | | PRCSF | | |
|---|---|---|---|---|---|
| Vegetation type | Open | Closed | Vegetation type | Open | Closed |
| Young Aspen | 3.5 | 9.0 | Young Aspen | 9.4 | 7.6 |
| Medium-Aged Aspen | 40.4 | 14.4 | Medium-Aged Aspen | 15.4 | 10.1 |
| Old Aspen | 6.8 | 18.6 | Old Aspen | 8.8 | 7.0 |
| Upland Hardwoods | 7.9 | 26.7 | Upland Hardwoods | 23.6 | 19.6 |
| Oaks | 19.2 | 11.5 | Lowland Conifers | 14.7 | 17.4 |
| Lowland Conifers | 2.4 | 0.4 | Jack Pine | 1.7 | 5.6 |
| Young Jack Pine | 0.5 | 6.0 | Young Pines | 0.4 | 3.4 |
| Old Jack Pine | 3.1 | 2.5 | Old Pines | 11.9 | 21.0 |
| Young Pines | 0.7 | 1.2 | Lowland Hardwoods | 7.9 | 4.5 |
| Old Pines | 11.8 | 5.1 | Other | 6.3 | 3.8 |
| Lowland Hardwoods | 1.5 | 0.9 | | | |
| Other | 2.2 | 3.7 | | | |

The overall HSI score for the HNF open site was 0.31 and for the closed site was 0.14. The difference in these values is due to the quantity of quality grouse habitat on the sites. The large amount (40.4% area) of Medium-Aged Aspen on the open site taken in conjunction with its high HSI score of 0.62 is the primary factor responsible for the overall site value of 0.31. The high score of Lowland Conifers (0.39) on the open site is diminished by its low percent area of 2.4%. Likewise, although Young Jack Pine scored 0.52 on the open site it makes up only 0.5% of the site.

On the PRCSF area grouse habitat quality was not equivalent on the sites. The

average HSI scores for Young Pines and Lowland Hardwoods were substantially greater on the closed than on the open site (Table 3). The open site had greater average scores for Medium-Aged Aspen, Old Aspen, and Lowland Conifers than did the closed site. All other vegetation categories on the sites received similar average HSI scores. HSI scores for stands in the Old Aspen category were significantly different between the open and closed sites ($P < 0.01$) (Table 3). On the open site the average HSI score for Old Aspen (0.47) was similar to the score for Medium-Aged Aspen (0.52). This was due to the high density of young deciduous and coniferous trees present on most of the Old Aspen stands sampled on the open site. On 5 of the 18 sampled stands these densities caused the stands to receive a stem density SI of 1.0. On the closed site, only 2 of 16 Old Aspen stands received a stem density SI of 1.0. These were both due to the presence of a high density of young conifers.

The quantity (% area) of quality grouse habitat on the PRCSF open site is not equivalent to that on the closed site. On the open site the categories Medium-Aged Aspen and Lowland Conifers had an average HSI score $\geq 0.50$ (Table 3). These categories make up 30.1% of the total open site area (Table 4). There was no vegetation category on the closed site that had an average HSI score $\geq 0.50$. However, the quantity of the open and closed site that had an average HSI score $\geq 0.30$ was 38.9% and 35.4%, respectively. These values are comparable.

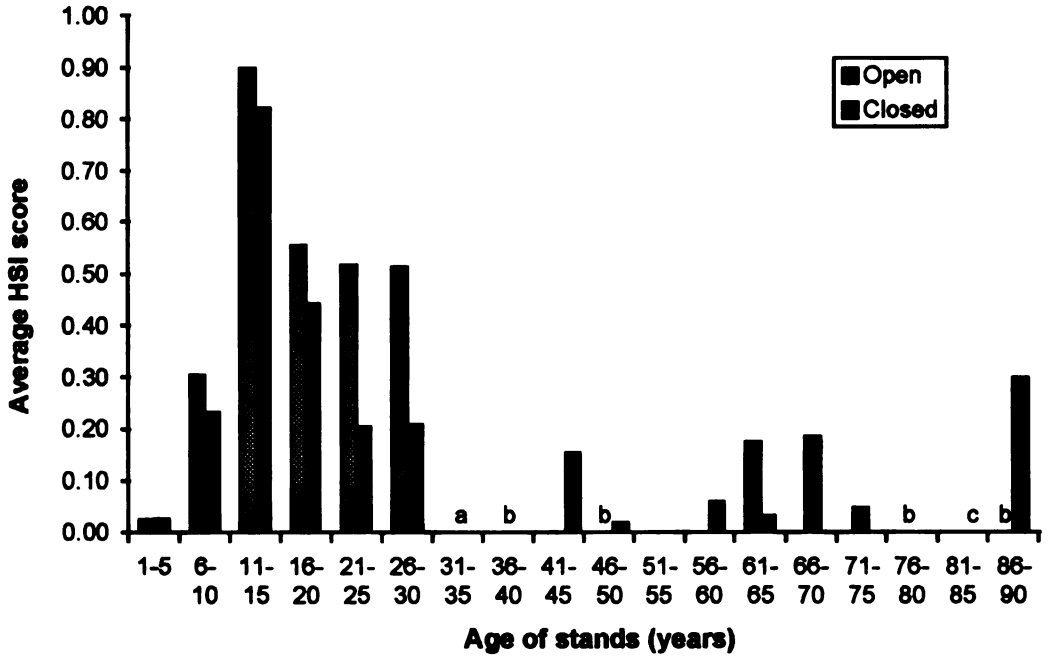
The overall HSI score for the PRCSF open site was 0.27 and for the closed site was 0.21. There are 2 primary reasons for the open site receiving a slightly higher overall score. The first is the significantly greater average HSI for Old Aspen on the open site.

The second is a combination of the percent area and average HSI value for Medium-Aged Aspen on the open site. The open site contained approximately 1/3 more Medium-Aged Aspen than did the closed and the HSI score for Medium-Aged Aspen on the open site was greater than on the closed. Although there are differences within the vegetation categories between the 2 sites, the overall HSI scores are similar.

Because aspen is the vegetation type of primary importance to ruffed grouse in Michigan, the quality of aspen as grouse habitat was examined in more detail than the other vegetation types. Sampled aspen stands were divided into 5 year age classes. An average HSI score was calculated for each age class on each site.

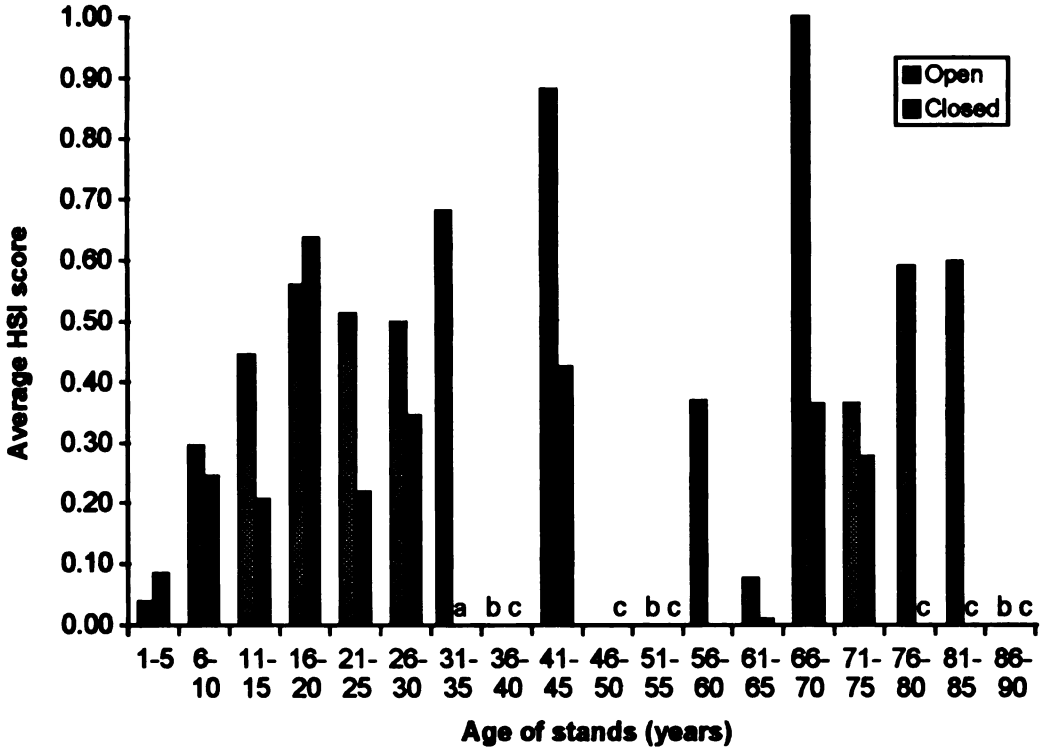
On the 2 HNF sites 1-20 year old aspen stands sampled in 5-year age classes had similar average HSI scores within age categories (Figure 4). Age classes 21 to 30 years old on the open site had substantially greater average HSI scores than did those on the closed site. Average HSI scores for aspen on the open and closed site followed a similar trend. Average HSI scores increased from age class 1-5 years old to age class 11-15 years old. From age 16 to 30 average HSI scores decreased. After age 30 the scores were sporadically distributed. Average HSI scores of zero on the open and closed sites were due to stands within the given age class having a stem density SI value of zero. On the closed site an 88-year-old stand had a high HSI, because it is succeeding to a conifer stand. There was a large number of young conifers present, which resulted in the stand receiving a high SI value for stem density.

For the PRCSF open and closed sites, plots of average HSI score versus age of aspen sampled do not follow any trend (Figure 5). Stands with high HSI scores are




a Unless otherwise noted, blank values had an average HSI score of 0.00.
b No stands of this age class were present on the open site.
c No stands of this age class were present on the closed site.

Figure 4. Average ruffed grouse HSI score by age of aspen stands on HNF, 1994 and 1995.




a Unless otherwise noted, blank values had an average HSI score of 0.00.
b No stands of this age class were present on the open site.
c No stands of this age class were present on the closed site.

Figure 5. Average ruffed grouse HSI score by age of aspen stands on PRCSF, 1994 and 1995.

distributed across all age classes, as are stands with low scores. Average HSI scores of 0 for age classes on both sites are due to stands having a stem density SI value ≤ 0.02.

Woodland Hawks Nesting Habitat Model.--

Titus and Mosher (1981) found that woodland hawks nested in habitat with an average medium- and large-sized tree density of 8-148 stems/ha and a canopy height ≥15 m. Based on these reported values and the vegetation data collected, the HNF open and closed sites are comparable in habitat quality for nesting woodland hawks. In some of the vegetation categories one site attained an adequate value for a variable while the other site did not (Table 5). However, there was no vegetation category that met both the stem density and canopy height requirements for either site. Results of a Wilcoxon-Mann-Whitney test showed a significant difference between sites for average stem density ($P = 0.0348$) and average canopy height ($P = 0.0094$) in the Young Pines category. In this category, the open site had an adequate average canopy height value, while the closed site did not. Although there was a significant difference between the sites for average stem density, both the open and closed sites had a poor average stem density value.

The PRCSF sites are also comparable in woodland hawks nesting habitat. There was no vegetation category on either site that received an adequate value for both variables (Table 6). The canopy height variable in the Upland Hardwoods category was significantly different between the open and closed sites. This difference did not effect the comparability of the sites, because both sites received a canopy height value greater than 15 m, which was found by Titus and Mosher to be a requirement of nesting woodland hawks.

Table 5. Nesting woodland hawks habitat analysis variables, HNF area 1994 and 1995.

| Vegetation category | Average medium- and large-sized tree density (no. of stems dbh ≥ 21 cm/ha) | | | Average canopy height for deciduous trees ≥ 10 m | | |
|---|---|---|---|---|---|---|
| | Open | Closed | P value[a] | Open | Closed | P value[a] |
| Young Aspen | 20 | 0 | 0.465 | –[b] | – | 0.484 |
| Medium-Aged Aspen | 6 | 39 | 0.080 | 12 | 14 | 0.159 |
| Old Aspen | 1009 | 777 | 0.660 | 20 | 18 | 0.131 |
| Upland Hardwoods | 658 | 764 | 0.653 | 19 | 19 | 0.741 |
| Oaks | 1090 | 460 | 0.234 | 15 | 14 | 0.721 |
| Lowland Conifers | 624 | 297 | 0.343 | 15 | 10 | 0.343 |
| Young Jack Pine | 0 | 28 | 1.000 | – | – | 1.000 |
| Old Jack Pine | 656 | 436 | 0.393 | – | – | 0.912 |
| Young Pines | 786 | 413 | 0.035 | 15 | – | 0.009 |
| Old Pines | 1020 | 789 | 0.352 | 15 | 15 | 0.478 |
| Lowland Hardwoods | 350 | 67 | 1.000 | – | 12 | 1.000 |

[a] P values from Wilcoxon-Mann-Whitney test on stands sampled.

[b] Average canopy height for deciduous trees was inadequate (i.e., <10 m).

Table 6. Nesting woodland hawks habitat analysis variables, PRCSF area 1994 and 1995.

| Vegetation category | Average medium- and large-sized tree density (no. of stems dbh ≥ 21 cm/ha) | | | Average canopy height for deciduous trees ≥ 10 m | | |
|---|---|---|---|---|---|---|
| | Open | Closed | P value[a] | Open | Closed | P value[a] |
| Young Aspen | 0 | 8 | 0.119 | –[b] | – | 0.289 |
| Medium-Aged Aspen | 41 | 99 | 0.407 | 11 | – | 0.818 |
| Old Aspen | 208 | 193 | 0.465 | 15 | 16 | 0.562 |
| Upland Hardwoods | 295 | 243 | 0.308 | 20 | 17 | 0.006 |
| Lowland Conifers | 350 | 188 | 0.109 | 11 | 11 | 1.000 |
| Jack Pine | 176 | 150 | 0.536 | – | – | 0.887 |
| Young Pines | 183 | 83 | 0.147 | – | – | 0.516 |
| Old Pines | 244 | 266 | 0.739 | 10 | 12 | 0.912 |
| Lowland Hardwoods | 183 | 133 | 1.000 | 11 | – | 0.486 |

[a] P values from Wilcoxon-Mann-Whitney test on stands sampled.

[b] Average canopy height for deciduous trees was inadequate (i.e., <10 m).

**Raptor Surveys**

The survey was conducted in the HNF area for 29 weeks in 1994 and 27 weeks in 1995. In the PRCSF area the survey was carried out for 30 weeks in 1994 and 31 weeks in 1995. On the 2 study areas 10 species of raptors were identified (Table 7). Survey data collected on each site are given in Appendix C.

On the HNF in 1994 the number of raptors observed on the open site was 51 ($\bar{x}$ = 1.76 raptors/week) and on the closed site was 44 ($\bar{x}$ = 1.52 raptors/week). In 1995 on the open site 65 raptors were observed ($\bar{x}$ = 2.41 raptors/week) and 64 were seen on the closed site ($\bar{x}$ = 2.37 raptors/week). No significant differences were detected between paired site indices within years or same site indices between years by the Wilcoxon-Mann-Whitney test (Table 8). Based on the collected data the HNF open and closed sites are comparable in raptor numbers.

On the PRCSF in 1994 25 raptors were observed on the open site ($\bar{x}$ = 0.83 raptors/week) and 29 were seen on the closed site ($\bar{x}$ = 0.97 raptors/week). In 1995 on the open site 25 raptors were observed ($\bar{x}$ = 0.81 raptors/week) and on the closed site 5 were seen ($\bar{x}$ = 0.16 raptors/week). Results of a Wilcoxon-Mann-Whitney test show a significant difference between the open and closed sites in 1995 and between the closed site in 1994 and 1995 (Table 8). These differences are due to the small number of raptors observed on the closed site in 1995.

Table 7. Raptor species identified and numbers seen on survey routes on HNF and PRCSF study areas, 1994 and 1995.

| Species | | No. seen | | | | | | | | Total by species |
|---|---|---|---|---|---|---|---|---|---|---|
| | | 1994 | | | | 1995 | | | | |
| | | HNF | | PRCSF | | HNF | | PRCSF | | |
| | | Open | Closed | Open | Closed | Open | Closed | Open | Closed | |
| Sharp-shinned Hawk | (Accipiter striatus) | 2 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 4 |
| Cooper's Hawk[a] | (Accipiter cooperii) | 1 | 1 | 0 | 0 | 8 | 3 | 0 | 0 | 13 |
| Northern Goshawk[a] | (Accipiter gentilis) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Red-tailed Hawk | (Buteo jamaicensis) | 6 | 17 | 3 | 4 | 11 | 20 | 2 | 2 | 65 |
| Red-shouldered Hawk | (Buteo lineatus) | 0 | 0 | 4 | 1 | 0 | 2 | 0 | 0 | 7 |
| Broad-winged Hawk | (Buteo platypterus) | 17 | 3 | 2 | 2 | 3 | 12 | 2 | 0 | 41 |
| American Kestrel | (Falco sparverius) | 1 | 3 | 0 | 0 | 2 | 4 | 0 | 1 | 11 |
| Northern Harrier | (Circus cyaneus) | 0 | 1 | 0 | 3 | 3 | 0 | 2 | 0 | 9 |
| Bald Eagle | (Haliaeetus leucocephalus) | 0 | 0 | 0 | 0 | 3 | 0 | 0 | 0 | 3 |
| Barred Owl[a] | (Strix varia) | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| Species Unknown | | 24 | 19 | 16 | 18 | 33 | 22 | 19 | 2 | 153 |
| | Total by site | 51 | 44 | 25 | 29 | 65 | 64 | 25 | 5 | |

[a] Species most likely to prey on ruffed grouse.

Table 8. Wilcoxon-Mann-Whitney test on raptor indices of HNF and PRCSF open and closed sites, 1994 and 1995.

| | HNF | | PRCSF | |
|---|---|---|---|---|
| Indices tested | Z | P value | Z | P value |
| open 1994 vs. closed 1994 | -0.32 | 0.749 | 0.02 | 0.984 |
| open 1995 vs. closed 1995 | -0.07 | 0.944 | -3.47 | 0.001 |
| open 1994 vs. open 1995 | 1.48 | 0.139 | -0.31 | 0.757 |
| closed 1994 vs. closed 1995 | 1.67 | 0.095 | 3.12 | 0.002 |

## Trapping

A daily record of the number of traps set and grouse caught on each site each year is given in Appendix D. In 1993 the trapping rate on the HNF open site was 1 grouse/27 trap nights; on the closed site the rate was 1 grouse/26 trap nights. On the PRCSF open site in 1993 the trapping rate was 1 grouse/30 trap nights; on the closed site the rate was 1 grouse/40 trap nights. In 1994 the trapping rate increased on the HNF sites. The rate on the open site was 1 grouse/12 trap nights and on the closed site was 1 grouse/17 trap nights. On the PRCSF sites in 1994 the trapping rate was similar to the 1993 rate. The open site had a rate of 1 grouse/29 trap nights and the closed site had a rate of 1 grouse/37 trap nights. The increased trapping rate on the HNF sites in 1994 is believed to be primarily due to an increase in the local grouse population.

Data collected on all radio-tagged and banded birds are given in Appendix E. Included in these tables is 1 bird trapped on the HNF closed site in 1993 that was recaptured on the closed site by night-lighting on 3 October 1994. At that time the radio transmitter was replaced and the bird was added to the 1994 data set. In addition, 1 bird trapped on the PRCSF open site in 1993 and 2 birds trapped on the PRCSF closed site in 1993 were alive with functioning transmitters at the start of the 1994 trapping season.

These 3 birds were used in the 1994 data set independently from the 1993 data set. It should be noted that during the spring of 1994 1 bird on the HNF closed site and 1 bird on the PRCSF closed site were recaptured on nest to replace their radio transmitters. During the spring and summer of 1995 11 birds on the HNF open site, 5 birds on the HNF closed site, and 3 birds on the PRCSF closed site were recaptured on nest or by night-lighting to replace their radio transmitters.

Data were not collected on every trapped grouse. Five birds escaped while being removed from a trap and 2 were immediately released due to their being severely injured by the trap. Five grouse were euthanized due to their sustaining extreme injuries. Also, 11 birds were found dead or partially eaten in traps. The number of trapped birds that were radio-tagged, banded only, or unable to be used in the study for one of the above reasons are given in Table 9. Birds that were banded only include those that weighed <350 g, were injured by the trap, or were trapped after all the radio transmitters had been put into use. In 1993 56 of the grouse trapped on the HNF area and 64 on the PRCSF area were radio-tagged. In 1994 144 of the grouse trapped on the HNF area and 89 on the PRCSF area were radio-tagged.

Some grouse were trapped more than one time. In this study the number trapped given in tables represents the number of individual birds caught, and, therefore, does not include recaptured birds. Of the 51 grouse trapped in 1993 on the HNF closed site 4 (1 AHY, 3 HY) were recaptured. Of the 42 birds trapped on the PRCSF open site in 1993 5 (2 AHY, 3 HY) were recaptured; on the closed site 1 (AHY) of the 32 grouse trapped was recaptured. Of the 106 birds trapped on the HNF open site in 1994 12 (2 AHY, 10

HY) were recaptured and on the closed site 10 (3 AHY, 7 HY) of the 89 grouse were recaptured. In 1994 on the PRCSF open site 7 (3 AHY, 4 HY) of the 56 birds were caught a second time and on the closed site 5 (2 AHY, 2 HY, 1 UNK) of the 47 grouse were recaptured.

Table 9. Trapping results for HNF and PRCSF areas, 1993 and 1994.

| | 1993 | | | |
|---|---|---|---|---|
| | HNF | | PRCSF | |
| | Open | Closed | Open | Closed |
| No. trapped | 37 | 51 | 42 | 32 |
| No. radio-tagged | 20 | 36 | 36 | 28 |
| No. banded only | 17 | 10 | 2 | 2 |
| No. escaped | 0 | 1 | 0 | 0 |
| No. released | 0 | 0 | 2 | 0 |
| No. euthanized | 0 | 2 | 2 | 0 |
| No. dead in trap | 0 | 2 | 0 | 2 |

| | 1994 | | | |
|---|---|---|---|---|
| | HNF | | PRCSF | |
| | Open | Closed | Open | Closed |
| No. trapped | 106 | 89 | 56 | 47 |
| No. radio-tagged | 74 | 70 | 47 | 42 |
| No. banded only | 27 | 15 | 7 | 4 |
| No. escaped | 2 | 1 | 1 | 0 |
| No. released | 0 | 0 | 0 | 0 |
| No. euthanized | 0 | 1 | 0 | 0 |
| No. dead in trap | 3 | 2 | 1 | 1 |

## Sex and Age Ratios

The age-sex class distribution of radio-tagged and banded only grouse on each site in each year is given in Table 10. The sex ratio of birds trapped on each site each year was approximately 1:1. However, the number of male versus female grouse trapped on the HNF closed site in 1994 was significantly different ($X^2 = 4.25$, $P = 0.0393$).

The ratio of adults (AHY) to juveniles (HY) on the study areas varied greatly. On the HNF sites the ratio favored juveniles in 1993 and 1994. In both years the ratio on the

Table 10. Age-sex class distribution of ruffed grouse trapped on HNF and PRCSF areas, 1993 and 1994.

| | 1993 | | | |
|---|---|---|---|---|
| | HNF | | PRCSF | |
| Age/Sex | Open | Closed | Open | Closed |
| AHY/M | 2 | 7 | 11 | 13 |
| AHY/F | 7 | 8 | 9 | 7 |
| AHY/UNK | 0 | 0 | 0 | 0 |
| HY/M | 13 | 6 | 6 | 3 |
| HY/F | 5 | 12 | 11 | 7 |
| HY/UNK | 7 | 8 | 1 | 0 |
| UNK/M | 0 | 3 | 0 | 0 |
| UNK/F | 3 | 2 | 0 | 0 |
| Sex ratio (M:F) | 1:1 | 1:1.4 | 1:1.2 | 1:0.9 |
| Age ratio (AHY:HY) | 1:2.8 | 1:1.7 | 1:0.9 [a] | 1:0.5 [a] |

| | 1994 | | | |
|---|---|---|---|---|
| | HNF | | PRCSF | |
| Age/Sex | Open | Closed | Open | Closed |
| AHY/M | 10 | 20 | 15 | 13 |
| AHY/F | 9 | 11 | 8 | 10 |
| AHY/UNK | 0 | 0 | 1 | 2 |
| HY/M | 32 | 31 | 13 | 4 |
| HY/F | 39 | 22 | 12 | 11 |
| HY/UNK | 9 | 1 | 3 | 2 |
| UNK/M | 1 | 1 | 1 | 4 |
| UNK/F | 1 | 0 | 1 | 2 |
| Sex ratio (M:F) | 1:1.1 | 1:0.6 [a] | 1:0.7 | 1:1.1 |
| Age ratio (AHY:HY) | 1:4.2 [a] | 1:1.7 | 1:1.2 [a] | 1:0.7 [a] |

[a] Significant difference from a 1:1 sex ratio for M:F or 1:2 age ratio for AHY:HY detected by the chi square test at $\alpha = 0.05$.

open site was skewed toward juveniles more so than the ratio on the closed site. In 1994 on the HNF open site the number of juveniles was significantly greater than the number of adults ($X^2 = 8.91$, $P = 0.0028$). The age ratio on the PRCSF open site favored adults in 1993 and juveniles in 1994. The numbers of adults and juveniles on the open site were significantly different in 1993 ($X^2 = 6.3$, $P = 0.0116$) and 1994 ($X^2 = 3.89$, $P = 0.0499$). The age ratio on the PRCSF closed site favored adults in 1993 and 1994. The numbers of adults and juveniles on the closed site were significantly different in 1993 ($X^2 = 15.0$, $P = 0.0001$) and 1994 ($X^2 = 12.96$, $P = 0.0003$). An age ratio of 1:2 was used for comparisons based on the findings of Palmer and Bennett (1963) and Fischer and Keith (1974).

**Year-end Status of Radio-tagged Grouse**

Because birds were trapped from August to October of each year, the 1993 study year is the period 5 August 1993 to 4 August 1994 and the 1994 year is the period 5 August 1994 to 4 August 1995. The status of radio-tagged grouse at the end of each year of the study is given in Table 11. In 1993 on the HNF 95% of the grouse radio-tagged on the open site and 83% of the birds radio-tagged on the closed site were known to have died. On the PRCSF in 1993 64% of the birds on the open site and 50% of the birds on the closed site were known to have died. In 1994 on the HNF area 59% of the birds radio-tagged on the open site and 65% of the birds on the closed site were known to have died. On the PRCSF in 1994 48% of the birds on the open site and 45% of the birds on the closed site were known to have died. Censored observations on each site in each year are primarily due to premature radio failures and signals lost at a point in time beyond the

Table 11. End of year status for radio-tagged ruffed grouse on HNF and PRCSF areas in 1993 and 1994.

| | 1993 | | | |
|---|---|---|---|---|
| | HNF | | PRCSF | |
| | Open | Closed | Open | Closed |
| No. of grouse radio-tagged | 20 | 36 | 36 | 28 |
| Status on 4 August 1994: | | | | |
| Alive | 0 | 1 | 2 | 4 |
| Mortality | 19 | 30 | 23 | 14 |
| Censored | 1 | 5 | 11 | 10 |
| Time[a] | 0 | 2 | 2 | 4 |
| Radio failure[b] | 1 | 2 | 3 | 5 |
| Transmitter lost/removed[c] | 0 | 0 | 2 | 0 |
| Unknown[d] | 0 | 1 | 4 | 1 |

| | 1994 | | | |
|---|---|---|---|---|
| | HNF | | PRCSF | |
| | Open | Closed | Open | Closed |
| No. of grouse radio-tagged | 74 | 71 | 48 | 44 |
| Status on 4 August 1995: | | | | |
| Alive | 21 | 11 | 4 | 8 |
| Mortality | 44 | 46 | 23 | 20 |
| Censored | 9 | 14 | 21 | 16 |
| Time | 4 | 2 | 3 | 3 |
| Radio failure | 3 | 8 | 4 | 4 |
| Transmitter lost/removed | 0 | 0 | 2 | 3 |
| Unknown | 2 | 4 | 12 | 6 |

[a] Transmitters lasting >8 months before censoring occurred.

[b] Transmitters that sent a false mortality signal or interference only and those disappearing within 2 months of a bird's capture date.

[c] Transmitters that fell off within 1 week of a bird's capture date and those that were removed when a bird was recaptured due to the bird being injured.

[d] Includes transmitters that were censored after 6 months of use.

expected life of the transmitter batteries (Table 11).

**Sources of Mortality**

Ruffed grouse mortalities on the HNF and PRCSF areas were assigned to 1 of 7 sources. Mortality sources identified on the areas were Avian Predation, Mammalian Predation, Hunting, Trauma, Disease/Malnutrition, Stress, and No Diagnosis. Hunting includes birds that were retrieved by hunters, as well as those that died of gunshot wounds and were collected by project field personnel. Trauma includes deaths due to drowning, suffocation (e.g., by an acorn), and collisions with automobiles or houses. This source also includes deaths due to unknown causes of trauma. Pneumonia was the only identified Disease. Stress is composed of deaths that occurred within 5 days of capture and are thought to be solely due to trapping stress. The source No Diagnosis is composed of deaths due to unidentified factors (e.g., when a radio was found with no teeth/mandible marks on it and no remains of the bird were present).

Avian Predation was the greatest cause of grouse mortality on the HNF and PRCSF areas in 1993 and on PRCSF in 1994 (Table 12). The HNF open site in 1994 was the only site and year combination in which Mammalian Predation was greater than Avian Predation. For this site and year the number of mortalities due to Mammalian Predation was 1 greater than the number due to Avian Predation. Avian Predation accounted for 23%-65% of the mortalities on the 4 sites in 1993 and 1994.

Mammalian predators took a substantially smaller number of birds than did avian predators on HNF and PRCSF areas in 1993 and PRCSF in 1994. On the HNF area in 1994 Mammalian Predation accounted for 3.5 times the number of mortalities due to

Mammalian Predation in 1993. This change may be due at least in part to the increased sample size on the HNF in 1994. Although the number of mortalities due to Mammalian Predation tripled on the HNF area in 1994, the percent of deaths due to Mammalian Predation in 1994 was roughly twice that of 1993, 23% and 12%, respectively. The sources Trauma, Disease/Malnutrition, Stress, and No Diagnosis individually accounted for less than 22% of the mortalities on all sites.

Table 12. Distribution of ruffed grouse mortalities by source on HNF and PRCSF areas, 1993 and 1994.

| | No. of grouse mortalities | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1993 | | | | 1994 | | | |
| Source of | HNF | | PRCSF | | HNF | | PRCSF | |
| mortality | Open | Closed | Open | Closed | Open | Closed | Open | Closed |
| Avian Predation | 9 | 16 | 10 | 4 | 10 | 20 | 9 | 13 |
| Mammalian Predation | 3 | 3 | 3 | 4 | 11 | 10 | 2 | 2 |
| Hunting[a] | 3 | 0 | 6 | 0 | 6 | 0 | 5 | 0 |
| Trauma[b] | 2 | 1 | 2 | 1 | 4 | 1 | 3 | 1 |
| Disease/Malnutrition | 1 | 0 | 1 | 1 | 3 | 6 | 0 | 0 |
| Stress[c] | 0 | 5 | 1 | 3 | 6 | 3 | 2 | 0 |
| No Diagnosis | 1 | 5 | 0 | 1 | 4 | 6 | 2 | 4 |
| Total | 19 | 30 | 23 | 14 | 44 | 46 | 23 | 20 |

[a] Birds that died of gunshot wounds and were retrieved by hunters or collected by project field personnel.
[b] Includes deaths due to such things as: drowning and collisions with automobiles or houses.
[c] Deaths within 5 days of capture that were thought to be solely due to trapping stress.

Hunting accounted for a small amount of grouse mortality on the HNF open site in 1993 and 1994, 16% and 14%, respectively. On the PRCSF open site Hunting was the second greatest cause of grouse mortality. In 1993 Hunting was responsible for 26% of the PRCSF open site mortalities, and for 22% in 1994. Although Hunting was second to Avian Predation in number of mortalities on the PRCSF open site, the number of Hunting

mortalities was roughly ½ the number of avian mortalities. On the HNF open site the percents of radio-tagged grouse harvested in 1993 and 1994 were 15% and 8%, respectively. On the PRCSF open site the percents of radio-tagged birds harvested in 1993 and 1994 were 17% and 10%, respectively.

Because Hunting was not a source of mortality on the closed sites, only non-hunting mortality sources were used for comparisons of paired sites within years and same sites between years. Three categories of non-hunting mortality were defined; they were Avian Predation, Mammalian Predation, and Other. The mortality sources Trauma, Disease/Malnutrition, and No Diagnosis were combined into the category Other. With 3 exceptions, birds that died within 5 days of capture were removed from the data set prior to analysis. Three grouse (1 on the PRCSF closed site in 1993, 1 on the HNF open site in 1994, and 1 on the HNF closed site in 1994) that died within 5 days after being recaptured and having their radio transmitters replaced were not removed from the data set. It is assumed that the procedure of recapture and transmitter replacement did not have an effect on them, since this procedure was performed on 19 other grouse without effecting their behavior or survival. Two birds that died 6 days after capture on the PRCSF open site in 1994 were removed from the data set, because their deaths were caused by their radio collars twisting and choking them. The number of grouse mortalities in each category that were used in further analyses are given in Table 13.

The 3 categories of non-hunting mortality were compared between paired sites within years and same sites between years using a chi-square test. The comparisons of HNF open 1994 vs. closed 1994 ($X^2 = 2.67$, $P = 0.2634$) and HNF closed 1993 vs. closed

1994 ($X^2 = 1.63$, $P = 0.4429$) were the only 2 that had ≤20% of their expected frequencies <5. In all comparisons no significant differences were detected. However, because the chi-square requirement that expected frequencies not be too small was not met by all the comparisons, most of the results cannot be meaningfully interpreted. To produce reliable results the category Mammalian Predation was combined with the category Other. This combination was based on the knowledge that avian predation is a primary cause of grouse mortality and that in this study Avian Predation was the greatest cause of grouse mortality.

**Table 13. Categories and numbers[a] of non-hunting grouse mortalities used in analysis of HNF and PRCSF areas, 1993 and 1994.**

| | No. of grouse mortalities | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1993 | | | | 1994 | | | |
| | HNF | | PRCSF | | HNF | | PRCSF | |
| Category | Open | Closed | Open | Closed | Open | Closed | Open | Closed |
| Avian Predation | 9 | 15 | 10 | 4 | 10 | 19 | 9 | 13 |
| Mammalian Predation | 2 | 3 | 2 | 3 | 10 | 7 | 2 | 1 |
| Other | 4 | 4 | 3 | 3 | 10 | 11 | 3 | 4 |
| Total | 15 | 22 | 15 | 10 | 30 | 37 | 14 | 18 |

[a] Excluding birds that died within 5 days of capture.

A chi-square test was used for all comparisons except PRCSF open 1993 vs. closed 1993 and PRCSF closed 1993 vs. closed 1994. For these 2 comparisons the Fisher Exact test was used. The results of the tests are given in Table 14. No significant differences were detected in any comparison.

Data from paired sites were pooled within years to examine seasonal trends in sources of non-hunting mortality, since no significant differences had been found between paired sites. The 4 seasons were defined as follows: autumn, 5 August-30 November;

winter, 1 December-28 February; spring, 1 March-31 May; and summer, 1 June-4 August. The number of non-hunting mortalities that occurred in each season by category, area, and year and the number of birds at risk in each season are given in Table 15.

Table 14. Comparison of the non-hunting mortality categories Avian Predation and Other between paired sites and same sites on HNF and PRCSF areas, 1993 and 1994.

| | HNF | | PRCSF | |
|---|---|---|---|---|
| Comparison | $X^2$ | P value | $X^2$ | P value |
| Avian Predation and Other compared between: | | | | |
| open 1993 and closed 1993 | 0.03 | 0.872 | -- | 0.183 [a] |
| open 1994 and closed 1994 | 1.52 | 0.218 | 0.01 | 0.923 |
| open 1993 and open 1994 | 1.92 | 0.165 | 0.07 | 0.798 |
| closed 1993 and closed 1994 | 0.99 | 0.321 | -- | 0.103 [a] |

[a] P value from Fisher Exact test.

On the HNF area in 1993 the amount of non-hunting mortality per season increased steadily from autumn to summer (Figure 6). In 1994 the amount of non-hunting mortality was fairly stable, around 23%, from autumn to spring, then it decreased to 10% in summer. On the PRCSF the greatest amount of non-hunting mortality occurred during winter in 1993 and 1994 (Figure 7). Non-hunting mortality on PRCSF increased from autumn to winter then decreased to summer. There was no mortality during summer on the PRCSF in 1993 and 1994. There having been only 3 birds at risk in summer 1993 on the HNF may be the cause for the high percent of mortality in summer 1993.

With only 2 exceptions Avian Predation was the greatest cause of mortality in all seasons on both areas. On HNF in 1994 the percent mortality due to Avian Predation was slightly less than that due to Other in autumn (9% vs. 10%) and was less than Mammalian

Table 15. Number of non-hunting grouse mortalities and birds at risk by season on HNF and PRCSF areas, 1993 and 1994.

| | 1993 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HNF | | | | | PRCSF | | | | |
| | | No. of mortalities | | | | | No. of mortalities | | | |
| Season | No. at risk | Avian Predation | Mammalian Predation | Other | Total | No. at risk | Avian Predation | Mammalian Predation | Other | Total |
| Autumn | 47 | 10 | 3 | 1 | 14 | 54 | 7 | 1 | 4 | 12 |
| Winter | 28 | 8 | 0 | 5 | 13 | 34 | 6 | 3 | 2 | 11 |
| Spring | 14 | 5 | 2 | 1 | 8 | 16 | 1 | 1 | 0 | 2 |
| Summer | 3 | 1 | 0 | 1 | 2 | 11 | 0 | 0 | 0 | 0 |

| | 1994 | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|
| | HNF | | | | | PRCSF | | | | |
| | | No. of mortalities | | | | | No. of mortalities | | | |
| Season | No. at risk | Avian Predation | Mammalian Predation | Other | Total | No. at risk | Avian Predation | Mammalian Predation | Other | Total |
| Autumn | 128 | 11 | 5 | 13 | 29 | 82 | 7 | 2 | 4 | 13 |
| Winter | 84 | 10 | 4 | 3 | 17 | 46 | 12 | 0 | 1 | 13 |
| Spring | 62 | 6 | 7 | 4 | 17 | 24 | 3 | 1 | 2 | 6 |
| Summer | 40 | 2 | 1 | 1 | 4 | 15 | 0 | 0 | 0 | 0 |

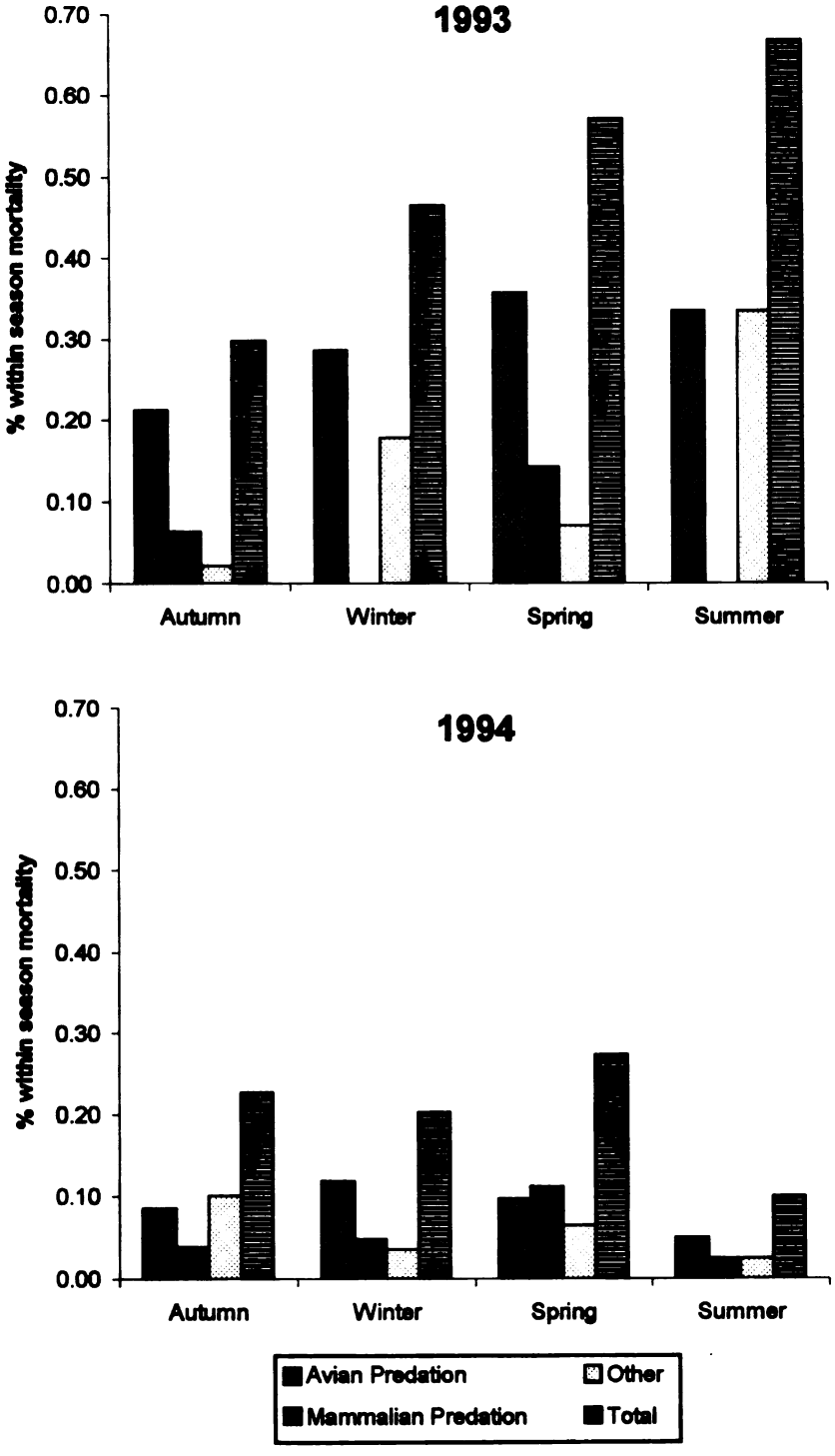



Figure 6. Percent within season non-hunting mortality on HNF, 1993 and 1994.

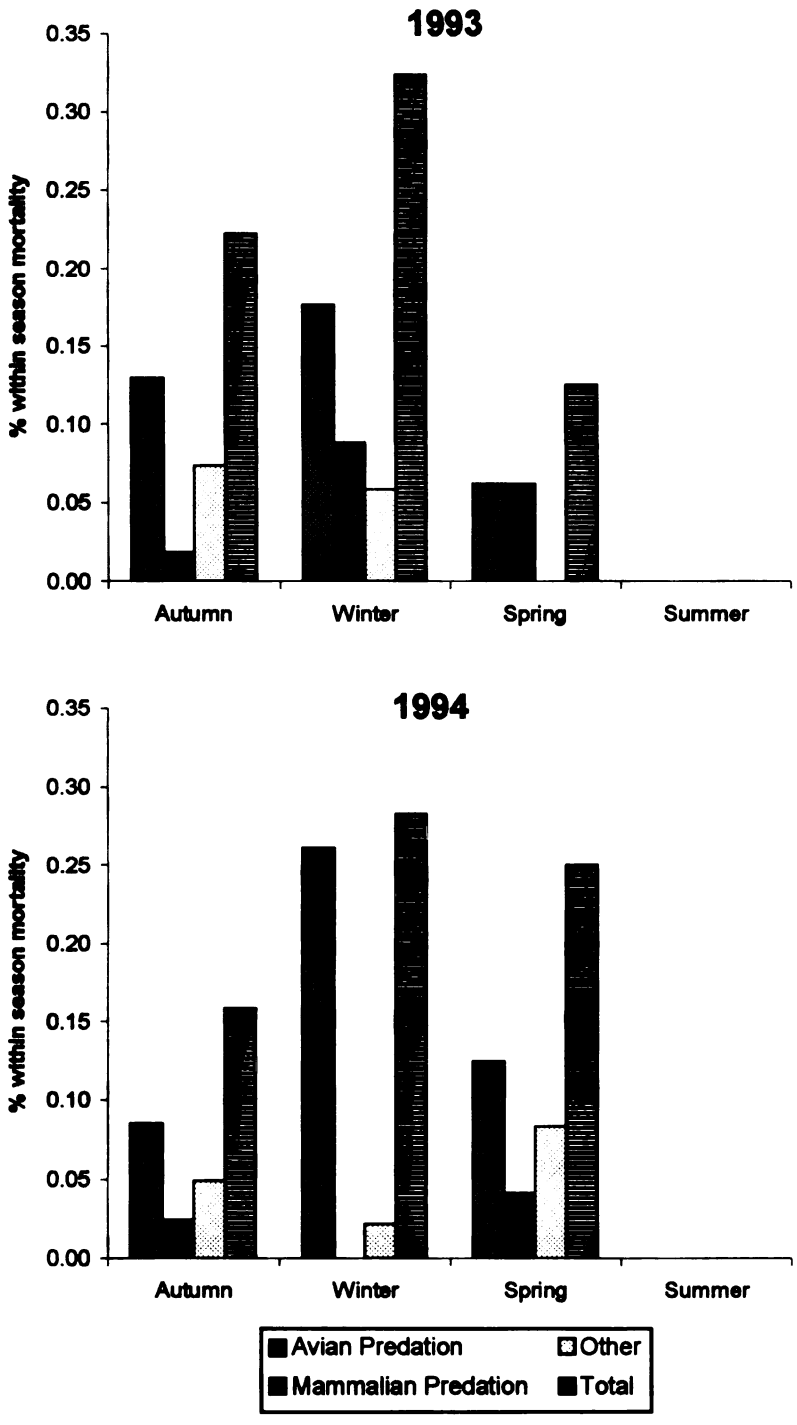



Figure 7. Percent within season non-hunting mortality on PRCSF, 1993 and 1994.

Predation in the spring (10% vs. 11%). The range for the amount of mortality in each season that was due to Avian Predation was zero to 36%. The highest percent, 36%, occurred on the HNF in spring 1993.

The amount of mortality in each season due to Mammalian Predation and to Other fluctuated throughout each year on HNF and PRCSF. The percent of mortality in each season attributed to each of these 2 categories was low in all seasons and years. The range for mortality due to Mammalian Predation was zero to 14%. The highest percent occurred on HNF in spring 1993. The range for mortality due to Other was zero to 18%. The greatest percent of Other mortality occurred on HNF in winter 1993.

**Survival**

Survival probabilities were calculated for all birds on each site each year using the Kaplan-Meier product limit estimator (Pollock et al. 1989). Probabilities were also calculated for adult, juvenile, male, and female grouse on each site each year. With 3 exceptions, birds that died within 5 days of capture were removed from the data set prior to analysis. Three grouse (1 on the PRCSF closed site in 1993, 1 on the HNF open site in 1994, and 1 on the HNF closed site in 1994) that died within 5 days after being recaptured and having their radio transmitters replaced were not removed from the data set. It is assumed that the procedure of recapture and transmitter replacement did not have an effect on them, since this procedure was performed on 19 other grouse without effecting their behavior or survival. One bird on the PRCSF open site in 1993 that died 7 days after capture was removed from the data set. This was because its death occurred early in the study year when the sample size was very small and, therefore, had an exaggerated effect

on the survival curve. For the same reason 1 bird on the HNF closed site in 1994 that died 6 days after capture was removed from the data set. Also, 2 birds that died 6 days after capture on the PRCSF open site in 1994 were removed, because their deaths were caused by their radio collars twisting and choking them. The sample size used to generate each survival curve is given in Table 16.

Table 16. Sample sizes used to calculate survival probabilities for ruffed grouse on HNF and PRCSF areas, 1993 and 1994.

| | Sample size | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | 1993 | | | | 1994 | | | |
| | HNF | | PRCSF | | HNF | | PRCSF | |
| Data set | Open | Closed | Open | Closed | Open | Closed | Open | Closed |
| all birds | 19 | 28 | 29 | 24 | 66 | 61 | 41 | 40 |
| adults (AHY) | 9 | 13 | 16 | 17 | 17 | 24 | 21 | 24 |
| juveniles (HY) | 7 | 12 | 13 | 7 | 47 | 37 | 18 | 13 |
| males (M) | 6 | 12 | 11 | 13 | 32 | 34 | 20 | 16 |
| females (F) | 12 | 14 | 18 | 11 | 33 | 26 | 17 | 21 |

Although 5 August is the first day of the 1993 and 1994 study years, the starting date of all survival analyses is 13 August. This is the earliest date on which a radio-tagged bird was present on all sites in 1993 and 1994. It should be noted that the earliest date on which a male grouse was radio-tagged on the HNF open and closed sites in 1993 was 1 September and 14 August, respectively. Also, the earliest date on which a juvenile bird was radio-tagged on the HNF closed site in 1993 was 17 August, on the PRCSF closed site in 1993 it was 27 August, and on the PRCSF closed site in 1994 it was 14 August. Therefore, survival analyses involving these 5 data sets start on a date other than 13 August. All analyses were run with a cumulative start, i.e., when an analysis starting date was later than the first capture date in the data sets all observations prior to the starting

date were used, but survival probabilities were calculated from the analysis starting date.

The ending date for analyses of the 1993 data set is 15 May 1994. This date was chosen for 2 reasons. One is that the small sample sizes obtained on each site in 1993 were reduced to extremely low numbers by summer 1994. The second reason is that this date is approximately the time most grouse hens have begun nesting. Therefore, survival probabilities were calculated from autumn to the breeding season. The ending date for analyses of the 1994 data set is 4 August 1995. However, for comparisons of same sites between years the ending date of 15 May 1995 was used for the 1994 data set.

The calculated survival probabilities are given in Appendix F. All survival curve comparisons were tested using the log-rank test and $\alpha = 0.05$. It should be noted that 1993 survival curves for adults, juveniles, males, and females on HNF and PRCSF are heavily influenced by the small 1993 sample sizes. Therefore, results of survival curve comparisons involving these data sets should be interpreted with caution.

HNF 1993 and 1994.--

In 1993 birds on the closed site had a higher survival rate than did birds on the open site (Figure 8). Curves for the 2 groups diverged during the winter; survival for birds on the open site decreased at a greater rate than for birds on the closed site. The survival rate for birds on the open site went to zero on 12 May 1994. On 15 May 1994 the survival rate for birds on the closed site was 0.23.

In 1994 survival curves for the open and closed sites diverged early in autumn (Figure 8). The curve for birds on the open site quickly dropped from 1.00 on 15 August to 0.77 on 18 August 1994. The 2 curves began to converge at the end of the winter. On

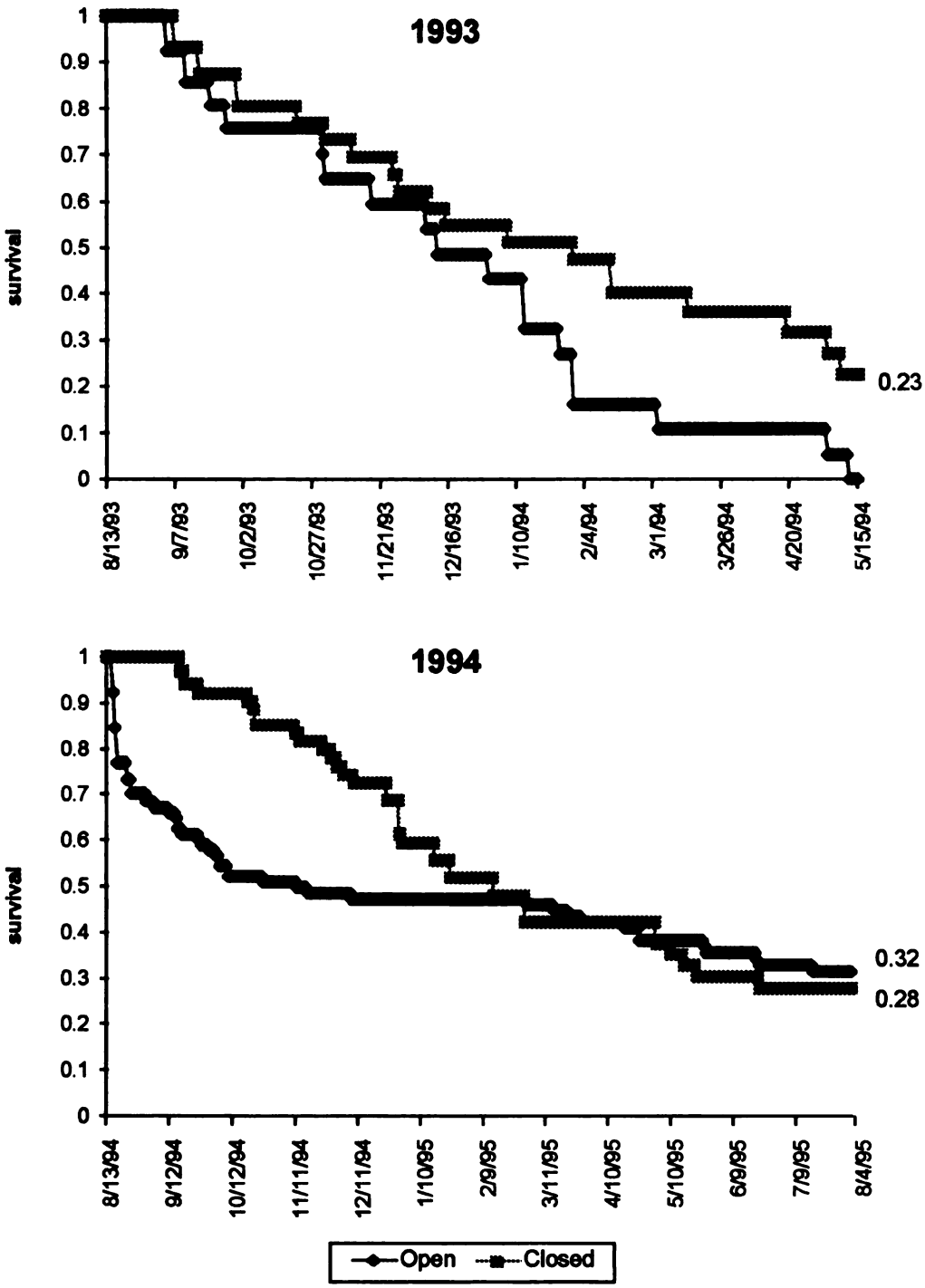



Figure 8. Survival curves for ruffed grouse on HNF, 1993 and 1994.

4 August 1995 the survival rates for birds on the open and closed sites were 0.32 and 0.28, respectively.

Results of tests on comparisons between paired sites within years and same sites between years are given in Table 17. Significant differences were detected between survival curves for grouse on the open vs. closed site in 1993 ($X^2 = 3.88$, $P = 0.0489$) and 1993 vs. 1994 birds on the open site ($X^2 = 12.22$, $P = 0.0005$).

Adult grouse on the closed site had a greater survival rate than did adults on the open site and juveniles on both the open and closed sites in 1993 (Figure 9). Juvenile grouse on the closed site had a greater survival rate than did adults and juveniles on the open site. Adult grouse on the open site experienced a large decrease in survival from 12 to 31 January 1994. During this period the survival rate dropped from 0.64 to 0.11. The rate for adults birds on the open site went to zero on 4 May 1994. Survival for juvenile grouse on the open site rapidly decreased from 0.69 on 30 October to 0.17 on 18 November 1993. The rate for this group of birds went to zero on 31 December 1993. On 15 May 1994 the survival rate for adult birds on the closed site was 0.27 and for juveniles was 0.20.

Adult grouse on the open site had a greater survival rate than did adults on the closed site and juveniles on both the open and closed sites in 1994 (Figure 9). The survival curve for adult birds on the open site decreased very slowly during the year. Juveniles on the open site had a rapid decrease in survival from 13 August to 1 September 1994. During this time the rate went from 1.00 to 0.61. The rate for this group of birds was fairly stable from 10 October 1994 to 15 May 1995. Curves for adults and juveniles on the closed site followed a similar decreasing trend throughout the year. On 4 August

Table 17. Results of the log-rank test on survival curves for ruffed grouse on HNF open and closed sites, 1993 and 1994.

| Survival curves tested | $X^2$ | P |
|---|---|---|
| open 1993 vs. closed 1993 | 3.88 | 0.049 |
| open 1994 vs. closed 1994 | 1.76 | 0.184 |
| | | |
| open 1993 vs. open 1994 | 12.22 | <0.001 |
| closed 1993 vs. closed 1994 | 0.90 | 0.342 |
| | | |
| open 1993: adult vs. juvenile | 5.17 | 0.023 |
| closed 1993: adult vs. juvenile | 0.16 | 0.692 |
| open 1994: adult vs. juvenile | 2.61 | 0.106 |
| closed 1994: adult vs. juvenile | 0.12 | 0.728 |
| | | |
| 1993: open adult vs. closed adult | 0.31 | 0.578 |
| 1993: open juvenile vs. closed juvenile | 4.68 | 0.031 |
| 1994: open adult vs. closed adult | 2.97 | 0.085 |
| 1994: open juvenile vs. closed juvenile | 0.36 | 0.550 |
| | | |
| open: 1993 adult vs. 1994 adult | 13.04 | <0.001 |
| open: 1993 juvenile vs. 1994 juvenile | 4.07 | 0.044 |
| closed: 1993 adult vs. 1994 adult | 0.60 | 0.437 |
| closed: 1993 juvenile vs. 1994 juvenile | 0.65 | 0.420 |
| | | |
| open 1993: male vs. female | 0.00 | 0.971 |
| closed 1993: male vs. female | 0.02 | 0.883 |
| open 1994: male vs. female | 0.71 | 0.399 |
| closed 1994: male vs. female | 1.04 | 0.307 |
| | | |
| 1993: open male vs. closed male | 1.14 | 0.285 |
| 1993: open female vs. closed female | 2.10 | 0.148 |
| 1994: open male vs. closed male | 3.09 | 0.079 |
| 1994: open female vs. closed female | 0.00 | 0.958 |
| | | |
| open: 1993 male vs. 1994 male | 5.61 | 0.018 |
| open: 1993 female vs. 1994 female | 6.97 | 0.008 |
| closed: 1993 male vs. 1994 male | 0.08 | 0.776 |
| closed: 1993 female vs. 1994 female | 2.09 | 0.149 |

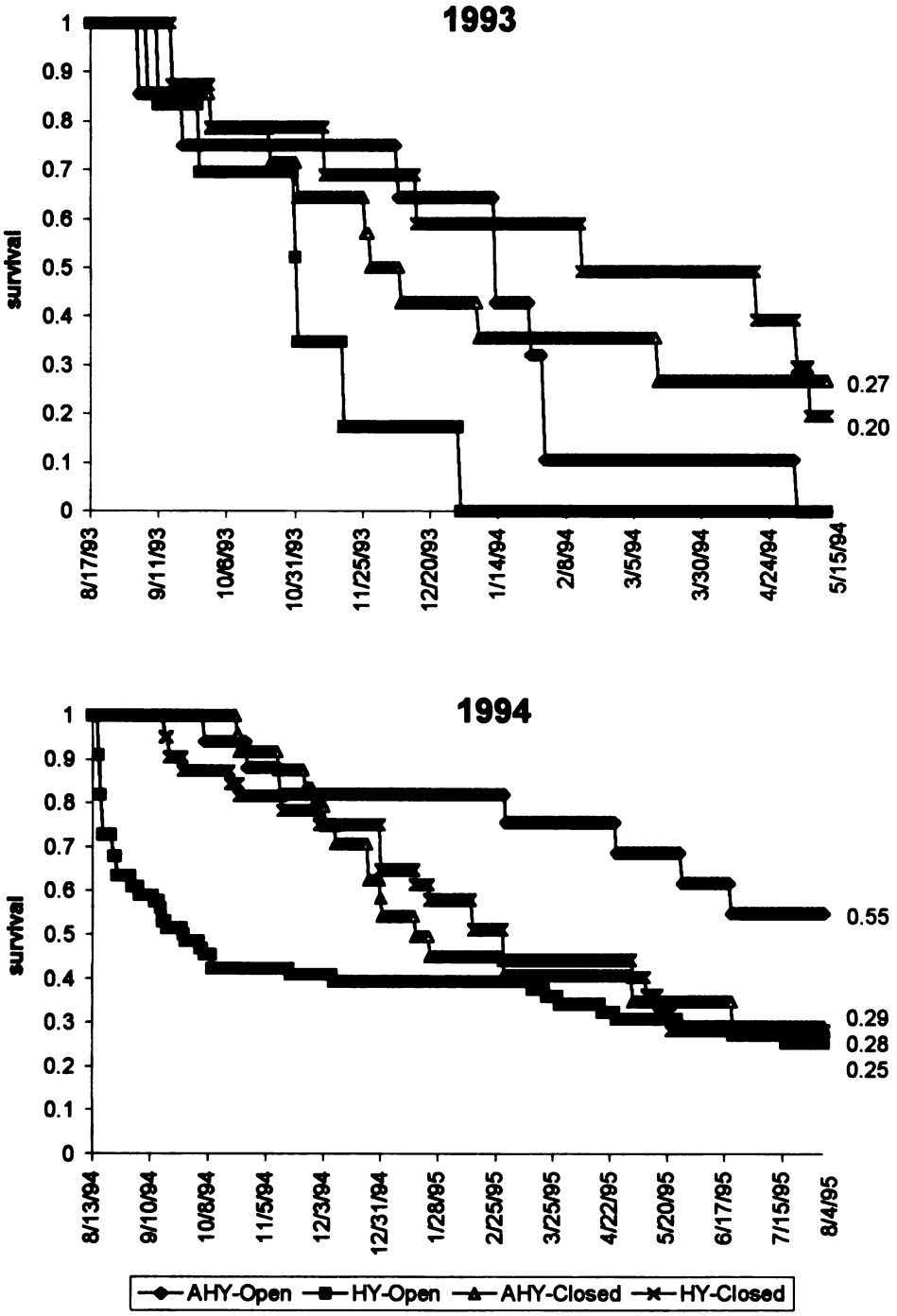



**Figure 9. Survival curves for adult (AHY) and juvenile (HY) grouse on HNF, 1993 and 1994.**

1995 the survival rates for adult and juvenile grouse on the open site was 0.55 and 0.25, respectively. At this time the survival rates for adult and juvenile birds on the closed site were 0.29 and 0.28, respectively.

Results of tests on all adult and juvenile comparisons are given in Table 17. Significant differences were detected between survival curves for adult vs. juvenile birds on the open site in 1993 ($X^2 = 5.17$, $P = 0.0229$), juvenile birds on the open site vs. closed site in 1993 ($X^2 = 4.68$, $P = 0.0306$), 1993 vs. 1994 adults on the open site ($X^2 = 13.04$, $P = 0.0003$), and 1993 vs. 1994 juvenile birds on the open site ($X^2 = 4.07$, $P = 0.0436$).

Survival curves for male and female grouse on the open and closed sites in 1993 tended to follow a similar decreasing trend (Figure 10). Male birds on the open site experienced a rapid decrease in survival between 30 October and 1 November 1993. During these 3 days the survival rate went from 0.83 to 0.50. The rate for male birds on the open site went to zero on 4 May 1994. The rate for female birds on the open site went to zero on 12 May 1994. On 15 May 1994 the survival rate for male and female grouse on the HNF closed site was 0.30 and 0.13, respectively.

On the open and closed sites in 1994 survival curves for male and female grouse diverged early in the autumn (Figure 10). The survival curve for female grouse on the open site was the first to begin decreasing. The curves began to converge early in February 1995. On 4 August 1995 male birds on the open site had the greatest survival rate of 0.47. At this time female birds on the open site and both male and female birds on the closed site had the same survival rate of 0.27.

Significant differences were detected between survival curves for 1993 vs. 1994 male grouse on the open site ($X^2 = 5.61$, $P = 0.0179$) and 1993 vs. 1994 female birds on

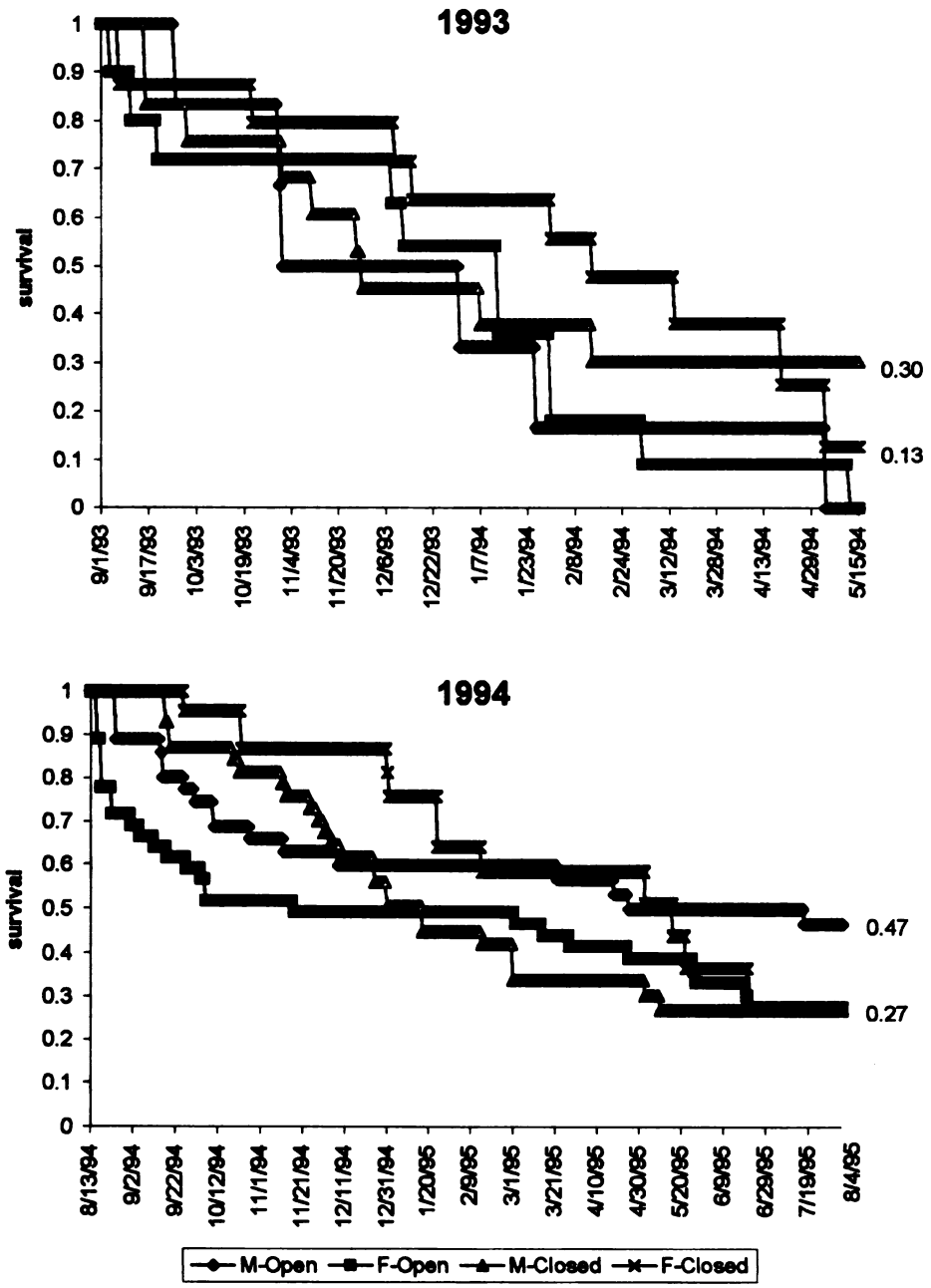



Figure 10. Survival curves for male (M) and female (F) grouse on HNF, 1993 and 1994

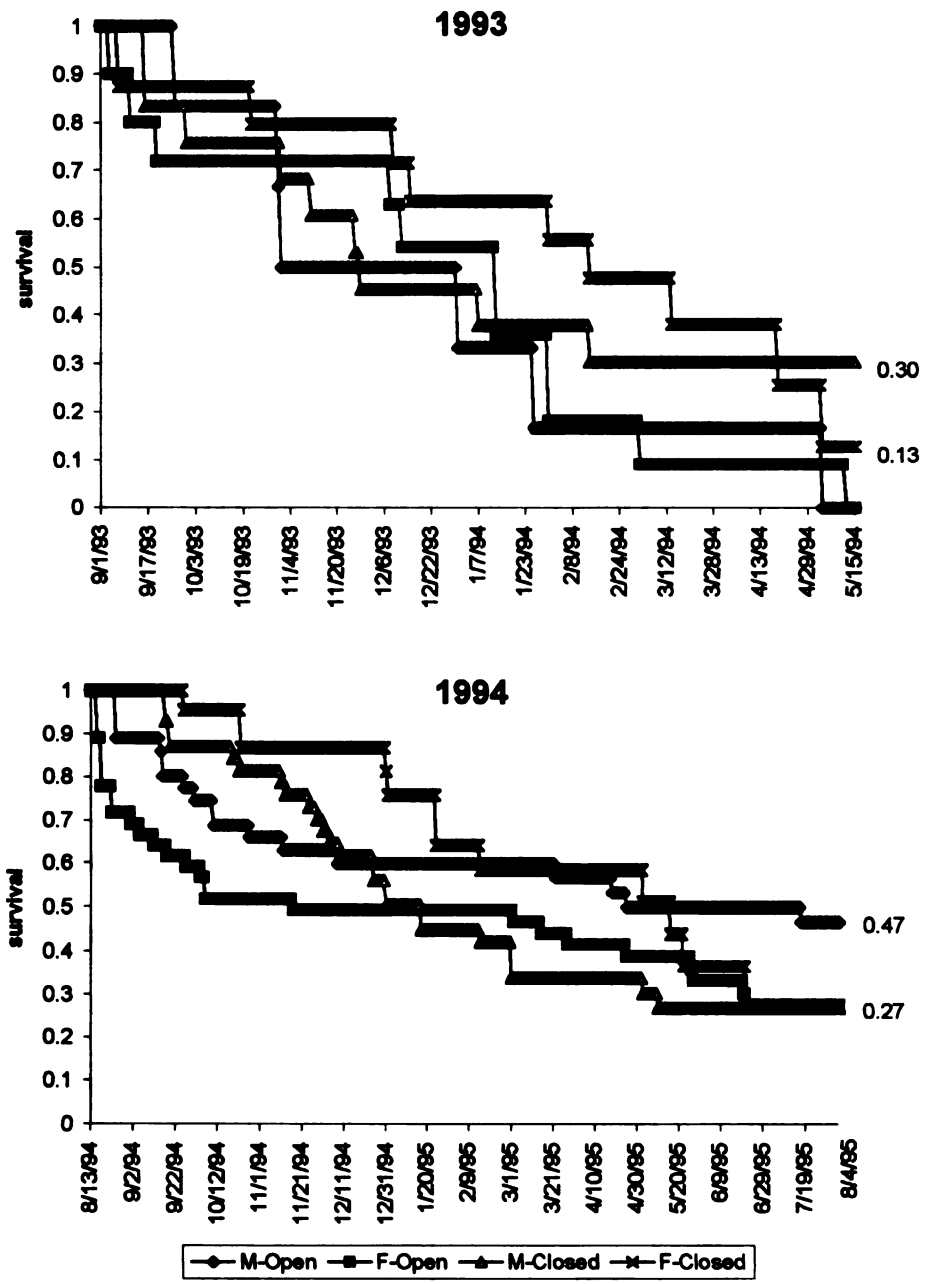



Figure 10. Survival curves for male (M) and female (F) grouse on HNF, 1993 and 1994

the open site ($X^2 = 6.97$, $P = 0.0083$) (Table 17).

PRCSF 1993 and 1994.--

In 1993 grouse on the closed site had a greater survival rate than did birds on the open site (Figure 11). The survival rate for birds on the open site began decreasing on 30 August 1993, while for birds on the closed site the rate did not decrease until 2 October 1993. On 15 May 1994 the survival rate for birds on the open site was 0.25 and for birds on the closed site was 0.63.

In 1994 survival curves for grouse on the open and closed sites were similar to each other (Figure 11). Survival for birds on the open site decreased only 5 days earlier than for birds on the closed site (28 August vs. 2 September 1994). On 4 August 1995 the survival rate for birds on the open site was 0.31 and for birds on the closed site was 0.32.

Results of tests on comparisons between paired sites within years and same sites between years are given in Table 18. A significant difference was detected between survival curves for grouse on the open vs. closed site in 1993 ($X^2 = 4.99$, $P = 0.0254$).

Adult grouse on the closed site had the greatest survival rate of all age classes in 1993 (Figure 12). Juvenile birds on the closed site had a greater rate than did adults and juveniles on the open site. Juveniles on the open site had the poorest survival. The rate for this group of birds went to zero on 23 January 1994. On 15 May 1994 the survival rate for adult birds on the open site was 0.30. On this date the rate for adults and juveniles on the closed sites was 0.69 and 0.51, respectively.

Adult grouse on the open site had a greater survival rate than did all other age classes in 1994 (Figure 12). The rate for this group of birds was greater than for all others

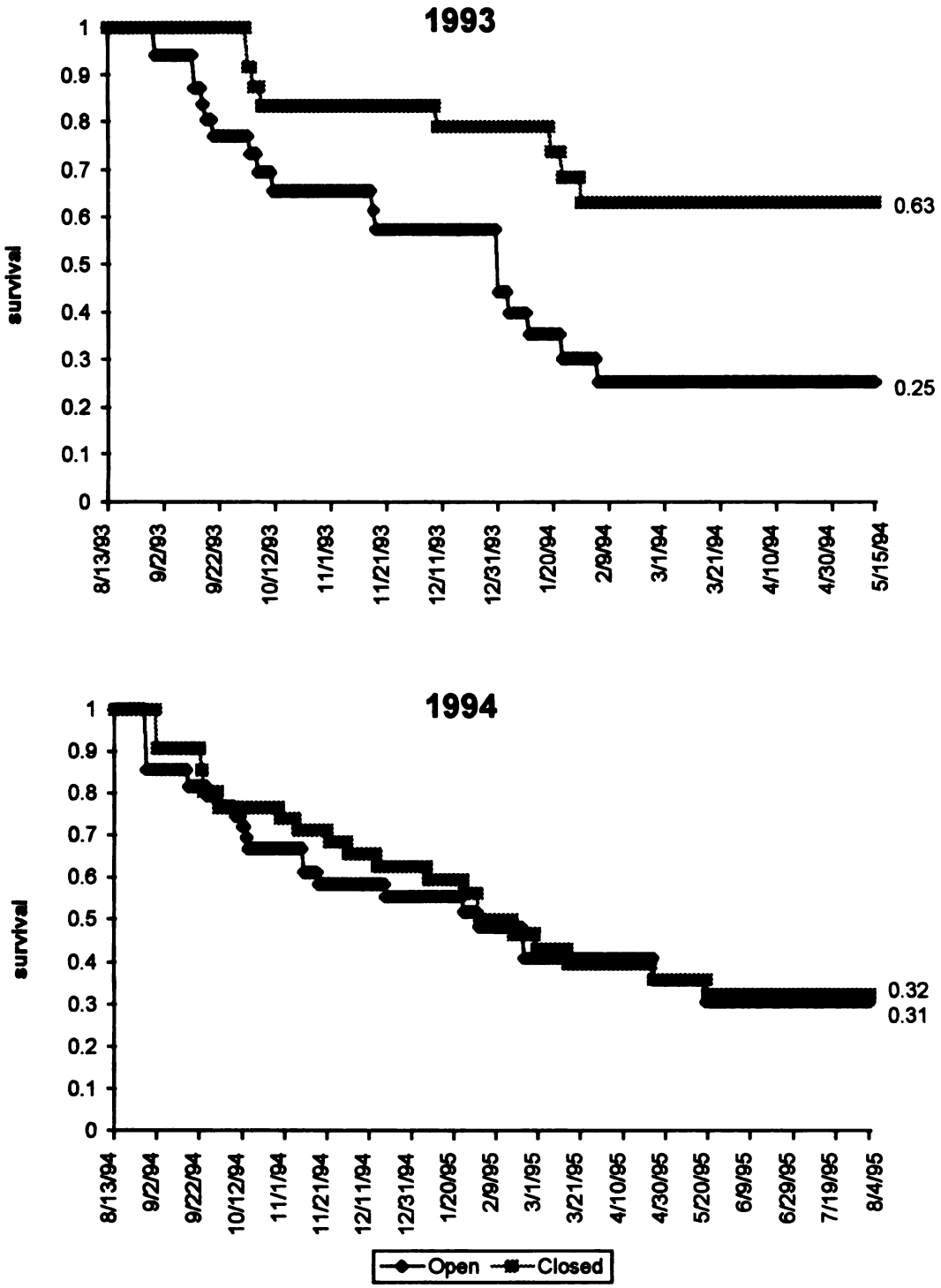



Figure 11. Survival curves for ruffed grouse on PRCSF, 1993 and 1994.

Table 18. Results of the log-rank test on survival curves for ruffed grouse on PRCSF open and closed sites, 1993 and 1994.

| Survival curves tested | $X^2$ | P |
|---|---|---|
| open 1993 vs. closed 1993 | 4.99 | 0.025 |
| open 1994 vs. closed 1994 | 0.02 | 0.891 |
| | | |
| open 1993 vs. open 1994 | 1.44 | 0.230 |
| closed 1993 vs. closed 1994 | 2.20 | 0.138 |
| | | |
| open 1993: adult vs. juvenile | 0.66 | 0.415 |
| closed 1993: adult vs. juvenile | 0.27 | 0.601 |
| open 1994: adult vs. juvenile | 1.39 | 0.238 |
| closed 1994: adult vs. juvenile | 0.00 | 0.949 |
| | | |
| 1993: open adult vs. closed adult | 3.12 | 0.077 |
| 1993: open juvenile vs. closed juvenile | 2.82 | 0.093 |
| 1994: open adult vs. closed adult | 0.47 | 0.492 |
| 1994: open juvenile vs. closed juvenile | 0.30 | 0.586 |
| | | |
| open: 1993 adult vs. 1994 adult | 1.75 | 0.186 |
| open: 1993 juvenile vs. 1994 juvenile | 0.37 | 0.542 |
| closed: 1993 adult vs. 1994 adult | 1.87 | 0.172 |
| closed: 1993 juvenile vs. 1994 juvenile | 0.34 | 0.560 |
| | | |
| open 1993: male vs. female | 0.10 | 0.754 |
| closed 1993: male vs. female | 0.09 | 0.766 |
| open 1994: male vs. female | 0.74 | 0.388 |
| closed 1994: male vs. female | 3.84 | 0.050 |
| | | |
| 1993: open male vs. closed male | 3.15 | 0.076 |
| 1993: open female vs. closed female | 2.53 | 0.112 |
| 1994: open male vs. closed male | 0.00 | 0.959 |
| 1994: open female vs. closed female | 0.91 | 0.341 |
| | | |
| open: 1993 male vs. 1994 male | 0.00 | 0.971 |
| open: 1993 female vs. 1994 female | 1.44 | 0.231 |
| closed: 1993 male vs. 1994 male | 2.12 | 0.145 |
| closed: 1993 female vs. 1994 female | 0.37 | 0.541 |

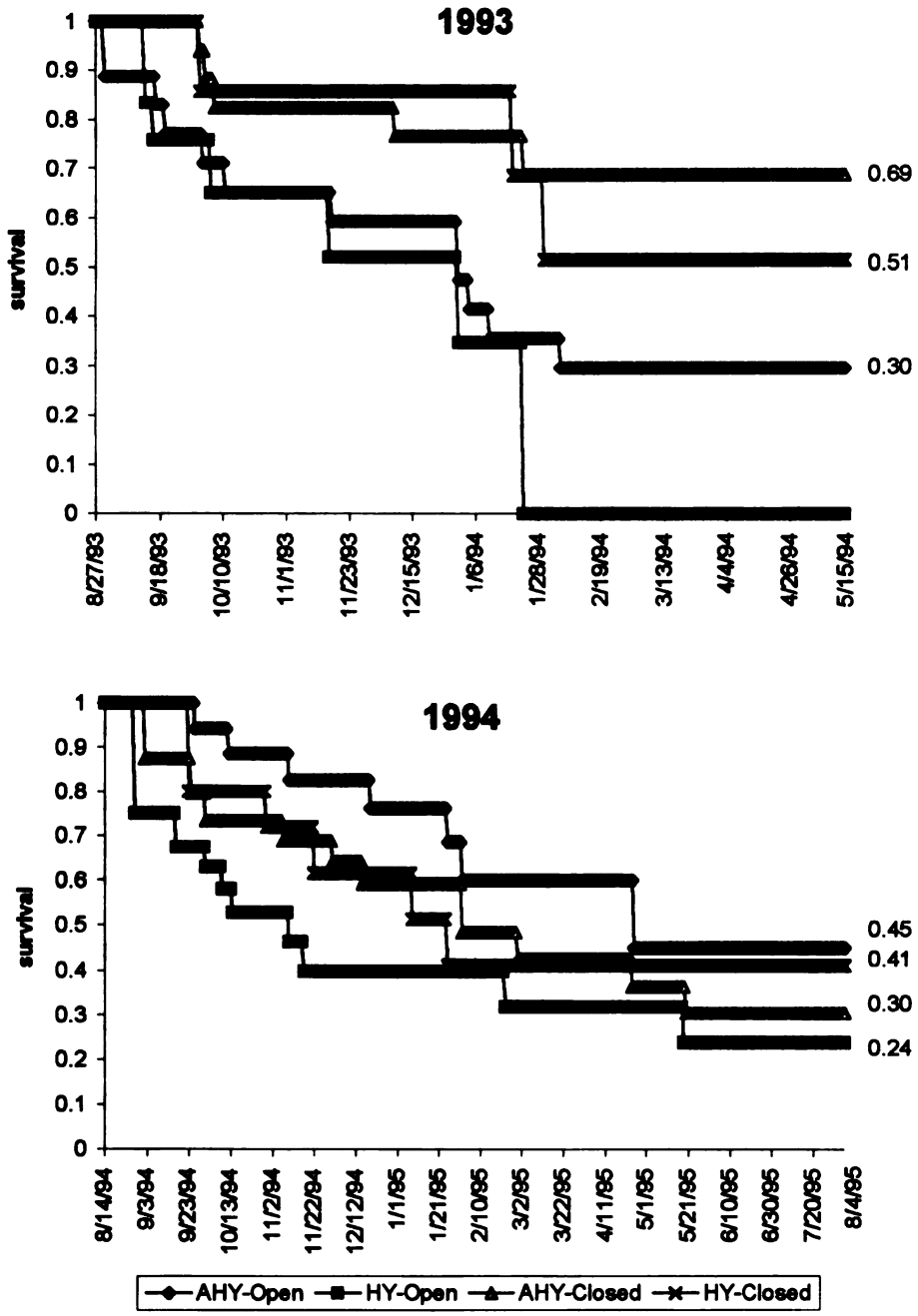



Figure 12. Survival curves for adult (AHY) and juvenile (HY) grouse on PRCSF, 1993 and 1994.

throughout the year. As in 1993, juvenile birds on the closed site had the second greatest survival rate and juveniles on the open site had the lowest. Survival for juvenile grouse on the open site was lower than all other age classes throughout the year. On 4 August 1995 survival for adult and juvenile grouse on the open site was 0.45 and 0.24, respectively. Survival for adult and juvenile birds on the closed site at this time was 0.30 and 0.41, respectively.

Results of tests on all age class survival curve comparisons are given in Table 18. No significant differences were detected in any comparison.

Female grouse on the closed site in 1993 had a greater survival rate than did males on the closed site and both sexes on the open site (Figure 13). Male birds on the closed site had the second greatest survival rate. As on the closed site, female grouse on the open site had a greater survival rate than did male birds on the open site. Male grouse had a greater survival rate than did females on both the open and closed sites until 5 February and 23 January 1994, respectively. On 15 May 1994 the survival rate for male and female birds on the open site was 0.17 and 0.29, respectively. At this time the rate for male birds on the closed site was 0.56 and for female birds was 0.73.

Female grouse had a greater survival rate during the year than did male grouse on the open and closed sites in 1994 (Figure 13). Female birds on the closed site had the greatest survival rate of all sex classes in 1994. Male birds on the closed site had the lowest survival rate. Survival for males on the open and closed sites decreased roughly 25 days earlier than for females on both sites. On 4 August 1995 the survival rate for male and female grouse on the open site was 0.24 and 0.28, respectively. At this time on the

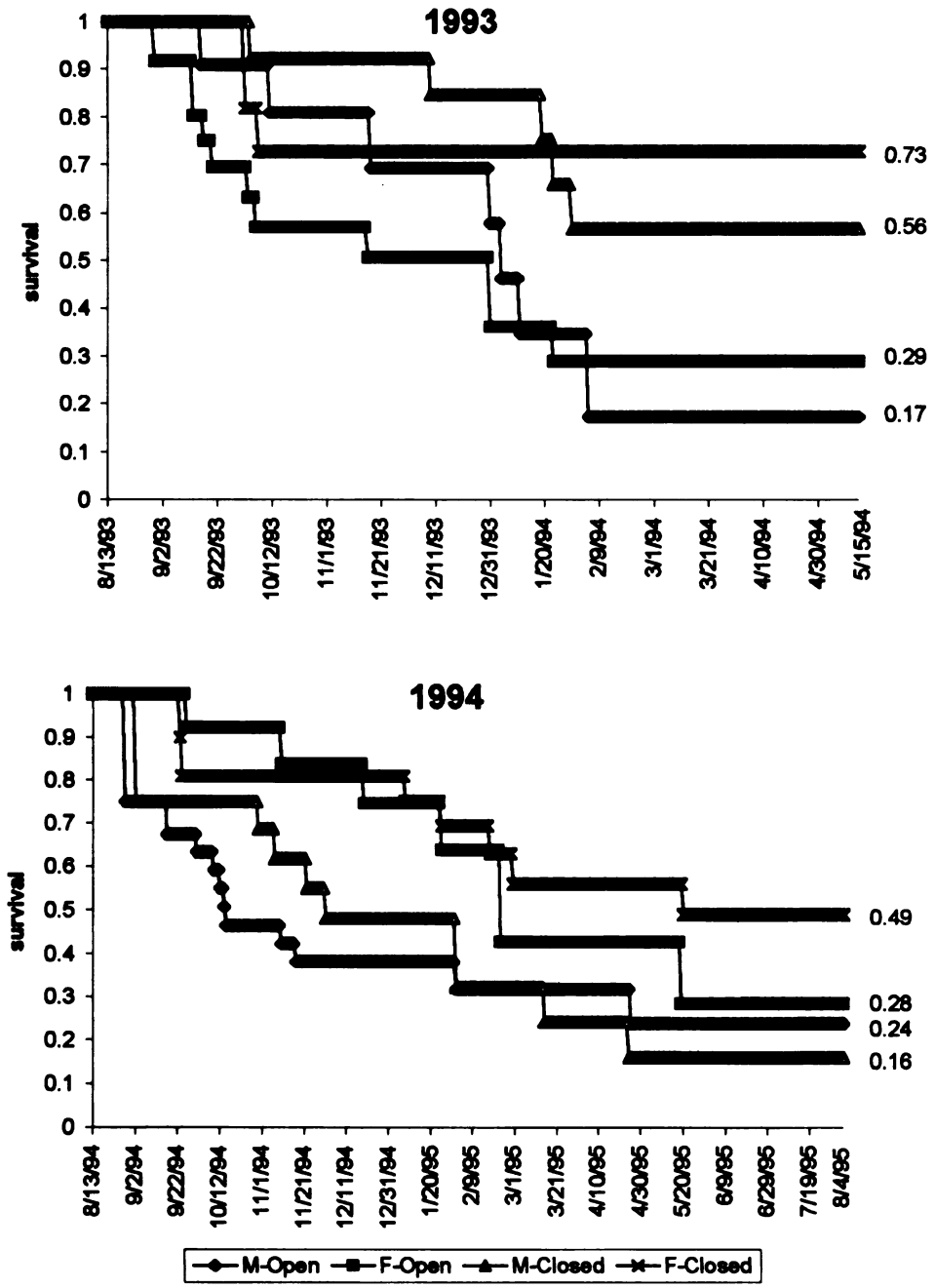



Figure 13. Survival curves for male (M) and female (F) grouse on PRCSF, 1993 and 1994.

closed site the survival rate for male birds was 0.16 and for females was 0.49.

Results of tests on all male and female survival curve comparisons are given in Table 18. A significant difference was detected between survival curves for male and female birds on the closed site in 1994 ($X^2 = 3.84$, $P = 0.050$).

# DISCUSSION

## Vegetation Analysis and Raptor Abundance

The design of this study, having paired sites, 1 open and 1 closed to hunting, allowed for the determination of the amount and effect of hunting as a source of ruffed grouse mortality. To accomplish this the comparability of the paired sites had to be evaluated for grouse habitat and potential predation on grouse by raptors. These 2 factors are critically important to grouse survival and, therefore, could cause differences in grouse survival rates between paired sites.

Extensive vegetation sampling based on the Michigan ruffed grouse HSI model (Hammill and Moran 1986) was conducted on each site to evaluate the habitat for grouse. Although this model has not been thoroughly tested, there is evidence that it is valid. Roloff (1994) found a positive significant correlation between HSI score and an index of ruffed grouse populations in Alcona County, Michigan. In addition, of the aspen stands sampled in this study, grouse were trapped and often found in stands having relatively high HSI scores.

The nesting woodland hawks habitat vegetation data and the raptor survey data were used to evaluate the amount of potential predation on grouse by raptors on each site. The model for predicting woodland hawks nesting habitat (Mosher et al. 1986) was developed in western Maryland and northeastern Wisconsin. A raptor model specific to

Michigan could be developed. Although such a model would have been beneficial to this study, it was beyond the means of this project to create a raptor habitat model. It is felt that the model used was adequate for the intended purpose, which was to determine if the paired sites were comparable in woodland hawk nesting habitat quality.

Ruffed Grouse Habitat.--

The open sites on the HNF and PRCSF areas had a greater overall HSI score than the closed sites. Two conclusions can be drawn from this finding regarding the impact of hunting on the resident grouse populations. One is that the open sites having higher overall HSI scores than the closed ensured that any potential effect of hunting on the grouse population was not masked by poorer habitat quality. The second is that the better habitat quality on the open sites may have compensated for the effect of hunting on the grouse populations. There are direct and indirect effects of hunting on a grouse population. A direct effect is the harvesting of birds, an indirect effect is the movement of birds by hunters, especially those with dogs, from areas of secure cover. The indirect effect results in birds being at a greater risk of predation by natural predators. The higher habitat quality on the open sites compared to the closed sites could counteract both of these effects. Data from 1993 and 1994 showed that there was little or no effect of hunting on the grouse populations on the HNF and PRCSF areas. It cannot be determined at this time which, if either, of these 2 possible scenarios is occurring on the HNF and PRCSF areas. The remaining years of this study may provide data that will lead to an answer to this question. It should be noted, however, that since the difference between the overall HSI score for the PRCSF open and closed sites was small and hunting

appeared to have no direct effect in 1993 and no effect in 1994, habitat quality on the PRCSF open site probably did not compensate for any effect of hunting on the grouse population.

The overall HSI scores for the open and closed sites on HNF and PRCSF areas were fairly low (< 0.50). However, these values reflect the quality and quantity of all habitat types on the study areas. It is known that aspen is the primary habitat of ruffed grouse in the Lake States (Gullion 1972, Gullion and Svoboda 1972). Therefore, it was most important that paired sites were comparable in aspen habitat quality.

Gullion and Svoboda (1972) recognized that 1-10 year old aspen stands provide quality brood habitat, 10-12 year old stands provide good quality cover for wintering and breeding grouse, 13-25 year old stands have the highest value for wintering and breeding cover, and that beyond 25 years aspen is useful as a winter food source and nesting cover for hens. In the Michigan ruffed grouse HSI model the variables stem density and interspersion are equally given the greatest weight. Adequate stem density is required for breeding cover and adequate interspersion for wintering cover. Therefore, in this study it is expected that the category Medium-Aged Aspen (11-29 years old) would receive the highest HSI scores.

On the HNF open and closed sites the vegetation category Medium-Aged Aspen did have the highest HSI scores of all categories (Table 3). The distributions of average HSI score versus age class of aspen on the 2 HNF sites followed the expected trend in change in habitat quality over time (Figure 4). Therefore, although overall HSI scores for both sites were low, each site does provide primary grouse habitat for breeding, nesting,

brood rearing, and winter cover.

On the PRCSF open and closed sites there was no consistent pattern to the distribution of average HSI score versus age class of aspen (Figure 5). Stands that had high and low HSI scores were distributed throughout all age classes. Campa et al. (1993) suggested that in PRCSF white-tailed deer (Odocoileus virginianus) and elk (Cervus elaphus) browsing may effect the regeneration and development of aspen stands. Vegetation data collected in this study support their suggestion. Due to this atypical distribution of habitat quality versus age class of aspen, grouse on the PRCSF area are probably using aspen stands of all ages to meet each of their life history requirements.

Woodland Hawks Nesting Habitat.--

Mosher et al. (1986) found the 4 variables distance to water, distance to forest openings, canopy height, and number of medium- and large-sized trees to be useful in predicting nesting habitat. It was assumed that all vegetation categories on each site met the requirements for distance to water and to forest openings. Most of the vegetation categories on each site met the requirements for either canopy height or average stem density of medium- and large-sized trees, but no category met the requirements of both variables. Therefore, although each site does not provide premium nesting habitat, they do provide habitat useful to woodland hawks. The quality of nesting habitat for woodland hawks was similar for paired sites on the HNF and PRCSF areas.

Raptor Surveys.--

The HNF open and closed sites were comparable in numbers of raptors seen on paired sites in 1994 and 1995. Although not significantly different, the numbers of raptors

seen on the 2 sites in 1995 were greater than in 1994.

Besides the change in the number of raptors seen on the 2 HNF sites from 1994 to 1995, there was also a change in the species composition. In 1994 buteos, such as red-tailed and broad-winged hawks, were the most often seen raptors. In 1995 a greater number of accipiters were seen than in 1994 (13 vs. 4). Among the species of accipiters seen on the HNF open site in 1995 was 1 northern goshawk. Buteos are not particularly great threats to ruffed grouse, since they tend to soar above open lands to search for prey. Accipiters, especially goshawks, are greater threats to grouse, since they hunt within forests. Eng and Gullion (1962) found that goshawk predation was the single most important factor causing the reduction of grouse numbers on the Cloquet Research Forest. Although only 1 northern goshawk was seen during the survey routes on the HNF area, goshawks were seen on the area by field personnel while conducting other field work. In addition, based on observations by field personnel it is believed that great horned owls were numerous on the 2 HNF sites during 1993 and 1994.

The PRCSF open and closed sites were comparable in number of raptors observed in 1994, but not in 1995. There were significantly fewer raptors seen on the closed site in 1995 versus 1994. No explanation could be found for this difference.

Due to the proximity of paired sites to one another, it is possible that a raptor observed on one site was seen at another time on the site's pair. However, it is felt that if this did occur it had a minimal impact on the indices for paired sites. Because the raptor survey was not conducted in 1993 no comparisons could be made between the number of raptors seen and the amount of avian predation on each site during the 1993 and 1994

study years. However, during the remaining years of the study a relationship between the number of raptors observed and amount of avian predation on each site may become apparent.

**Trapping**

The trapping success rate on the HNF increased from 1993 to 1994. The increased trapping rate is believed to be primarily due to an increase in the size of the local grouse population. The age ratio of trapped birds on the 2 HNF sites favored juveniles in 1993 and 1994. On the HNF open site in 1994 the number of juvenile grouse trapped was significantly greater than the number of adults. The greater number of juveniles than adults suggests that the HNF population is increasing.

DeStefano and Rusch (1986) suggested that lily-pad (i.e., cloverleaf) traps are biased in favor of juveniles, because they found the percent of juveniles retrapped to be greater than the percent of adults. On the HNF and PRCSF open and closed sites in 1994 a greater percent of juvenile grouse were retrapped than adult grouse. The percents of retrapped grouse in 1993 are not considered, because the total number of grouse retrapped on each area was low (0-5 birds). The 1994 findings of this study support the suggestion that the traps are biased toward juvenile birds. However, it is believed that the HNF grouse population is increasing. Drumming count data for northern lower Michigan show that grouse numbers had increased slightly from 1993 to 1994 and had increased markedly from 1994 to 1995 (J. Urbain, Michigan DNR, pers. commun.).

On the PRCSF open and closed sites the trapping success rate was similar for 1993 and 1994. Age ratios favored adults on the PRCSF open and closed sites in 1993 and on

the closed site in 1994. On the open site in 1994 the age ratio significantly favored juveniles. This finding in conjunction with that of the drumming survey suggests that the grouse population on the PRCSF may also be starting to increase.

Factors that may be responsible for the greater number of juveniles than adults include such things as an increase in number of breeding females, clutch size, nest success, and/or chick survival. While grouse numbers increased in Rochester, Alberta from 1966 to 1968 Rusch and Keith (1971) found mean clutch size to remain constant. It is unlikely that clutch size is able to change quickly enough to respond to short term changes in population numbers. Data from Bump et al. (1947) showed that the percent of females with broods increased as the number of birds per $km^2$ decreased. This suggests that when grouse populations are low there is an increase in the number of females breeding and/or in nest success and/or in chick survival. Similarly, Bergerud (1985) stated that there is compensatory reproduction when breeding numbers are reduced. Although no data directly relating to any one of these factors was gathered in this study, an increase in overall breeding success seems to be the most likely cause for the increase in juvenile grouse numbers.

The sex ratios of grouse trapped on all 4 sites in 1993 and 1994 were approximately 1:1, with the exception of the HNF closed site in 1994. There was a significantly greater number of male than female grouse trapped on the HNF closed site in 1994. These findings are in accord with other studies (Marshall and Gullion 1965, Bendell and Zwickel 1979, and DeStefano and Rusch 1986).

**Sources of Mortality**

Avian predation was the greatest cause of ruffed grouse mortality on the HNF and PRCSF areas in 1993 and 1994. The amount of avian predation was on average 3 times greater than mammalian predation on each site in 1993 and 1994. Small et al. (1991) found the amount of avian predation to be approximately 2.2 times greater than the amount of mammalian predation, while Marshall and Gullion (1965) found avian predators to take 6.4 times the number of grouse as did mammalian predators. Based on these studies, the differences between the amount of avian and mammalian predation on the HNF and PRCSF areas were reasonable.

The amounts of grouse mortality in this study attributable to disease, trauma (e.g., collisions with automobiles and houses, suffocation by acorns, and drowning), and no diagnosis were similar to other studies (Eng and Gullion 1962, Marshall and Gullion 1965, Small et al. 1991). Although mortalities due to stress (i.e., deaths within 5 days of capture that were thought to be due solely to trapping stress) were not used in any analyses, it is worth noting that the amount of mortality caused by trapping on the 4 study sites averaged 8.9% during the 2 study years. This amount is comparable to the 8% mortality due to research (e.g., trapping injuries, predator kills in trap, radio-tagging) that Marshall and Gullion (1965) observed in their study.

Hunting accounted for a small percentage of the grouse mortalities on the HNF open site in 1993 and 1994, 16% and 14%, respectively. Avian predation, mammalian predation, and the combination trauma/no diagnosis each accounted for more grouse deaths than did hunting on the HNF open site. The percentages of mortality due to

hunting on the HNF open site are similar to the 15% found by Eng and Gullion (1962). On the PRCSF open site hunting was second to avian predation in number of grouse mortalities in both years, and was responsible for 26% of the total mortality in 1993 and 22% in 1994. These percentages are higher than those of the HNF open site. However, they are in accord with the percent hunting mortality of 27% found by Marshall and Gullion (1965) and 28% found by Small et al. (1991).

The relatively high amount of hunting mortality on the PRCSF may be due to 2 related factors. One is that PRCSF is a very popular recreational area for residents throughout lower Michigan, much more so than the HNF area. Although the amount of hunter effort is not exactly known for either the HNF or PRCSF open site, it is assumed that the PRCSF site receives more hunting pressure than does the HNF. This assumption is based on observations made by field personnel working on both areas during the study. A second reason is that there are more well maintained roads throughout the PRCSF than the HNF area. Fischer and Keith (1974) found that hunting mortality was greater on areas with better road access. This in conjunction with the assumed greater hunting pressure may be responsible for the higher percentages of mortality due to hunting on the PRCSF

In northern lower Michigan there is an autumn grouse hunt from 15 September to 14 November and a December hunt from 1 December to 1 January. The 2 week break in November is due to the white-tailed deer firearm season. On the HNF open site in 1993 3 radio-tagged grouse were harvested, 2 during the autumn hunt and 1 during the December hunt. Similarly, Rusch et al. (1984) found that during the 4 month (October-January) hunting season on the Navarino Wildlife Area, Wisconsin harvest rates were highest in

October and decreased by approximately 50% in each successive month. All harvested radio-tagged grouse on the HNF in 1994 and on PRCSF in 1993 and 1994 were shot during the autumn hunting season. With one exception, all of these birds were taken during the first 4 weeks of the autumn hunt. Data provided by the Michigan DNR indicated that most hunter effort on the HNF and PRCSF areas in 1993 and 1994 occurred during the autumn hunt (J. Urbain, Michigan DNR, pers. commun.). It appears that the majority of hunter effort and success in northern lower Michigan takes places early in the hunting season. This is in agreement with Kubisiak (1984) and Small et al. (1991) who found that most hunter effort and grouse kill occurred during the first 2-3 weeks and 6 weeks of the hunting season, respectively.

**Seasonal Changes in Non-hunting Mortality**

Avian predation was the greatest cause of non-hunting mortality in all seasons on the HNF and PRCSF in 1993 and 1994. The percent of within season mortality due to avian predators followed a similar trend on HNF and PRCSF in 1993 and 1994; it increased from autumn to winter and decreased from winter to summer. On the Cloquet Forest in Minnesota Eng and Gullion (1962) found that the amount of predation on grouse by goshawks decreased starting in May. They point out that the decrease in predation was due to the arrival of migrant birds, which increased the number of prey species available, and to the development of vegetative cover, which provided protection for grouse. While avian predation in this study includes raptors other than goshawks, Eng and Gullion's explanation for decreased late spring and summer mortality is applicable.

Many researchers have examined season trends in total predation (avian and

mammalian combined) and have found that the greatest amount of predation on grouse occurs during the autumn-spring period (Gullion and Marshall 1968, Rusch and Keith 1971, Small et al. 1991). The amount of mortality due to predation on the HNF and PRCSF in 1993 and 1994 was greatest during winter and spring and least in summer. The seasonal trend of predation (avian and mammalian) on grouse followed that of avian predation. Although data from the HNF and PRCSF support the findings of other studies it appears that mortality due to predation is unimportant relative to that due to avian predation alone.

**Survival**

All Birds.--

In 1993 survival curves for grouse on the HNF and PRCSF closed sites were significantly different than for birds on the open sites ($P < 0.05$); birds on the closed sites had greater survival rates. Survival rates for birds on the 4 sites were similar in 1994 and ranged from 0.28 to 0.32. The significant difference in 1993 survival rates may be due in part to the smaller sample sizes obtained in 1993 versus 1994. The smaller the number of birds at risk at a given point in time the greater the effect of a mortality event on the survival rate at that time point. Therefore, for most of the year each grouse mortality in 1993 had a greater impact on the 1993 survival rate than mortality events in 1994 had on the 1994 survival rate. This was also true of the PRCSF open and closed 1993 survival curves and especially so of the adult, juvenile, male, and female survival curves for birds on the HNF and PRCSF areas in 1993.

During the 1993 autumn hunting season survival for grouse on the PRCSF open

site decreased slightly more than it did for birds on the closed site. There were 2 periods of marked decrease in survival for birds on the PRCSF open and closed sites in 1993 (approximately mid-September to mid-October 1993 and during January 1994). During both of these periods survival decreased more for birds on the open site than for birds on the closed site. Other than during these 2 periods the curves for birds on both sites were similar. Therefore, it is probable that hunting had little direct effect on survival of birds on the open site. On the HNF in 1993 and 1994 and the PRCSF in 1994 survival curves were similar for birds on open and closed sites during the autumn hunting season.

During the December hunting season in 1993, on the HNF survival curves for birds on the open and closed sites diverged; survival for birds on the open site decreased at a greater rate than for birds on the closed site. However, since survival continued to decrease at a greater rate for birds on the open site than on the closed beyond the December hunting season (approximately to 1 February 1994), hunting most likely did not directly affect the survival of birds on the open site. In 1994 on the HNF during the December hunt survival for birds on the open site was fairly constant, while survival decreased for birds on the closed site. On the PRCSF in 1993 and 1994 survival curves for birds on the open and closed sites were similar during the December hunting season.

Based on the survival data for grouse on the paired sites and the relatively low amounts of mortality due to hunting it appears that hunting has little if any direct effect on grouse survival in northern lower Michigan. Monschein (1974) and Fischer and Keith (1974) also concluded that there was no evidence that hunting pressure had a significant negative effect on grouse populations. Conversely, in his review paper Bergerud (1985)

concluded that autumn hunting is additive and reduces the spring breeding population size. Kubisiak (1984) suggested that heavy early season hunting may be a major factor depressing grouse populations. He found that during 1971-1983 grouse populations were significantly lower on a hunted versus unhunted area. While this was true of the HNF and PRCSF areas in 1993, it was certainly not true in 1994. The year-end survival rates for grouse on paired sites in 1994 were nearly equivalent. As previously stated, the 1993 sample sizes may partially be responsible for the differences in survival rates between paired sites in 1993.

Age and Sex Classes.--

On most of the 4 sites in both years survival was similar for adults and juveniles and for males and females. These findings support those by Rusch and Keith (1971), Fischer and Keith (1974), and DeStefano and Rusch (1986). However, several significant differences were found. On the HNF in 1993 survival for adults on the open site was significantly greater than for juveniles, and survival for juveniles on the closed site was significantly greater than for juveniles on the open site. On the PRCSF in 1994 survival for females on the closed site was significantly greater than for males. These differences suggest that juveniles and males may tend to have reduced survival.

During the hunting seasons survival was similar for adult and juvenile grouse on the HNF and PRCSF open sites. Juvenile curves were considerably lower than adult curves during the 1994 hunting seasons due to their having undergone a large decrease in survival prior to the start of the autumn hunting season. The cause of the early autumn decrease in survival for juveniles on the open sites in 1994 is not known. However, age

alone does not seem to be the responsible factor, since during this time survival for juveniles on the closed sites did not decrease. Studies by DeStefano and Rusch (1986) and Small et al. (1991) also found that hunting did not differentially effect adult and juvenile grouse.

With the exception of PRCSF in 1993, on the open sites male grouse experienced a decrease in survival 2-6 times greater than did females during the autumn hunting season. On the PRCSF open site in 1993 male and female birds underwent a comparable decline in survival during the autumn hunt. During the 1993 and 1994 December hunting seasons survival was similar for both sexes on HNF and PRCSF. Across both years and areas the percents of male radio-tagged grouse harvested ($\bar{x}$ = 18%) tended to be greater than that of females ($\bar{x}$ = 8%). Fischer and Keith (1974) and DeStefano and Rusch (1986) both concluded that there was no differential vulnerability by sex to hunting. However, DeStefano and Rusch also stated that among juvenile birds males were more susceptible to hunting than females. Of the 20 harvested grouse on the HNF and PRCSF open sites in 1993 and 1994 9 (45%) were juvenile males. Therefore, the combination of the 2 factors juvenile and male may be responsible for the difference in survival between the sexes on the HNF and PRCSF open sites during the autumn hunting season.

## MANAGEMENT IMPLICATIONS

Hunting appears to have had no direct and probably limited indirect effect on the HNF and PRCSF grouse populations. While there was a significant difference between survival curves for birds on open and closed paired sites in 1993, no differences were found for birds on the paired sites in 1994. The yearly survival rates (autumn to autumn) for birds on paired sites in 1994 were extremely comparable. Survival during the autumn and December hunts were similar for birds on paired sites in 1993 and 1994.

Palmer and Bennett (1963) concluded that as much as 50% of the grouse population in Michigan could be safely harvested. At the time of their study the grouse season in northern lower Michigan was from 1 October to 10 November. Since the time of their study the grouse season has been lengthened by 6 weeks, approximately doubling the season length. Even with this increase in season length, the percents of radio-tagged grouse harvested in 1993 and 1994 on the HNF (15% and 8%, respectively) and PRCSF (17% and 10%, respectively) open sites were considerably lower than the 50% harvest proposed by Palmer and Bennett. Although it is possible that not every radio-tagged bird harvested was reported, the number, if any, of unreported harvests is assumed to be small. This assumption is based on the large amount of publicity this study has had throughout Michigan and the positive support for the project expressed by the public, especially hunters. Data from this study indicate that increasing the length of the hunting season had

no obvious effect on grouse populations.

On the HNF and PRCSF areas avian predation was found to be the greatest mortality factor in 1993 ($\bar{x}$ = 43%) and 1994 ($\bar{x}$ = 42%). For the grouse populations on the study areas to withstand heavy predation such as this, adequate cover must be available to them. Gullion (1981) noted the importance of quality habitat for cover, specifically from goshawks, and stated that as effective as goshawks are as grouse predators the effect of their predation can be lessened if grouse have proper cover. Gullion (1972) also stated that the best cover is a canopy of deciduous trees, which allows grouse to see raptors before they themselves are seen. The Michigan ruffed grouse HSI score is based on the food and cover requirements of ruffed grouse. Therefore, the low values (< 0.50) for overall HSI scores for the HNF and PRCSF open and closed sites indicate that the amount of quality cover for grouse on each site is not at a maximum. While it is understood that both the HNF and PRCSF areas are by no means managed exclusively for ruffed grouse, improvement of habitat for grouse on each area would benefit resident grouse populations. A method of habitat improvement is rotational clear cutting of aspen stands. For example, clear cutting a block of 10 acres out of a 40 acre aspen stand approximately every 10 years would provide grouse with the 3 age classes of aspen required to meet all their life history needs.

# APPENDICES

# APPENDIX A

Data collected on vegetation stands sampled on Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1994 and 1995.

Table A1. Data collected on vegetation stands sampled on Huron National Forest (HNF) open site, 1994 and 1995.

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) | | | | | Height (m) | | | | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | |
| Young Aspen | | | | | | | | | | | | |
| 109-39 | 2 | 4.9 | 1800.0 | 0.0 | 8933.3 | 3000.0 | 0.0 | 2.5 | –[a] | 1.7 | 0.0 | 0.0 |
| 113-2 | 7 | 228.0 | 5200.0 | 0.0 | 3000.0 | 800.0 | 0.0 | 6.9 | – | 1.1 | 12.3 | 0.0 |
| 153-6 | 3 | 12.6 | 1466.7 | 0.0 | 13066.7 | 600.0 | 0.0 | 1.5 | – | 1.2 | 0.0 | 0.0 |
| 153-20 | 3 | 10.1 | 466.7 | 0.0 | 16333.3 | 0.0 | 66.7 | 2.7 | – | – | 0.0 | 0.0 |
| 159-9 | 9 | 2.8 | 10800.0 | 0.0 | 2333.3 | 1666.7 | 0.0 | 3.5 | – | 1.5 | 0.0 | 0.0 |
| 159-10 | 9 | 2.0 | 3000.0 | 0.0 | 6600.0 | 200.0 | 0.0 | 4.4 | – | 1.6 | 0.0 | 0.0 |
| 159-11 | 9 | 6.9 | 13866.7 | 0.0 | 5533.3 | 3066.7 | 0.0 | 5.0 | – | 1.7 | 0.0 | 0.0 |
| 159-13 | 7 | 10.1 | 6733.3 | 0.0 | 6133.3 | 2000.0 | 0.0 | 5.0 | – | 1.7 | 10.5 | 0.0 |
| 159-15 | 7 | 8.9 | 200.0 | 0.0 | 12066.7 | 0.0 | 0.0 | 2.7 | – | – | 0.0 | 0.0 |
| 160-28 | 10 | 4.5 | 8266.7 | 0.0 | 4800.0 | 1000.0 | 0.0 | 7.9 | – | 2.1 | 13.7 | 0.0 |
| Medium-Aged Aspen | | | | | | | | | | | | |
| 111-1 | 12 | 12.1 | 8066.7 | 0.0 | 1933.3 | 2866.7 | 0.0 | 6.0 | – | 2.1 | 13.0 | 0.0 |
| 113-1 | 19 | 42.5 | 8466.7 | 0.0 | 3733.3 | 4200.0 | 0.0 | 10.4 | – | 2.0 | 14.0 | 0.0 |
| 115-1 | 21 | 70.9 | 4666.7 | 0.0 | 2733.3 | 0.0 | 0.0 | 10.4 | – | – | 16.0 | 0.0 |
| 115-8 | 12 | 4.9 | 7600.0 | 0.0 | 3800.0 | 4266.7 | 0.0 | 6.9 | – | 1.9 | 12.0 | 0.0 |
| 152-6 | 28 | 12.6 | 2066.7 | 600.0 | 866.7 | 1533.3 | 0.0 | 4.5 | 1.2 | 1.4 | 0.0 | 0.0 |
| 152-10 | 23 | 25.6 | 6533.3 | 0.0 | 1866.7 | 3333.3 | 0.0 | 9.3 | – | 1.5 | 13.0 | 0.0 |
| 153-10 | 17 | 9.7 | 1266.7 | 0.0 | 3133.3 | 3733.3 | 0.0 | 6.0 | – | 1.5 | 11.0 | 0.0 |
| 153-23 | 16 | 42.1 | 2866.7 | 66.7 | 2400.0 | 866.7 | 0.0 | 11.1 | 5.8 | 1.5 | 16.0 | 0.0 |
| 155-3 | 20 | 102.5 | 2933.3 | 0.0 | 1666.7 | 333.3 | 0.0 | 10.8 | – | 2.2 | 15.0 | 0.0 |
| 155-5 | 18 | 26.1 | 11266.7 | 0.0 | 2666.7 | 1133.3 | 0.0 | 8.0 | – | 3.9 | 13.0 | 0.0 |
| 155-16 | 20 | 7.3 | 5600.0 | 200.0 | 4066.7 | 466.7 | 0.0 | 8.8 | 1.8 | 1.2 | 12.0 | 0.0 |
| 158-6 | 24 | 1.6 | 5400.0 | 0.0 | 3666.7 | 400.0 | 66.7 | 6.9 | – | 1.6 | 12.0 | 0.0 |
| 158-10 | 16 | 36.0 | 4066.7 | 0.0 | 4600.0 | 4600.0 | 0.0 | 12.6 | – | 4.2 | 16.0 | 0.0 |
| 160-1 | 14 | 1.8 | 5866.7 | 0.0 | 5866.7 | 1600.0 | 0.0 | 7.7 | – | 1.5 | 12.0 | 0.0 |
| 169-7 | 13 | 7.2 | 2266.7 | 0.0 | 7066.7 | 4066.7 | 0.0 | 8.0 | – | 1.9 | 11.0 | 0.0 |

Table A1. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Medium-Aged Aspen (cont'd) | | | | | | | | | | | | |
| 170-9 | 28 | 1.6 | 5866.7 | 2200.0 | 10000.0 | 1266.7 | 0.0 | 6.5 | 0.4 | 1.3 | 11.0 | 0.0 |
| 170-15 | 23 | 51.0 | 5666.7 | 0.0 | 2666.7 | 2733.3 | 0.0 | 7.4 | – | 1.7 | 12.0 | 0.0 |
| 173-25 | 21 | 54.3 | 5066.7 | 0.0 | 2666.7 | 266.7 | 0.0 | 7.3 | – | 1.3 | 14.0 | 0.0 |
| Old Aspen | | | | | | | | | | | | |
| 108-14 | 62 | 6.9 | 2106.7 | 1013.3 | 133.3 | 93.3 | 320.0 | 15.3 | 1.5 | 1.1 | 20.0 | 0.0 |
| 110-5 | 34 | 4.9 | 1293.3 | 0.0 | 1053.3 | 306.7 | 26.7 | 8.8 | – | 1.4 | 14.0 | 0.0 |
| 111-10 | 72 | 26.7 | 560.0 | 480.0 | 440.0 | 93.3 | 213.3 | 15.9 | 0.8 | 1.1 | 19.0 | 0.0 |
| 111-23 | 67 | 12.6 | 6666.7 | 173.3 | 213.3 | 306.7 | 266.7 | 16.7 | 3.3 | 1.7 | 27.0 | 0.0 |
| 116-25 | 85 | 17.0 | 1453.3 | 0.0 | 1173.3 | 1000.0 | 253.3 | 11.2 | – | 1.6 | 18.0 | 0.0 |
| 152-5 | 31 | 6.5 | 1893.3 | 13.3 | 1240.0 | 1106.7 | 160.0 | 12.6 | 7.5 | 1.3 | 19.0 | 0.0 |
| 154-3 | 41 | 7.7 | 2866.7 | 0.0 | 293.3 | 2506.7 | 213.3 | 10.9 | – | 1.5 | 19.0 | 0.0 |
| 159-12 | 71 | 15.8 | 1813.3 | 0.0 | 346.7 | 640.0 | 493.3 | 16.5 | – | 1.4 | 23.0 | 0.0 |
| 160-4 | 55 | 59.5 | 2413.3 | 0.0 | 386.7 | 720.0 | 413.3 | 13.0 | – | 1.5 | 19.0 | 0.0 |
| 160-14 | 69 | 17.4 | 1440.0 | 466.7 | 146.7 | 253.3 | 253.3 | 13.3 | 0.6 | 1.4 | 19.0 | 0.0 |
| 160-20 | 59 | 4.1 | 2973.3 | 0.0 | 653.3 | 293.3 | 853.3 | 15.6 | – | 1.7 | 22.0 | 0.0 |
| 170-27 | 71 | 8.9 | 1013.3 | 0.0 | 666.7 | 0.0 | 733.3 | 21.8 | – | – | 26.0 | 0.0 |
| 170-33 | 72 | 5.3 | 2786.7 | 240.0 | 760.0 | 3626.7 | 173.3 | 8.5 | 1.5 | 1.9 | 15.0 | 0.0 |
| Upland Hardwoods | | | | | | | | | | | | |
| 111-5 | 70 | 4.1 | 1666.7 | 1626.7 | 186.7 | 640.0 | 293.3 | 20.9 | 0.7 | 1.9 | 24.1 | 0.0 |
| 155-4 | 66 | 54.7 | 2653.3 | 0.0 | 106.7 | 226.7 | 266.7 | 10.0 | – | 1.1 | 17.5 | 0.0 |
| 155-11 | 65 | 17.4 | 6973.3 | 0.0 | 546.7 | 1800.0 | 106.7 | 7.6 | – | 2.3 | 13.9 | 0.0 |
| 169-5 | 66 | 5.7 | 2946.7 | 0.0 | 1480.0 | 1733.3 | 186.7 | 11.3 | – | 1.7 | 18.0 | 0.0 |
| 170-46 | 74 | 3.2 | 4400.0 | 13.3 | 266.7 | 1533.3 | 213.3 | 15.1 | 2.0 | 1.7 | 26.2 | 0.0 |
| 172-12 | 61 | 7.3 | 1466.7 | 0.0 | 26.7 | 66.7 | 226.7 | 12.1 | – | 1.6 | 18.9 | 0.0 |
| 172-31 | 71 | 4.1 | 2400.0 | 0.0 | 146.7 | 253.3 | 373.3 | 14.3 | – | 1.1 | 22.3 | 0.0 |

Table A1. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Upland Hardwoods (cont'd) | | | | | | | | | | | | |
| 173-6 | 64 | 33.6 | 3373.3 | 760.0 | 200.0 | 0.0 | 200.0 | 9.3 | 0.9 | – | 17.8 | 0.0 |
| 174-1 | 64 | 3.6 | 4506.7 | 720.0 | 93.3 | 280.0 | 106.7 | 6.3 | 1.2 | 2.5 | 15.0 | 0.0 |
| Oaks | | | | | | | | | | | | |
| 114-4 | 23 | 4.9 | 2826.7 | 0.0 | 0.0 | 11266.7 | 13.3 | 3.8 | – | 1.3 | 0.0 | 600.0 |
| 116-3 | 22 | 4.1 | 1280.0 | 53.3 | 0.0 | 4840.0 | 40.0 | 4.9 | 1.3 | 1.3 | 12.0 | 725.0 |
| 156-2 | 70 | 33.6 | 2986.7 | 0.0 | 226.7 | 760.0 | 453.3 | 17.3 | – | 1.4 | 24.0 | 0.0 |
| 156-6 | 63 | 46.2 | 3346.7 | 0.0 | 240.0 | 600.0 | 413.3 | 14.6 | – | 1.7 | 24.0 | 0.0 |
| 159-19 | 72 | 9.3 | 773.3 | 0.0 | 3866.7 | 3040.0 | 280.0 | 11.3 | – | 1.2 | 22.0 | 0.0 |
| 161-3 | 63 | 7.7 | 2226.7 | 0.0 | 93.3 | 0.0 | 1333.3 | 15.5 | – | – | 18.0 | 0.0 |
| 161-7 | 63 | 11.3 | 2173.3 | 466.7 | 40.0 | 786.7 | 373.3 | 10.5 | 0.5 | 1.4 | 17.0 | 0.0 |
| 167-7 | 58 | 34.0 | 6400.0 | 266.7 | 13.3 | 24200.0 | 0.0 | 4.3 | 1.0 | 1.7 | 0.0 | 0.0 |
| Lowland Conifers | | | | | | | | | | | | |
| 110-13 | 93 | 13.0 | 853.3 | 186.7 | 520.0 | 306.7 | 360.0 | 12.0 | 1.3 | 1.5 | 18.0 | 0.0 |
| 158-3 | 73 | 13.4 | 1386.7 | 3600.0 | 3120.0 | 80.0 | 0.0 | 12.8 | 1.0 | 2.3 | 14.5 | 0.0 |
| 173-4 | 69 | 7.3 | 1053.3 | 5253.3 | 253.3 | 53.3 | 120.0 | 11.2 | 1.2 | 1.7 | 15.1 | 0.0 |
| 173-26 | 84 | 3.6 | 1440.0 | 546.7 | 506.7 | 53.3 | 173.3 | 8.5 | 2.8 | 1.4 | 14.2 | 0.0 |
| 173-27 | 84 | 13.8 | 653.3 | 1746.7 | 146.7 | 0.0 | 386.7 | 13.0 | 5.5 | – | 15.2 | 0.0 |
| Young Jack Pine | | | | | | | | | | | | |
| 152-17 | 17 | 10.9 | 1000.0 | 800.0 | 186.7 | 3746.7 | 0.0 | 2.9 | 0.4 | 1.3 | 0.0 | 0.0 |
| 167-21 | 14 | 26.7 | 893.3 | 9760.0 | 120.0 | 4866.7 | 0.0 | 3.9 | 2.7 | 2.3 | 0.0 | 0.0 |
| 168-3 | 14 | 2.4 | 586.7 | 8800.0 | 40.0 | 2600.0 | 0.0 | 1.8 | 1.0 | 1.4 | 0.0 | 0.0 |

Table A1. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Jack Pine | | | | | | | | | | | | |
| 114-2 | 57 | 9.7 | 626.7 | 200.0 | 480.0 | 1333.3 | 120.0 | 4.8 | 3.0 | 1.1 | 11.9 | 0.0 |
| 115-2 | 33 | 63.6 | 2040.0 | 866.7 | 280.0 | 14520.0 | 133.3 | 5.3 | 1.9 | 1.5 | 15.0 | 0.0 |
| 115-3 | 53 | 13.8 | 3426.7 | 653.3 | 333.3 | 14080.0 | 66.7 | 5.8 | 4.0 | 1.7 | 13.0 | 0.0 |
| 116-1 | 57 | 25.9 | 1333.3 | 666.7 | 226.7 | 933.3 | 333.3 | 4.1 | 5.1 | 1.8 | 14.4 | 0.0 |
| 116-4 | 72 | 45.4 | 3213.3 | 773.3 | 53.3 | 2813.3 | 173.3 | 3.5 | 2.7 | 1.6 | 0.0 | 0.0 |
| 116-19 | 55 | 6.1 | 1160.0 | 386.7 | 213.3 | 2146.7 | 360.0 | 5.4 | 3.6 | 1.6 | 14.6 | 0.0 |
| 116-21 | 54 | 14.6 | 1146.7 | 800.0 | 0.0 | 693.3 | 466.7 | 1.9 | 3.7 | 1.4 | 0.0 | 350.0 |
| 116-24 | 46 | 2.4 | 853.3 | 800.0 | 0.0 | 213.3 | 400.0 | 3.4 | 5.2 | 1.5 | 0.0 | 75.0 |
| 152-11 | 64 | 6.5 | 946.7 | 320.0 | 0.0 | 133.3 | 26.7 | 3.3 | 2.1 | 1.0 | 0.0 | 25.0 |
| 167-14 | 63 | 11.3 | 1826.7 | 986.7 | 66.7 | 693.3 | 106.7 | 3.8 | 2.9 | 1.4 | 11.0 | 0.0 |
| Young Pines | | | | | | | | | | | | |
| 155-15 | 28 | 5.7 | 266.7 | 1400.0 | 566.7 | 0.0 | 233.3 | 7.9 | 3.6 | – | 15.0 | 0.0 |
| 156-9 | 23 | 13.0 | 4966.7 | 700.0 | 0.0 | 300.0 | 300.0 | 7.1 | 1.3 | 1.7 | 16.9 | 175.0 |
| 169-4 | 30 | 6.9 | 2600.0 | 233.3 | 833.3 | 4866.7 | 166.7 | 4.0 | 1.7 | 1.2 | 20.0 | 0.0 |
| 170-10 | 27 | 7.3 | 700.0 | 7266.7 | 466.7 | 0.0 | 400.0 | 10.6 | 1.3 | – | 15.6 | 0.0 |
| 173-20 | 28 | 8.9 | 866.7 | 900.0 | 0.0 | 0.0 | 333.3 | 6.2 | 6.6 | – | 13.3 | 625.0 |
| 173-22 | 28 | 2.0 | 4000.0 | 633.3 | 100.0 | 533.3 | 66.7 | 7.7 | 3.4 | 1.6 | 12.2 | 0.0 |
| 174-10 | 28 | 4.5 | 3033.3 | 1100.0 | 0.0 | 1000.0 | 333.3 | 4.3 | 3.4 | 1.8 | 10.0 | 25.0 |
| Old Pines | | | | | | | | | | | | |
| 152-14 | 45 | 45.8 | 840.0 | 973.3 | 346.7 | 40.0 | 1400.0 | 6.0 | 5.8 | 1.0 | 17.0 | 0.0 |
| 153-9 | 54 | 10.5 | 1053.3 | 173.3 | 413.3 | 1546.7 | 520.0 | 5.8 | 3.4 | 1.3 | 15.3 | 0.0 |
| 153-19 | 46 | 47.4 | 1360.0 | 466.7 | 1746.7 | 1106.7 | 160.0 | 9.9 | 4.0 | 1.5 | 19.9 | 0.0 |
| 160-11 | 32 | 28.4 | 2200.0 | 1146.7 | 0.0 | 1026.7 | 640.0 | 3.1 | 3.1 | 1.3 | 10.4 | 225.0 |
| 161-4 | 51 | 68.9 | 1160.0 | 306.7 | 0.0 | 813.3 | 1080.0 | 4.6 | 6.8 | 1.4 | 19.1 | 75.0 |

*Table A1. (cont'd)*

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Pines (cont'd) | | | | | | | | | | | | |
| 167-4 | 59 | 15.4 | 1880.0 | 573.3 | 0.0 | 1573.3 | 1160.0 | 6.0 | 7.8 | 1.7 | 14.8 | 625.0 |
| 167-5 | 59 | 32.8 | 746.7 | 586.7 | 906.7 | 1880.0 | 920.0 | 1.5 | 10.4 | 1.3 | 0.0 | 0.0 |
| 174-2 | 45 | 2.4 | 2333.3 | 1120.0 | 80.0 | 360.0 | 1960.0 | 5.7 | 8.3 | 1.5 | 20.6 | 0.0 |
| Lowland Hardwoods | | | | | | | | | | | | |
| 172-21 | 3+ | 1.2 | 17733.3 | 0.0 | 0.0 | 18866.7 | 0.0 | 2.3 | -- | 1.4 | 0.0 | 175.0 |
| 172-28 | 71 | 1.6 | 466.7 | 0.0 | 0.0 | 166.7 | 133.3 | 4.9 | -- | 1.0 | 18.0 | 250.0 |
| 173-2 | 14+ | 6.5 | 15600.0 | 0.0 | 0.0 | 7133.3 | 0.0 | 3.8 | -- | 1.8 | 0.0 | 100.0 |
| 173-19 | 14+ | 4.5 | 4933.3 | 0.0 | 533.3 | 666.7 | 1200.0 | 9.3 | -- | 1.5 | 17.4 | 0.0 |

[a] No corresponding stems were present in any of the 3 plots sampled.

Table A2. Data collected on vegetation stands sampled on Huron National Forest (HNF) closed site, 1994 and 1995.

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) | | | | | Height (m) | | | | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | |
| Young Aspen | | | | | | | | | | | | |
| 15-16 | 7 | 9.3 | 6866.7 | 0.0 | 6066.7 | 6800.0 | 0.0 | 6.4 | –[a] | 3.1 | 11.3 | 0.0 |
| 16-427 | 2 | 13.0 | 200.0 | 0.0 | 5333.3 | 2866.7 | 0.0 | 1.8 | – | 1.3 | 0.0 | 0.0 |
| 16-527 | 4 | 8.1 | 1000.0 | 0.0 | 7666.7 | 3200.0 | 0.0 | 2.7 | – | 1.6 | 0.0 | 0.0 |
| 17-36 | 8 | 3.2 | 5866.7 | 0.0 | 4733.3 | 1600.0 | 0.0 | 5.1 | – | 1.5 | 11.0 | 0.0 |
| 18-14 | 10 | 7.3 | 6133.3 | 0.0 | 4933.3 | 4200.0 | 0.0 | 4.4 | – | 1.7 | 0.0 | 0.0 |
| 18-21 | 10 | 3.2 | 12866.7 | 66.7 | 1400.0 | 2666.7 | 0.0 | 5.2 | 3.0 | 2.2 | 11.0 | 0.0 |
| 50-15 | 7 | 5.3 | 1600.0 | 0.0 | 5400.0 | 6333.3 | 0.0 | 4.6 | – | 1.3 | 14.0 | 0.0 |
| 186-73 | 10 | 5.7 | 12733.3 | 66.7 | 5533.3 | 3066.7 | 0.0 | 4.8 | 0.1 | 1.6 | 10.3 | 0.0 |
| 189-17 | 3 | 2.8 | 933.3 | 0.0 | 14200.0 | 1600.0 | 0.0 | 2.5 | – | 1.7 | 0.0 | 0.0 |
| 189-26 | 7 | 2.0 | 3800.0 | 0.0 | 10933.3 | 800.0 | 0.0 | 4.7 | – | 1.2 | 12.0 | 0.0 |
| 190-2 | 6 | 14.2 | 2133.3 | 0.0 | 7000.0 | 2000.0 | 0.0 | 3.3 | – | 1.2 | 0.0 | 0.0 |
| 190-4 | 5 | 2.8 | 5400.0 | 0.0 | 14866.7 | 7000.0 | 0.0 | 3.6 | – | 1.7 | 0.0 | 0.0 |
| 193-20 | 3 | 16.2 | 1733.3 | 0.0 | 16133.3 | 2733.3 | 0.0 | 2.5 | – | 1.5 | 0.0 | 0.0 |
| 195-13 | 1 | 7.7 | 933.3 | 0.0 | 12800.0 | 7200.0 | 0.0 | 1.7 | – | 1.5 | 0.0 | 0.0 |
| 195-40 | 1 | 6.1 | 800.0 | 0.0 | 12666.7 | 7533.3 | 0.0 | 1.4 | – | 1.4 | 0.0 | 0.0 |
| 199-56 | 6 | 4.9 | 7133.3 | 0.0 | 8866.7 | 5466.7 | 0.0 | 4.0 | – | 1.4 | 0.0 | 0.0 |
| Medium-Aged Aspen | | | | | | | | | | | | |
| 15-10 | 25 | 11.3 | 2933.3 | 0.0 | 400.0 | 1200.0 | 7.0 | 9.1 | – | 1.6 | 21.0 | 0.0 |
| 15-11 | 22 | 13.4 | 2800.0 | 0.0 | 2866.7 | 800.0 | 0.0 | 10.4 | – | 1.7 | 17.0 | 0.0 |
| 16-26 | 13 | 12.6 | 5666.7 | 0.0 | 5133.3 | 2266.7 | 0.0 | 6.2 | – | 3.1 | 11.7 | 0.0 |
| 16-31 | 29 | 7.3 | 1000.0 | 53.3 | 1320.0 | 4440.0 | 800.0 | 8.0 | 1.0 | 1.7 | 15.0 | 0.0 |
| 17-31 | 12 | 8.5 | 11133.3 | 0.0 | 6200.0 | 8600.0 | 0.0 | 7.8 | – | 1.7 | 12.0 | 0.0 |
| 49-1 | 24 | 4.5 | 6400.0 | 0.0 | 1333.3 | 2600.0 | 0.0 | 8.7 | – | 4.3 | 15.0 | 0.0 |
| 186-14 | 19 | 133.7 | 4000.0 | 66.7 | 3266.7 | 1600.0 | 0.0 | 12.2 | 1.0 | 4.0 | 15.0 | 0.0 |
| 186-56 | 19 | 3.6 | 3466.7 | 0.0 | 2866.7 | 600.0 | 0.0 | 8.8 | – | 2.1 | 14.3 | 0.0 |
| 189-25 | 17 | 15.4 | 5000.0 | 0.0 | 4933.3 | 466.7 | 0.0 | 6.4 | – | 2.1 | 12.7 | 0.0 |

Table A2. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Medium-Aged Aspen (cont'd) | | | | | | | | | | | | |
| 191-6 | 25 | 5.7 | 2866.7 | 66.7 | 1333.3 | 1000.0 | 0.0 | 6.3 | 0.9 | 2.4 | 13.0 | 0.0 |
| 192-8 | 27 | 2.0 | 3600.0 | 0.0 | 5466.7 | 16600.0 | 2.0 | 5.8 | – | 1.9 | 18.0 | 0.0 |
| 192-38 | 28 | 6.1 | 3266.7 | 0.0 | 1800.0 | 7200.0 | 2.0 | 5.1 | – | 1.2 | 16.0 | 0.0 |
| 194-47 | 13 | 19.0 | 2133.3 | 0.0 | 4400.0 | 3666.7 | 0.0 | 8.5 | – | 1.5 | 12.5 | 0.0 |
| 195-22 | 26 | 14.2 | 1933.3 | 0.0 | 4066.7 | 400.0 | 2.0 | 7.8 | – | 1.5 | 15.0 | 0.0 |
| 196-1 | 14 | 2.0 | 1066.7 | 27733.3 | 4666.7 | 0.0 | 0.0 | 5.5 | 0.7 | – | 0.0 | 0.0 |
| 196-6 | 14 | 39.7 | 8666.7 | 66.7 | 2066.7 | 5400.0 | 0.0 | 7.2 | 1.5 | 1.8 | 12.0 | 0.0 |
| 196-24 | 14 | 31.2 | 4066.7 | 0.0 | 5533.3 | 4866.7 | 0.0 | 8.0 | – | 1.9 | 11.6 | 0.0 |
| 199-41 | 20 | 7.3 | 5400.0 | 0.0 | 1866.7 | 1133.3 | 0.0 | 9.2 | – | 2.3 | 14.3 | 0.0 |
| 199-47 | 21 | 4.5 | 4600.0 | 0.0 | 2400.0 | 6400.0 | 2.0 | 10.3 | – | 1.7 | 15.0 | 0.0 |
| 212-20 | 11 | 13.8 | 3000.0 | 0.0 | 6133.3 | 1600.0 | 0.0 | 7.7 | – | 1.4 | 11.0 | 0.0 |
| 213-24 | 14 | 15.8 | 3866.7 | 0.0 | 4266.7 | 3266.7 | 0.0 | 8.4 | – | 2.4 | 13.6 | 0.0 |
| Old Aspen | | | | | | | | | | | | |
| 15-5 | 52 | 11.7 | 3786.7 | 0.0 | 266.7 | 746.7 | 1200.0 | 8.2 | – | 1.2 | 16.0 | 0.0 |
| 15-12 | 67 | 14.6 | 2213.3 | 13.3 | 293.3 | 93.3 | 720.0 | 13.1 | 0.2 | 1.1 | 19.0 | 0.0 |
| 15-13 | 68 | 21.1 | 1826.7 | 0.0 | 173.3 | 520.0 | 600.0 | 12.0 | – | 2.5 | 17.0 | 0.0 |
| 15-26 | unk | 2.4 | 2146.7 | 26.7 | 666.7 | 1506.7 | 1040.0 | 10.9 | 1.8 | 1.3 | 21.0 | 0.0 |
| 16-111 | 60 | 16.2 | 4786.7 | 0.0 | 293.3 | 1226.7 | 800.0 | 10.0 | – | 1.8 | 19.0 | 0.0 |
| 17-4 | 44 | 25.9 | 2200.0 | 0.0 | 533.3 | 2506.7 | 440.0 | 10.8 | – | 1.5 | 15.0 | 0.0 |
| 49-15 | 35 | 12.2 | 2106.7 | 13.3 | 426.7 | 693.3 | 880.0 | 10.0 | 1.8 | 1.8 | 19.0 | 0.0 |
| 52-7 | 86 | 4.5 | 720.0 | 0.0 | 653.3 | 266.7 | 1600.0 | 12.1 | – | 1.2 | 17.0 | 0.0 |
| 52-18 | 86 | 8.9 | 2426.7 | 0.0 | 333.3 | 1600.0 | 1000.0 | 14.1 | – | 1.7 | 18.0 | 0.0 |
| 186-71 | 88 | 8.9 | 1280.0 | 2413.3 | 200.0 | 973.3 | 840.0 | 13.1 | 0.8 | 1.2 | 20.0 | 0.0 |
| 186-75 | 78 | 5.7 | 1226.7 | 40.0 | 120.0 | 240.0 | 1000.0 | 15.5 | 0.3 | 2.1 | 19.0 | 0.0 |
| 189-24 | 49 | 3.6 | 3386.7 | 0.0 | 173.3 | 3146.7 | 920.0 | 17.4 | – | 1.4 | 20.0 | 0.0 |
| 190-5 | 76 | 6.5 | 3186.7 | 0.0 | 226.7 | 613.3 | 800.0 | 19.2 | – | 1.2 | 23.0 | 0.0 |

Table A2. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Aspen (cont'd) | | | | | | | | | | | | |
| 191-9 | 35 | 5.3 | 1360.0 | 106.7 | 773.3 | 2320.0 | 600.0 | 8.5 | 2.8 | 1.6 | 16.0 | 0.0 |
| 191-32 | 59 | 9.7 | 3413.3 | 0.0 | 786.7 | 1653.3 | 320.0 | 12.7 | – | 1.9 | 19.0 | 0.0 |
| 192-18 | 62 | 6.5 | 866.7 | 80.0 | 1720.0 | 4533.3 | 160.0 | 9.8 | 1.6 | 1.8 | 16.0 | 0.0 |
| 192-21 | 30 | 13.0 | 1573.3 | 93.3 | 2386.7 | 1253.3 | 160.0 | 8.8 | 3.0 | 1.4 | 14.0 | 0.0 |
| 195-9 | 37 | 17.0 | 2173.3 | 0.0 | 626.7 | 3053.3 | 920.0 | 11.7 | – | 2.0 | 19.0 | 0.0 |
| 195-30 | 43 | 2.4 | 1973.3 | 360.0 | 3120.0 | 2360.0 | 600.0 | 7.3 | 2.1 | 1.3 | 15.0 | 0.0 |
| 199-81 | 72 | 19.4 | 1400.0 | 26.7 | 266.7 | 346.7 | 1200.0 | 15.3 | 7.2 | 1.9 | 20.0 | 0.0 |
| Upland Hardwoods | | | | | | | | | | | | |
| 17-14 | 65 | 16.6 | 2480.0 | 0.0 | 306.7 | 1466.7 | 520.0 | 10.9 | – | 1.4 | 16.0 | 0.0 |
| 18-13 | 59 | 20.3 | 3080.0 | 133.3 | 13.3 | 2573.3 | 640.0 | 12.9 | 0.2 | 1.3 | 21.0 | 0.0 |
| 49-2 | 84 | 44.6 | 8080.0 | 0.0 | 40.0 | 1000.0 | 600.0 | 7.7 | – | 1.5 | 15.0 | 0.0 |
| 50-13 | 84 | 17.0 | 2120.0 | 0.0 | 13.3 | 346.7 | 960.0 | 14.5 | – | 1.2 | 23.0 | 0.0 |
| 51-12 | 68 | 59.1 | 1613.3 | 0.0 | 106.7 | 213.3 | 960.0 | 14.5 | – | 1.7 | 20.0 | 0.0 |
| 51-19 | 65 | 6.9 | 2173.3 | 0.0 | 66.7 | 93.3 | 1320.0 | 18.9 | – | 1.1 | 24.0 | 0.0 |
| 52-4 | 74 | 41.7 | 2320.0 | 0.0 | 0.0 | 813.3 | 1120.0 | 13.8 | – | 1.2 | 20.0 | 400.0 |
| 194-26 | 67 | 16.6 | 2200.0 | 0.0 | 0.0 | 1733.3 | 400.0 | 10.9 | – | 1.6 | 19.0 | 50.0 |
| 194-53 | 74 | 6.1 | 4506.7 | 0.0 | 333.3 | 1320.0 | 560.0 | 11.9 | – | 1.9 | 17.0 | 0.0 |
| 212-28 | unk | 21.9 | 1720.0 | 0.0 | 173.3 | 1960.0 | 560.0 | 8.7 | – | 2.3 | 19.0 | 0.0 |
| Oaks | | | | | | | | | | | | |
| 186-6 | 87 | 7.7 | 1840.0 | 146.7 | 0.0 | 933.3 | 800.0 | 11.2 | 0.4 | 1.5 | 18.0 | 150.0 |
| 186-29 | 77 | 4.9 | 1840.0 | 80.0 | 106.7 | 373.3 | 720.0 | 13.3 | 0.3 | 1.5 | 18.0 | 0.0 |
| 186-76 | 79 | 4.5 | 1146.7 | 320.0 | 0.0 | 106.7 | 920.0 | 10.7 | 0.5 | 1.1 | 19.0 | 150.0 |
| 189-15 | 81 | 17.8 | 826.7 | 0.0 | 0.0 | 133.3 | 440.0 | 11.1 | – | 1.1 | 20.0 | 100.0 |
| 198-33 | 70 | 6.9 | 2560.0 | 1320.0 | 0.0 | 840.0 | 360.0 | 6.2 | 0.6 | 1.7 | 16.0 | 600.0 |

Table A2. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Oaks (cont'd) | | | | | | | | | | | | |
| 212-3 | 13 | 10.1 | 1040.0 | 226.7 | 266.7 | 7120.0 | 0.0 | 3.2 | 0.9 | 3.0 | 0.0 | 0.0 |
| 212-21 | 65 | 39.3 | 2920.0 | 40.0 | 493.3 | 3333.3 | 440.0 | 8.1 | 2.0 | 1.5 | 17.0 | 0.0 |
| 213-1 | 13 | 30.4 | 1840.0 | 120.0 | 0.0 | 5040.0 | 0.0 | 3.4 | 1.5 | 3.1 | 0.0 | 275.0 |
| Lowland Conifers | | | | | | | | | | | | |
| 186-38 | 134 | 12.2 | 173.3 | 6653.3 | 0.0 | 0.0 | 440.0 | 9.9 | 1.7 | – | 15.0 | 75.0 |
| 186-40 | 94 | 2.4 | 146.7 | 4746.7 | 13.3 | 0.0 | 400.0 | 15.0 | 3.7 | – | 16.0 | 0.0 |
| 186-66 | 77 | 1.2 | 1306.7 | 1560.0 | 133.3 | 3666.7 | 400.0 | 7.3 | 3.0 | 1.4 | 15.0 | 0.0 |
| 190-1 | 74 | 2.0 | 986.7 | 3720.0 | 0.0 | 1920.0 | 280.0 | 2.1 | 1.7 | 1.6 | 0.0 | 75.0 |
| 196-39 | 74 | 0.4 | 920.0 | 493.3 | 0.0 | 2506.7 | 160.0 | 6.7 | 2.5 | 1.6 | 11.0 | 25.0 |
| 199-10 | 74 | 1.2 | 166.7 | 4033.3 | 0.0 | 14966.7 | 0.0 | 1.7 | 1.2 | 1.0 | 0.0 | 475.0 |
| 199-52 | 72 | 6.5 | 1933.3 | 720.0 | 80.0 | 3906.7 | 400.0 | 9.5 | 3.2 | 1.6 | 14.0 | 0.0 |
| Young Jack Pine | | | | | | | | | | | | |
| 185-7 | 22 | 1.2 | 1253.3 | 560.0 | 200.0 | 2580.0 | 0.0 | 3.2 | 0.4 | 1.5 | 0.0 | 0.0 |
| 185-37 | 15 | 39.7 | 586.7 | 2173.3 | 0.0 | 320.0 | 0.0 | 2.3 | 0.4 | 1.2 | 0.0 | 825.0 |
| 197-11 | 14 | 7.7 | 773.3 | 2693.3 | 13.3 | 5653.3 | 0.0 | 1.9 | 0.5 | 1.3 | 0.0 | 0.0 |
| 198-45 | 16 | 2.8 | 706.7 | 826.7 | 0.0 | 1120.0 | 0.0 | 3.2 | 0.3 | 1.4 | 0.0 | 400.0 |
| 199-79 | 14 | 2.0 | 586.7 | 1120.0 | 0.0 | 93.3 | 160.0 | 1.9 | 6.7 | 1.6 | 0.0 | 50.0 |
| 200-4 | 14 | 6.1 | 773.3 | 9613.3 | 0.0 | 226.7 | 0.0 | 2.4 | 0.7 | 1.4 | 0.0 | 1475.0 |
| 200-6 | 14 | 4.5 | 640.0 | 3026.7 | 0.0 | 600.0 | 120.0 | 2.2 | 0.6 | 1.1 | 0.0 | 1475.0 |
| 200-11 | 14 | 3.6 | 266.7 | 7200.0 | 0.0 | 493.3 | 0.0 | 1.4 | 0.4 | 1.0 | 0.0 | 925.0 |
| 200-14 | 14 | 5.3 | 1226.7 | 6760.0 | 0.0 | 466.7 | 0.0 | 2.7 | 0.5 | 1.3 | 0.0 | 637.5 |
| 212-2 | 14 | 19.0 | 800.0 | 4786.7 | 0.0 | 3680.0 | 0.0 | 1.8 | 0.8 | 1.1 | 0.0 | 0.0 |

Table A2. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Jack Pine | | | | | | | | | | | | |
| 192-15 | 73 | 2.8 | 1680.0 | 346.7 | 826.7 | 1440.0 | 240.0 | 7.0 | 2.1 | 1.3 | 12.0 | 0.0 |
| 197-3 | 65 | 13.4 | 2466.7 | 1146.7 | 0.0 | 480.0 | 720.0 | 1.9 | 6.2 | 1.3 | 0.0 | 625.0 |
| 197-12 | 62 | 11.3 | 2946.7 | 920.0 | 66.7 | 533.3 | 400.0 | 4.4 | 3.1 | 1.7 | 16.3 | 0.0 |
| 198-21 | 59 | 21.9 | 2693.3 | 826.7 | 160.0 | 213.3 | 520.0 | 2.6 | 8.8 | 1.4 | 0.0 | 0.0 |
| 198-37 | 56 | 5.7 | 1586.7 | 1400.0 | 0.0 | 40.0 | 280.0 | 5.5 | 4.9 | 1.0 | 15.0 | 1000.0 |
| 198-42 | 59 | 17.8 | 1746.7 | 493.3 | 600.0 | 1160.0 | 760.0 | 5.4 | 8.5 | 1.4 | 14.0 | 0.0 |
| 199-1 | 53 | 3.2 | 3773.3 | 2826.7 | 0.0 | 1853.3 | 160.0 | 3.4 | 1.4 | 1.5 | 0.0 | 300.0 |
| 199-59 | 54 | 6.9 | 2533.3 | 1066.7 | 0.0 | 440.0 | 320.0 | 3.0 | 7.1 | 1.3 | 11.5 | 37.5 |
| 200-5 | 56 | 6.9 | 1960.0 | 1826.7 | 0.0 | 186.7 | 240.0 | 1.9 | 6.3 | 1.2 | 0.0 | 1312.5 |
| 200-7 | 56 | 10.9 | 2213.3 | 586.7 | 0.0 | 2786.7 | 720.0 | 2.1 | 5.9 | 1.3 | 0.0 | 1000.0 |
| Young Pines | | | | | | | | | | | | |
| 185-14 | 12 | 4.9 | 8700.0 | 400.0 | 666.7 | 3733.3 | 0.0 | 3.5 | 0.7 | 1.5 | 0.0 | 0.0 |
| 185-16 | 20 | 30.4 | 1600.0 | 1466.7 | 66.7 | 366.7 | 300.0 | 3.7 | 1.5 | 1.5 | 13.0 | 0.0 |
| 185-24 | 21 | 22.3 | 3500.0 | 533.3 | 166.7 | 666.7 | 0.0 | 2.7 | 0.7 | 1.2 | 0.0 | 0.0 |
| 186-3 | 18 | 17.8 | 2320.0 | 813.3 | 493.3 | 1866.7 | 0.0 | 6.3 | 1.7 | 1.9 | 13.0 | 0.0 |
| 186-8 | 20 | 11.7 | 2133.3 | 2066.7 | 133.3 | 133.3 | 200.0 | 2.8 | 1.7 | 1.2 | 0.0 | 0.0 |
| 192-12 | 30 | 3.6 | 533.3 | 1700.0 | 400.0 | 66.7 | 500.0 | 3.0 | 1.4 | 0.9 | 10.5 | 0.0 |
| 198-11 | 15 | 17.8 | 633.3 | 3500.0 | 0.0 | 533.3 | 0.0 | 2.4 | 0.4 | 1.7 | 0.0 | 450.0 |
| 212-25 | 7 | 4.5 | 733.3 | 1133.3 | 2766.7 | 3166.7 | 2300.0 | 2.3 | 6.9 | 1.5 | 0.0 | 0.0 |
| Old Pines | | | | | | | | | | | | |
| 185-21 | 76 | 6.1 | 1733.3 | 320.0 | 173.3 | 880.0 | 520.0 | 6.1 | 3.8 | 1.5 | 15.0 | 0.0 |
| 191-7 | 109 | 3.2 | 1293.3 | 306.7 | 546.7 | 840.0 | 640.0 | 11.3 | 3.8 | 1.4 | 17.0 | 0.0 |
| 197-22 | 60 | 7.3 | 1253.3 | 546.7 | 0.0 | 520.0 | 1240.0 | 4.3 | 4.9 | 1.4 | 14.0 | 350.0 |
| 197-30 | 54 | 2.4 | 2826.7 | 906.7 | 0.0 | 2613.3 | 1680.0 | 4.8 | 10.5 | 1.7 | 15.0 | 75.0 |
| 199-17 | 98 | 11.3 | 1906.7 | 666.7 | 93.3 | 1360.0 | 720.0 | 6.9 | 5.4 | 1.9 | 12.0 | 0.0 |

Table A2. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Pines (cont'd) | | | | | | | | | | | | |
| 200-22 | 59 | 13.8 | 440.0 | 506.7 | 0.0 | 93.3 | 400.0 | 3.5 | 5.7 | 1.1 | 17.0 | 625.0 |
| 212-12 | unk | 8.1 | 1666.7 | 240.0 | 1560.0 | 10906.7 | 320.0 | 6.2 | 2.6 | 2.0 | 15.0 | 0.0 |
| Lowland Hardwoods | | | | | | | | | | | | |
| 17-20 | 15+ | 1.2 | 11933.3 | 0.0 | 0.0 | 30266.7 | 200.0 | 3.4 | – | 1.9 | 11.0 | 25.0 |
| 18-8 | 57 | 1.2 | 9400.0 | 266.7 | 0.0 | 10933.3 | 0.0 | 2.4 | 0.3 | 1.5 | 12.0 | 50.0 |
| 189-6 | unk | 0.8 | 4000.0 | 66.7 | 200.0 | 2533.3 | 0.0 | 4.8 | 1.5 | 1.6 | 12.0 | 50.0 |

[a] No corresponding stems were present in any of the 3 plots sampled.

Table A3. Data collected on vegetation stands sampled on Pigeon River Country State Forest (PRCSF) open site, 1994 and 1995.

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) | | | | | Height (m) | | | | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | |
| Young Aspen | | | | | | | | | | | | |
| 3-48 | 9 | 8.9 | 7466.7 | 1200.0 | 6533.3 | 4533.3 | 0.0 | 2.9 | 0.2 | 1.5 | 0.0 | 0.0 |
| 6-83 | 2 | 5.7 | 0.0 | 0.0 | 8466.7 | 0.0 | 0.0 | 1.4 | –[a] | – | 0.0 | 0.0 |
| 7-12 | 8 | 5.7 | 133.3 | 2200.0 | 5800.0 | 0.0 | 0.0 | 5.9 | 0.3 | – | 0.0 | 0.0 |
| 7-29 | 2 | 8.1 | 133.3 | 333.3 | 3933.3 | 200.0 | 0.0 | 1.2 | 0.3 | 1.1 | 0.0 | 0.0 |
| 8-9 | 6 | 4.9 | 3200.0 | 333.3 | 16933.3 | 3133.3 | 0.0 | 3.6 | 0.9 | 2.0 | 0.0 | 0.0 |
| 8-32 | 4 | 1.6 | 7466.7 | 800.0 | 11000.0 | 10933.3 | 0.0 | 1.9 | 0.3 | 1.7 | 0.0 | 0.0 |
| 8-38 | 4 | 13.4 | 0.0 | 0.0 | 1653.3 | 0.0 | 0.0 | 1.6 | – | – | 0.0 | 0.0 |
| 9-34 | 9 | 14.2 | 1600.0 | 0.0 | 4466.7 | 2133.3 | 0.0 | 4.7 | – | 1.1 | 0.0 | 0.0 |
| 10-7 | 6 | 11.7 | 2800.0 | 1666.7 | 6466.7 | 1733.3 | 0.0 | 2.7 | 0.2 | 2.5 | 0.0 | 0.0 |
| 10-56 | 6 | 15.0 | 4133.3 | 0.0 | 11000.0 | 1600.0 | 0.0 | 4.3 | – | 1.7 | 10.5 | 0.0 |
| 11-62 | 7 | 14.6 | 600.0 | 2133.3 | 8933.3 | 0.0 | 0.0 | 5.5 | 0.4 | – | 0.0 | 0.0 |
| 12-47 | 9 | 17.4 | 8400.0 | 400.0 | 8466.7 | 2666.7 | 0.0 | 7.4 | 0.0 | 2.1 | 12.0 | 0.0 |
| 12-67 | 1 | 18.2 | 133.3 | 266.7 | 6466.7 | 66.7 | 0.0 | 1.3 | 1.2 | 1.0 | 0.0 | 0.0 |
| 14-8 | 4 | 13.8 | 2000.0 | 0.0 | 6666.7 | 2600.0 | 0.0 | 1.3 | – | 1.2 | 0.0 | 0.0 |
| 14-11 | 4 | 4.9 | 1800.0 | 0.0 | 7800.0 | 3000.0 | 0.0 | 1.7 | – | 1.4 | 0.0 | 0.0 |
| 14-32 | 7 | 10.5 | 3266.7 | 0.0 | 6933.3 | 3266.7 | 0.0 | 1.5 | – | 1.2 | 0.0 | 0.0 |
| 14-44 | 7 | 15.4 | 1333.3 | 0.0 | 2133.3 | 733.3 | 0.0 | 1.7 | – | 1.4 | 0.0 | 0.0 |
| 15-69 | 2 | 14.6 | 2733.3 | 0.0 | 8000.0 | 666.7 | 0.0 | 1.2 | – | 1.3 | 0.0 | 0.0 |
| 17-83 | 10 | 6.9 | 1200.0 | 133.3 | 2066.7 | 2666.7 | 0.0 | 4.6 | 0.2 | 1.9 | 0.0 | 0.0 |
| Medium-Aged Aspen | | | | | | | | | | | | |
| 1-31 | 19 | 59.5 | 866.7 | 3400.0 | 1666.7 | 533.3 | 0.0 | 6.0 | 0.8 | 1.2 | 11.0 | 0.0 |
| 2-63 | 24 | 4.5 | 1200.0 | 1266.7 | 1733.3 | 7533.3 | 133.3 | 8.9 | 0.8 | 2.0 | 15.0 | 0.0 |
| 2-68 | 25 | 4.9 | 1800.0 | 800.0 | 600.0 | 2133.3 | 133.3 | 6.6 | 0.6 | 1.7 | 14.0 | 0.0 |
| 2-90 | 22 | 17.0 | 3066.7 | 66.7 | 2200.0 | 1200.0 | 0.0 | 6.7 | 0.1 | 2.0 | 11.0 | 0.0 |
| 3-75 | 28 | 21.5 | 986.7 | 1666.7 | 666.7 | 720.0 | 280.0 | 10.8 | 1.7 | 1.4 | 16.0 | 0.0 |
| 6-48 | 21 | 4.5 | 0.0 | 666.7 | 3200.0 | 0.0 | 0.0 | 6.7 | 0.7 | – | 10.0 | 0.0 |

*Table A3. (cont'd)*

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Medium-Aged Aspen (cont'd) | | | | | | | | | | | | |
| 6-87 | 19 | 11.7 | 866.7 | 466.7 | 1400.0 | 600.0 | 133.3 | 8.7 | 0.5 | 1.9 | 12.0 | 0.0 |
| 7-4 | 28 | 6.1 | 266.7 | 2000.0 | 1066.7 | 200.0 | 0.0 | 9.3 | 1.2 | 1.5 | 12.0 | 0.0 |
| 7-14 | 28 | 15.0 | 333.3 | 2666.7 | 1933.3 | 133.3 | 0.0 | 8.9 | 0.7 | 1.6 | 13.0 | 0.0 |
| 7-57 | 12 | 4.5 | 1066.7 | 800.0 | 6666.7 | 800.0 | 0.0 | 5.9 | 0.3 | 1.8 | 11.0 | 0.0 |
| 8-36 | 15 | 2.4 | 200.0 | 1200.0 | 1933.3 | 0.0 | 0.0 | 6.0 | 0.2 | – | 0.0 | 0.0 |
| 8-69 | 13 | 14.2 | 1466.7 | 1333.3 | 4133.3 | 1933.3 | 0.0 | 5.3 | 0.3 | 1.9 | 11.0 | 0.0 |
| 10-42 | 15 | 17.4 | 2600.0 | 666.7 | 2800.0 | 1000.0 | 0.0 | 4.8 | 0.3 | 1.8 | 11.0 | 0.0 |
| 11-21 | 21 | 7.3 | 2733.3 | 1266.7 | 1800.0 | 200.0 | 0.0 | 6.5 | 0.3 | 1.8 | 11.0 | 0.0 |
| 13-15 | 15 | 11.7 | 1866.7 | 200.0 | 3600.0 | 133.3 | 0.0 | 5.1 | 0.5 | 1.5 | 12.0 | 0.0 |
| 15-33 | 12 | 9.7 | 933.3 | 5000.0 | 4466.7 | 18266.7 | 0.0 | 1.4 | 0.4 | 1.5 | 0.0 | 0.0 |
| 17-9 | 18 | 1.2 | 6000.0 | 266.7 | 2666.7 | 1200.0 | 0.0 | 6.1 | 0.7 | 1.4 | 14.0 | 0.0 |
| 17-77 | 25 | 3.6 | 2133.3 | 3600.0 | 733.3 | 533.3 | 66.7 | 9.9 | 1.2 | 1.9 | 14.0 | 0.0 |
| Old Aspen | | | | | | | | | | | | |
| 2-95 | 35 | 8.5 | 1746.7 | 2906.7 | 1066.7 | 560.0 | 106.7 | 7.7 | 0.8 | 1.9 | 13.0 | 0.0 |
| 4-46 | 78 | 13.8 | 506.7 | 1693.3 | 3440.0 | 866.7 | 106.7 | 6.2 | 2.9 | 2.6 | 15.0 | 0.0 |
| 7-9 | 71 | 10.5 | 613.3 | 1106.7 | 186.7 | 0.0 | 253.3 | 6.1 | 2.8 | – | 17.0 | 0.0 |
| 7-56 | 68 | 2.8 | 506.7 | 5026.7 | 173.3 | 13.3 | 200.0 | 10.7 | 0.5 | 1.1 | 16.0 | 0.0 |
| 8-2 | 35 | 3.6 | 600.0 | 7866.7 | 66.7 | 400.0 | 400.0 | 10.0 | 2.0 | 4.2 | 16.0 | 0.0 |
| 8-13 | 81 | 1.2 | 1200.0 | 5653.3 | 106.7 | 40.0 | 186.7 | 13.6 | 0.4 | 1.0 | 15.0 | 0.0 |
| 8-86 | 125 | 2.0 | 440.0 | 2213.3 | 226.7 | 506.7 | 266.7 | 9.2 | 1.3 | 1.8 | 14.0 | 0.0 |
| 9-5 | 74 | 4.9 | 2440.0 | 2093.3 | 133.3 | 306.7 | 280.0 | 8.0 | 1.8 | 1.5 | 17.0 | 0.0 |
| 12-59 | 45 | 1.6 | 4693.3 | 2360.0 | 960.0 | 6826.7 | 146.7 | 6.0 | 0.6 | 1.6 | 17.0 | 0.0 |
| 12-80 | 61 | 3.2 | 1680.0 | 893.3 | 720.0 | 200.0 | 266.7 | 7.2 | 4.3 | 2.8 | 18.0 | 0.0 |
| 14-54 | 34 | 0.4 | 1080.0 | 626.7 | 2080.0 | 933.3 | 306.7 | 13.6 | 0.6 | 1.6 | 18.0 | 0.0 |
| 15-80 | 48 | 5.7 | 1466.7 | 53.3 | 160.0 | 1266.7 | 120.0 | 4.2 | 0.3 | 1.3 | 16.0 | 0.0 |
| 16-10 | 91 | 4.0 | 1373.3 | 1093.3 | 1333.3 | 1440.0 | 146.7 | 6.5 | 1.0 | 1.6 | 16.0 | 0.0 |

*Table A3. (cont'd)*

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Aspen (cont'd) | | | | | | | | | | | | |
| 16-21 | 34 | 51.0 | 533.3 | 2266.7 | 1466.7 | 200.0 | 200.0 | 13.2 | 0.9 | 1.0 | 16.0 | 0.0 |
| 16-54 | 30 | 3.6 | 1800.0 | 400.0 | 333.3 | 1466.7 | 133.3 | 8.8 | 2.1 | 1.4 | 12.0 | 0.0 |
| 17-57 | 60 | 14.2 | 2453.3 | 1053.3 | 986.7 | 293.3 | 240.0 | 9.3 | 0.7 | 1.3 | 16.0 | 0.0 |
| 17-60 | 57 | 1.6 | 3786.7 | 1240.0 | 346.7 | 1413.3 | 106.7 | 1.6 | 0.9 | 1.4 | 0.0 | 0.0 |
| 18-57 | 85 | 3.6 | 4933.3 | 226.7 | 626.7 | 173.3 | 253.3 | 9.2 | 7.6 | 3.2 | 14.0 | 0.0 |
| Mixed-Aged Aspen | | | | | | | | | | | | |
| 5-44 | 555[b] | 10.9 | 106.7 | 1600.0 | 240.0 | 120.0 | 146.7 | 12.0 | 1.5 | 1.8 | 15.0 | 0.0 |
| 17-44 | 555 | 2.4 | 2573.3 | 746.7 | 1186.7 | 1840.0 | 240.0 | 12.7 | 1.1 | 1.7 | 19.0 | 0.0 |
| 18-49 | 555 | 6.5 | 4173.3 | 133.3 | 506.7 | 320.0 | 266.7 | 9.8 | 1.5 | 1.4 | 18.0 | 0.0 |
| Upland Hardwoods | | | | | | | | | | | | |
| 4-63 | 555 | 74.1 | 2826.7 | 13.3 | 0.0 | 106.7 | 293.3 | 9.8 | 4.0 | 3.2 | 22.0 | 275.0 |
| 7-60 | 555 | 62.4 | 1240.0 | 0.0 | 0.0 | 0.0 | 253.3 | 11.7 | – | – | 18.0 | 700.0 |
| 9-21 | 555 | 72.1 | 5720.0 | 0.0 | 0.0 | 0.0 | 240.0 | 5.2 | – | – | 17.0 | 0.0 |
| 9-31 | 555 | 8.1 | 3533.3 | 0.0 | 0.0 | 26.7 | 240.0 | 11.0 | – | 1.5 | 17.0 | 0.0 |
| 11-63 | 555 | 7.7 | 1520.0 | 13.3 | 13.3 | 186.7 | 266.7 | 11.0 | 2.5 | 1.8 | 19.0 | 0.0 |
| 14-4 | 555 | 59.1 | 5373.3 | 0.0 | 0.0 | 120.0 | 306.7 | 9.4 | – | 1.4 | 20.0 | 300.0 |
| 15-53 | 555 | 4.9 | 6573.3 | 173.3 | 93.3 | 333.3 | 240.0 | 7.4 | 0.9 | 1.1 | 22.0 | 0.0 |
| 15-81 | 555 | 92.7 | 5373.3 | 0.0 | 0.0 | 520.0 | 466.7 | 7.2 | – | 1.4 | 20.0 | 0.0 |
| 18-6 | 555 | 21.9 | 2253.3 | 0.0 | 0.0 | 0.0 | 346.7 | 12.9 | – | – | 21.0 | 175.0 |
| Lowland Conifers | | | | | | | | | | | | |
| 2-28 | 92 | 8.1 | 933.3 | 10400.0 | 33.3 | 8833.3 | 433.3 | 4.9 | 1.2 | 1.8 | 14.0 | 50.0 |
| 5-46 | 555 | 9.7 | 700.0 | 12600.0 | 0.0 | 266.7 | 166.7 | 1.5 | 0.5 | 3.0 | 0.0 | 0.0 |
| 10-31 | 196 | 8.1 | 866.7 | 1766.7 | 33.3 | 0.0 | 533.3 | 4.2 | 4.1 | – | 15.0 | 0.0 |

Table A3. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lowland Conifers (cont'd) | | | | | | | | | | | | |
| 17-2 | 184 | 14.2 | 1400.0 | 4200.0 | 0.0 | 300.0 | 266.7 | 6.7 | 3.1 | 1.3 | 13.0 | 100.0 |
| Jack Pine | | | | | | | | | | | | |
| 5-53 | 61 | 2.4 | 2600.0 | 1666.7 | 133.3 | 166.7 | 266.7 | 1.5 | 3.3 | 1.0 | 0.0 | 0.0 |
| 6-66 | 65 | 3.6 | 366.7 | 1066.7 | 533.3 | 33.3 | 300.0 | 6.7 | 2.6 | 4.0 | 10.0 | 0.0 |
| 6-91 | 65 | 7.7 | 2466.7 | 433.3 | 600.0 | 200.0 | 166.7 | 5.9 | 3.2 | 2.4 | 11.0 | 0.0 |
| 9-41 | 63 | 6.9 | 33.3 | 1900.0 | 4266.7 | 0.0 | 100.0 | 4.3 | 1.8 | – | 14.0 | 0.0 |
| 13-38 | unk | unk | 166.7 | 2933.3 | 266.7 | 200.0 | 100.0 | 7.1 | 1.9 | 1.5 | 10.0 | 0.0 |
| 17-64 | 66 | 2.4 | 7166.7 | 766.7 | 0.0 | 100.0 | 66.7 | 5.5 | 1.9 | 2.7 | 12.0 | 50.0 |
| 18-22 | 555 | 13.8 | 166.7 | 1333.3 | 0.0 | 166.7 | 233.3 | 2.6 | 2.0 | 1.1 | 0.0 | 75.0 |
| Young Pines | | | | | | | | | | | | |
| 5-24 | 555 | 72.1 | 466.7 | 1133.3 | 2800.0 | 33.3 | 133.3 | 3.7 | 0.6 | 3.0 | 0.0 | 0.0 |
| 7-38 | 8 | 4.5 | 166.7 | 666.7 | 100.0 | 0.0 | 233.3 | 14.5 | 3.0 | – | 15.0 | 0.0 |
| Old Pines | | | | | | | | | | | | |
| 4-28 | 93 | 10.5 | 1333.3 | 1080.0 | 1933.3 | 2666.7 | 40.0 | 1.2 | 0.5 | 1.3 | 0.0 | 0.0 |
| 5-27 | 91 | 9.3 | 266.7 | 1880.0 | 186.7 | 53.3 | 173.3 | 11.6 | 2.7 | 2.6 | 14.0 | 0.0 |
| 5-56 | 555 | 4.5 | 213.3 | 1560.0 | 373.3 | 26.7 | 373.3 | 4.1 | 4.5 | 1.2 | 13.0 | 0.0 |
| 8-23 | 49 | 9.3 | 900.0 | 2033.3 | 1333.3 | 33.3 | 100.0 | 6.5 | 2.6 | 1.6 | 0.0 | 0.0 |
| 8-40 | 59 | 6.1 | 66.7 | 1700.0 | 433.3 | 0.0 | 300.0 | 13.7 | 2.6 | – | 15.0 | 0.0 |
| 9-24 | 96 | 13.0 | 480.0 | 2133.3 | 93.3 | 320.0 | 306.7 | 4.5 | 2.2 | 2.3 | 16.0 | 0.0 |
| 9-42 | 555 | 23.5 | 173.3 | 1946.7 | 493.3 | 93.3 | 360.0 | 10.9 | 2.7 | 1.3 | 15.0 | 0.0 |
| 16-35 | 60 | 47.4 | 173.3 | 1173.3 | 813.3 | 0.0 | 293.3 | 5.3 | 3.9 | – | 13.0 | 0.0 |
| 17-34 | 67 | 63.2 | 786.7 | 120.0 | 40.0 | 4320.0 | 120.0 | 4.1 | 7.8 | 1.4 | 16.0 | 0.0 |
| 17-55 | 62 | 8.1 | 1680.0 | 413.3 | 0.0 | 533.3 | 373.3 | 2.9 | 11.3 | 1.1 | 0.0 | 150.0 |

Table A3. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lowland Hardwoods | | | | | | | | | | | | |
| 15-13 | unk | 10.1 | 4866.7 | 0.0 | 333.3 | 15066.7 | 0.0 | 2.7 | -- | 1.4 | 0.0 | 0.0 |
| 18-32 | unk | 2.8 | 1066.7 | 0.0 | 0.0 | 10200.0 | 66.7 | 6.2 | -- | 2.4 | 15.0 | 0.0 |
| 18-36 | 69 | 1.6 | 3733.3 | 1333.3 | 0.0 | 466.7 | 666.7 | 12.5 | 0.8 | 1.1 | 16.0 | 175.0 |
| 18-37 | unk | 5.7 | 666.7 | 0.0 | 0.0 | 50533.3 | 0.0 | 9.1 | -- | 1.5 | 12.0 | 50.0 |

[a] No corresponding stems were present in any of the 3 plots sampled.
[b] Represents mixed-aged stand.

Table A4. Data collected on vegetation stands sampled on Pigeon River Country State Forest (PRCSF) closed site, 1994 and 1995.

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Young Aspen | | | | | | | | | | | | |
| 37-24 | 5 | 9.7 | 0.0 | 66.7 | 1733.3 | 0.0 | 0.0 | 1.2 | 3.2 | –[a] | 0.0 | 0.0 |
| 40-21 | 4 | 8.1 | 66.7 | 266.7 | 133.3 | 533.3 | 66.7 | 1.5 | 0.2 | 1.2 | 0.0 | 0.0 |
| 40-36 | 4 | 13.0 | 66.7 | 1000.0 | 6333.3 | 1466.7 | 0.0 | 1.7 | 0.4 | 1.7 | 0.0 | 0.0 |
| 41-15 | 7 | 10.1 | 2800.0 | 1000.0 | 9800.0 | 7933.3 | 0.0 | 4.2 | 0.4 | 1.7 | 11.0 | 0.0 |
| 41-63 | 6 | 7.7 | 2800.0 | 0.0 | 8733.3 | 0.0 | 0.0 | 2.0 | – | – | 0.0 | 0.0 |
| 41-67 | 6 | 8.1 | 533.3 | 400.0 | 17866.7 | 666.7 | 0.0 | 2.6 | 0.3 | 1.3 | 0.0 | 0.0 |
| 43-22 | 5 | 9.3 | 533.3 | 333.3 | 13933.3 | 2466.7 | 0.0 | 2.0 | 0.9 | 1.2 | 0.0 | 0.0 |
| 44-15 | 3 | 10.1 | 66.7 | 0.0 | 15000.0 | 2066.7 | 0.0 | 1.6 | – | 1.0 | 0.0 | 0.0 |
| 47-25 | 8 | 5.7 | 3533.3 | 400.0 | 1800.0 | 5600.0 | 0.0 | 5.9 | 0.1 | 2.2 | 10.0 | 0.0 |
| 47-35 | 2 | 5.7 | 0.0 | 133.3 | 10000.0 | 1466.7 | 0.0 | 1.4 | 0.4 | 1.0 | 0.0 | 0.0 |
| 47-41 | 2 | 8.1 | 733.3 | 200.0 | 12466.7 | 15200.0 | 0.0 | 1.6 | 1.7 | 1.2 | 0.0 | 0.0 |
| 47-48 | 8 | 6.9 | 4666.7 | 1000.0 | 2333.3 | 400.0 | 0.0 | 7.5 | 1.4 | 4.0 | 11.0 | 0.0 |
| 47-62 | 2 | 6.9 | 200.0 | 600.0 | 11200.0 | 66.7 | 66.7 | 2.2 | 0.9 | 1.2 | 18.0 | 0.0 |
| 48-3 | 7 | 13.4 | 1533.3 | 200.0 | 10666.7 | 1600.0 | 0.0 | 3.0 | 0.4 | 1.2 | 0.0 | 0.0 |
| 49-9 | 9 | 3.6 | 2800.0 | 533.3 | 9266.7 | 6000.0 | 0.0 | 4.1 | 0.1 | 1.3 | 0.0 | 0.0 |
| 49-35 | 9 | 12.1 | 666.7 | 266.7 | 10066.7 | 1866.7 | 0.0 | 2.3 | 0.5 | 1.4 | 0.0 | 0.0 |
| Medium-Aged Aspen | | | | | | | | | | | | |
| 37-50 | 15 | 13.0 | 1333.3 | 333.3 | 3066.7 | 1866.7 | 0.0 | 4.6 | 0.1 | 4.1 | 10.0 | 0.0 |
| 38-28 | 11 | 2.0 | 1000.0 | 400.0 | 4666.7 | 866.7 | 0.0 | 4.7 | 0.3 | 1.4 | 0.0 | 0.0 |
| 40-11 | 12 | 9.7 | 3200.0 | 933.3 | 3333.3 | 2000.0 | 933.3 | 4.6 | 0.4 | 1.7 | 0.0 | 0.0 |
| 40-13 | 28 | 2.0 | 400.0 | 1600.0 | 800.0 | 333.3 | 400.0 | 4.6 | 2.3 | 1.3 | 18.0 | 0.0 |
| 40-26 | 14 | 13.8 | 333.3 | 333.3 | 5333.3 | 0.0 | 0.0 | 5.2 | 0.3 | – | 0.0 | 0.0 |
| 40-27 | 24 | 12.1 | 2533.3 | 0.0 | 5666.7 | 666.7 | 0.0 | 4.9 | – | 1.2 | 0.0 | 0.0 |
| 40-35 | 14 | 13.0 | 2066.7 | 66.7 | 3066.7 | 2933.3 | 0.0 | 6.1 | 1.0 | 1.8 | 0.0 | 0.0 |
| 41-7 | 27 | 7.3 | 933.3 | 3133.3 | 1533.3 | 133.3 | 0.0 | 12.6 | 0.9 | 2.0 | 16.0 | 0.0 |
| 41-36 | 29 | 11.3 | 1066.7 | 933.3 | 2400.0 | 1600.0 | 0.0 | 12.1 | 1.3 | 1.9 | 14.0 | 0.0 |

Table A4. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) | | | | | Height (m) | | | | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | |
| Medium-Aged Aspen (cont'd) | | | | | | | | | | | | |
| 41-54 | 24 | 35.2 | 866.7 | 400.0 | 1400.0 | 266.7 | 66.7 | 10.7 | 1.4 | 1.2 | 14.0 | 0.0 |
| 42-44 | 17 | 7.7 | 1133.3 | 1066.7 | 1333.3 | 666.7 | 0.0 | 6.3 | 0.7 | 1.8 | 12.0 | 0.0 |
| 43-10 | 14 | 17.0 | 3333.3 | 733.3 | 1800.0 | 2533.3 | 0.0 | 4.3 | 0.4 | 2.5 | 0.0 | 0.0 |
| 43-18 | 27 | 42.1 | 666.7 | 1800.0 | 266.7 | 400.0 | 133.3 | 6.3 | 1.1 | 1.7 | 19.0 | 0.0 |
| 43-33 | 25 | 35.2 | 1000.0 | 2080.0 | 1840.0 | 346.7 | 186.7 | 7.2 | 0.7 | 1.5 | 16.0 | 0.0 |
| 43-44 | 22 | 15.4 | 2200.0 | 133.3 | 4466.7 | 1866.7 | 0.0 | 7.6 | 0.6 | 1.2 | 13.0 | 0.0 |
| 46-4 | 13 | 13.8 | 1866.7 | 1466.7 | 4800.0 | 200.0 | 0.0 | 3.7 | 0.2 | 1.3 | 0.0 | 0.0 |
| 47-46 | 20 | 50.6 | 2600.0 | 1466.7 | 3200.0 | 3066.7 | 0.0 | 7.9 | 1.3 | 2.8 | 11.0 | 0.0 |
| 48-31 | 25 | 42.9 | 1400.0 | 866.7 | 6133.3 | 400.0 | 266.7 | 1.9 | 2.9 | 1.4 | 0.0 | 0.0 |
| 48-38 | 25 | 20.2 | 666.7 | 66.7 | 2333.3 | 266.7 | 66.7 | 10.0 | 2.0 | 1.4 | 13.0 | 0.0 |
| 49-32 | 21 | 33.2 | 1533.3 | 466.7 | 2066.7 | 866.7 | 66.7 | 4.5 | 1.2 | 1.3 | 12.0 | 0.0 |
| 49-57 | 19 | 8.5 | 866.7 | 1400.0 | 5933.3 | 0.0 | 0.0 | 10.2 | 0.4 | – | 13.0 | 0.0 |
| 49-61 | 19 | 15.4 | 1066.7 | 1266.7 | 2266.7 | 600.0 | 66.7 | 4.8 | 1.4 | 1.7 | 14.0 | 0.0 |
| Old Aspen | | | | | | | | | | | | |
| 36-45 | 45 | 3.6 | 666.7 | 13933.3 | 733.3 | 1666.7 | 333.3 | 9.0 | 1.1 | 1.7 | 20.0 | 0.0 |
| 37-1 | 30 | 25.9 | 1133.3 | 66.7 | 1333.3 | 0.0 | 0.0 | 11.5 | 2.0 | – | 14.0 | 0.0 |
| 39-37 | 75 | 1.6 | 2506.7 | 933.3 | 213.3 | 40.0 | 160.0 | 11.2 | 0.8 | 1.2 | 17.0 | 0.0 |
| 39-53 | 30 | 9.3 | 3000.0 | 333.3 | 266.7 | 133.3 | 0.0 | 8.3 | 0.5 | 3.3 | 14.0 | 0.0 |
| 40-30 | 56 | 17.4 | 546.7 | 1080.0 | 93.3 | 173.3 | 546.7 | 8.6 | 5.2 | 1.5 | 13.0 | 0.0 |
| 41-39 | 59 | 4.0 | 640.0 | 693.3 | 986.7 | 120.0 | 93.3 | 10.1 | 1.0 | 1.6 | 13.0 | 0.0 |
| 42-18 | 58 | 2.4 | 1266.7 | 320.0 | 400.0 | 1200.0 | 266.7 | 6.7 | 1.0 | 1.8 | 22.0 | 0.0 |
| 43-14 | 32 | 32.8 | 733.3 | 400.0 | 1333.3 | 266.7 | 200.0 | 9.7 | 2.0 | 1.8 | 13.0 | 0.0 |
| 46-9 | 63 | 11.7 | 1426.7 | 93.3 | 533.3 | 186.7 | 426.7 | 13.4 | 7.1 | 1.5 | 16.0 | 0.0 |
| 47-39 | 66 | 6.5 | 413.3 | 4093.3 | 226.7 | 240.0 | 173.3 | 8.7 | 2.0 | 1.4 | 17.0 | 0.0 |
| 47-50 | 68 | 13.4 | 786.7 | 866.7 | 680.0 | 0.0 | 333.3 | 12.4 | 0.4 | – | 16.0 | 0.0 |
| 48-14 | 61 | 16.6 | 773.3 | 760.0 | 253.3 | 133.3 | 213.3 | 7.6 | 1.0 | 1.0 | 17.0 | 0.0 |

Table A4. (cont'd)

Table A4. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Aspen (cont'd) | | | | | | | | | | | | |
| 48-37 | 74 | 7.3 | 1040.0 | 1333.3 | 933.3 | 853.3 | 80.0 | 6.1 | 1.4 | 1.6 | 12.0 | 0.0 |
| 49-6 | 61 | 8.1 | 2266.7 | 146.7 | 1800.0 | 5573.3 | 226.7 | 3.9 | 1.1 | 1.3 | 14.0 | 0.0 |
| 49-10 | 42 | 72.1 | 1426.7 | 346.7 | 1400.0 | 1226.7 | 53.3 | 8.2 | 1.6 | 1.6 | 13.0 | 0.0 |
| 49-29 | 42 | 5.7 | 320.0 | 1480.0 | 866.7 | 573.3 | 53.3 | 6.5 | 0.5 | 1.4 | 13.0 | 0.0 |
| Mixed-Aged Aspen | | | | | | | | | | | | |
| 49-21 | 555[b] | 18.2 | 2333.3 | 0.0 | 906.7 | 12600.0 | 53.3 | 7.4 | – | 1.6 | 16.0 | 0.0 |
| 49-55 | 555 | 11.3 | 346.7 | 373.3 | 626.7 | 200.0 | 266.7 | 11.6 | 0.6 | 1.3 | 21.0 | 0.0 |
| Upland Hardwoods | | | | | | | | | | | | |
| 37-7 | 555 | 66.4 | 2533.3 | 53.3 | 0.0 | 0.0 | 200.0 | 12.2 | 2.3 | – | 16.0 | 400.0 |
| 37-48 | 555 | 13.8 | 3066.7 | 0.0 | 0.0 | 173.3 | 253.3 | 11.0 | – | 1.2 | 17.0 | 0.0 |
| 39-21 | 555 | 49.0 | 1160.0 | 0.0 | 106.7 | 66.7 | 66.7 | 13.5 | – | 2.9 | 19.0 | 0.0 |
| 39-38 | 76 | 10.9 | 1226.7 | 240.0 | 0.0 | 0.0 | 426.7 | 14.8 | 6.3 | – | 16.0 | 125.0 |
| 40-1 | 555 | 16.6 | 3866.7 | 506.7 | 26.7 | 560.0 | 26.7 | 9.1 | 0.9 | 1.3 | 15.0 | 0.0 |
| 43-12 | 555 | 4.5 | 3013.3 | 586.7 | 466.7 | 573.3 | 213.3 | 8.3 | 1.5 | 1.5 | 17.0 | 0.0 |
| 47-16 | 555 | 42.5 | 1720.0 | 0.0 | 0.0 | 0.0 | 280.0 | 12.4 | – | – | 18.0 | 0.0 |
| 47-28 | 555 | 19.4 | 2266.7 | 0.0 | 13.3 | 40.0 | 373.3 | 8.2 | – | 1.6 | 17.0 | 0.0 |
| 47-32 | 555 | 17.8 | 2306.7 | 253.3 | 0.0 | 0.0 | 160.0 | 11.6 | 2.9 | – | 16.0 | 0.0 |
| 48-9 | 555 | 51.0 | 3946.7 | 0.0 | 66.7 | 586.7 | 426.7 | 9.5 | – | 1.3 | 18.0 | 0.0 |
| Lowland Conifers | | | | | | | | | | | | |
| 37-15 | 104 | 52.7 | 333.3 | 3000.0 | 33.3 | 4133.3 | 233.3 | 2.8 | 2.4 | 1.5 | 15.0 | 0.0 |
| 40-10 | 146 | 60.8 | 500.0 | 4166.7 | 0.0 | 6833.3 | 266.7 | 2.7 | 1.4 | 1.9 | 0.0 | 100.0 |
| 40-38 | 107 | 1.2 | 433.3 | 1700.0 | 66.7 | 3000.0 | 200.0 | 3.0 | 4.4 | 1.6 | 13.0 | 0.0 |
| 41-4 | 77 | 23.9 | 700.0 | 2400.0 | 0.0 | 9066.7 | 166.7 | 1.4 | 1.9 | 1.6 | 0.0 | 100.0 |

*Table A4. (cont'd)*

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Lowland Conifers (cont'd) | | | | | | | | | | | | |
| 43-4 | 68 | 16.2 | 533.3 | 2033.3 | 166.7 | 1000.0 | 166.7 | 5.5 | 3.3 | 1.5 | 14.0 | 0.0 |
| 43-16 | 68 | 9.7 | 1566.7 | 5433.3 | 66.7 | 5733.3 | 133.3 | 5.0 | 0.8 | 2.1 | 13.0 | 0.0 |
| 46-20 | 73 | 17.8 | 1166.7 | 3100.0 | 66.7 | 4700.0 | 200.0 | 3.6 | 4.0 | 1.5 | 13.0 | 0.0 |
| 48-32 | 72 | 12.2 | 66.7 | 5466.7 | 66.7 | 0.0 | 133.3 | 16.5 | 5.5 | – | 17.0 | 0.0 |
| Jack Pine | | | | | | | | | | | | |
| 34-70 | 555 | 11.3 | 700.0 | 933.3 | 100.0 | 666.7 | 333.3 | 2.8 | 2.5 | 2.1 | 13.0 | 0.0 |
| 35-47 | 70 | 5.7 | 333.3 | 933.3 | 166.7 | 200.0 | 66.7 | 3.4 | 4.4 | 1.3 | 13.0 | 0.0 |
| 36-20 | 85 | 13.8 | 666.7 | 2100.0 | 0.0 | 0.0 | 200.0 | 7.9 | 1.9 | – | 12.0 | 0.0 |
| 37-17 | 63 | 15.4 | 300.0 | 5300.0 | 0.0 | 966.7 | 0.0 | 3.2 | 1.5 | 1.6 | 0.0 | 125.0 |
| 39-47 | 24 | 2.0 | 300.0 | 3200.0 | 0.0 | 0.0 | 66.7 | 2.2 | 4.4 | – | 0.0 | 50.0 |
| 40-23 | 56 | 6.1 | 100.0 | 1233.3 | 0.0 | 0.0 | 266.7 | 12.1 | 6.1 | – | 17.0 | 100.0 |
| 40-32 | 29 | 10.5 | 0.0 | 2766.7 | 0.0 | 0.0 | 0.0 | – | 0.8 | – | 0.0 | 75.0 |
| 41-61 | 33 | 6.1 | 8433.3 | 600.0 | 166.7 | 0.0 | 133.3 | 2.4 | 4.4 | – | 0.0 | 0.0 |
| 42-13 | 58 | 6.9 | 66.7 | 1300.0 | 433.3 | 66.7 | 433.3 | 6.1 | 5.8 | 1.4 | 17.0 | 0.0 |
| 46-22 | 21 | 11.7 | 233.3 | 6566.7 | 900.0 | 166.7 | 0.0 | 4.7 | 1.0 | 1.6 | 11.0 | 0.0 |
| Young Pines | | | | | | | | | | | | |
| 35-51 | 10 | 16.2 | 133.3 | 2100.0 | 0.0 | 0.0 | 0.0 | 1.2 | 0.2 | – | 0.0 | 375.0 |
| 37-33 | 555 | 37.3 | 333.3 | 1100.0 | 0.0 | 533.3 | 100.0 | 1.9 | 0.8 | 1.2 | 0.0 | 75.0 |
| 37-53 | 4 | 15.0 | 300.0 | 5000.0 | 0.0 | 600.0 | 300.0 | 1.2 | 1.5 | 1.5 | 0.0 | 0.0 |
| 38-21 | 16 | 62.8 | 0.0 | 2433.3 | 0.0 | 133.3 | 33.3 | – | 1.5 | 1.1 | 0.0 | 0.0 |
| 41-45 | 20 | 3.6 | 4566.7 | 6766.7 | 0.0 | 833.3 | 33.3 | 5.7 | 1.3 | 1.5 | 15.0 | 50.0 |
| 41-77 | 8 | 17.8 | 433.3 | 1733.3 | 1766.7 | 433.3 | 0.0 | 1.3 | 0.1 | 1.5 | 0.0 | 0.0 |
| 47-5 | 14 | 1.2 | 700.0 | 5766.7 | 533.3 | 866.7 | 66.7 | 5.3 | 0.4 | 1.8 | 15.0 | 0.0 |
| 49-17 | 555 | 12.2 | 200.0 | 966.7 | 133.3 | 66.7 | 133.3 | 3.3 | 2.2 | 1.3 | 0.0 | 0.0 |

Table A4. (cont'd)

| Stand | Age (yrs) | Size (ha) | Stem density (stems/ha) deciduous | conifer | aspen | shrub | trees dbh ≥ 21 cm | Height (m) deciduous trees | conifer low branch | shrub | deciduous trees ≥ 10 m | Distance to food source (m) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Old Pines | | | | | | | | | | | | |
| 36-1 | 68 | 13.8 | 333.3 | 1333.3 | 136.0 | 333.3 | 229.3 | 6.6 | 2.4 | 1.6 | 13.0 | 0.0 |
| 36-24 | 70 | 18.6 | 1680.0 | 3226.7 | 306.7 | 40.0 | 120.0 | 10.4 | 1.1 | 2.7 | 13.0 | 0.0 |
| 36-30 | 80 | 21.1 | 773.3 | 533.3 | 333.3 | 733.3 | 66.7 | 3.2 | 1.4 | 1.2 | 13.0 | 0.0 |
| 41-28 | 84 | 14.2 | 13.3 | 813.3 | 0.0 | 40.0 | 573.3 | – | 5.5 | 0.9 | 0.0 | 0.0 |
| 41-70 | 99 | 9.7 | 2133.3 | 2133.3 | 0.0 | 133.3 | 866.7 | 5.8 | 3.2 | 1.4 | 23.0 | 25.0 |
| 42-24 | 76 | 8.5 | 506.7 | 1733.3 | 173.3 | 226.7 | 146.7 | 7.9 | 2.2 | 1.6 | 14.0 | 0.0 |
| 42-43 | 77 | 12.6 | 1120.0 | 573.3 | 66.7 | 693.3 | 320.0 | 9.4 | 10.3 | 1.8 | 15.0 | 0.0 |
| 46-29 | 86 | 3.6 | 680.0 | 1066.7 | 226.7 | 160.0 | 200.0 | 5.0 | 2.0 | 1.8 | 11.0 | 0.0 |
| 49-48 | 31 | 14.2 | 466.7 | 1200.0 | 2900.0 | 0.0 | 0.0 | 5.5 | 1.7 | – | 0.0 | 0.0 |
| 50-3 | 51 | 6.9 | 200.0 | 1226.7 | 186.7 | 106.7 | 133.3 | 12.3 | 4.3 | 1.8 | 15.0 | 0.0 |
| Lowland Hardwoods | | | | | | | | | | | | |
| 39-36 | 555 | 12.2 | 1066.7 | 466.7 | 0.0 | 0.0 | 266.7 | 11.1 | 5.0 | – | 16.0 | 50.0 |
| 40-18 | unk | 0.8 | 1533.3 | 1533.3 | 0.0 | 16133.3 | 266.7 | 3.4 | 2.5 | 2.0 | 0.0 | 25.0 |
| 41-73 | 555 | 1.2 | 1066.7 | 0.0 | 0.0 | 54933.3 | 0.0 | 3.4 | – | 2.0 | 0.0 | 75.0 |
| 49-19 | 177 | 3.6 | 2800.0 | 0.0 | 0.0 | 9600.0 | 0.0 | 4.1 | – | 1.7 | 0.0 | 50.0 |

[a] No corresponding stems were present in any of the 3 plots sampled.

[b] Represents mixed-aged stand.

## APPENDIX B

Ruffed grouse HSI score and SI values for vegetation stands sampled on Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1994 and 1995.

Table B1. Ruffed grouse HSI score and SI values for vegetation stands sampled on Huron National Forest (HNF) open site, 1994 and 1995.

Young Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 109-39 | 0.07 | 1.00 | 0.00 | 0.00 | 0.58 | 1.00 |
| 113-2 | 0.49 | 0.51 | 1.00 | 0.00 | 0.00 | 1.00 |
| 153-6 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 153-20 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 159-9 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 159-10 | 0.00 | 0.67 | 0.00 | 0.00 | 0.28 | 1.00 |
| 159-11 | 0.32 | 1.00 | 0.29 | 0.00 | 0.66 | 1.00 |
| 159-13 | 0.32 | 1.00 | 0.29 | 0.00 | 0.71 | 1.00 |
| 159-15 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 160-28 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 |

Medium-Aged Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 111-1 | 0.76 | 0.82 | 0.91 | 0.00 | 1.00 | 1.00 |
| 113-1 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 115-1 | 0.34 | 0.34 | 1.00 | 0.00 | 0.00 | 1.00 |
| 115-8 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 152-6 | 0.06 | 0.16 | 0.00 | 0.92 | 0.00 | 1.00 |
| 152-10 | 0.60 | 0.72 | 1.00 | 0.00 | 0.02 | 1.00 |
| 153-10 | 0.13 | 0.19 | 0.96 | 0.00 | 0.02 | 1.00 |
| 153-23 | 0.13 | 0.14 | 1.00 | 0.00 | 0.00 | 1.00 |
| 155-3 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 155-5 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 155-16 | 0.77 | 0.81 | 1.00 | 0.75 | 0.00 | 1.00 |
| 158-6 | 0.59 | 0.61 | 1.00 | 0.00 | 0.17 | 1.00 |
| 158-10 | 0.84 | 0.84 | 1.00 | 0.00 | 1.00 | 1.00 |
| 160-1 | 0.94 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 169-7 | 0.90 | 0.90 | 1.00 | 0.00 | 1.00 | 1.00 |
| 170-9 | 0.97 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 170-15 | 0.64 | 0.67 | 1.00 | 0.00 | 0.77 | 1.00 |
| 173-25 | 0.40 | 0.41 | 1.00 | 0.00 | 0.00 | 1.00 |

Old Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 108-14 | 0.17 | 0.20 | 1.00 | 0.84 | 0.00 | 1.00 |
| 110-5 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 111-10 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 111-23 | 0.37 | 0.39 | 1.00 | 0.36 | 0.78 | 1.00 |
| 116-25 | 0.00 | 0.00 | 1.00 | 0.00 | 0.22 | 1.00 |
| 152-5 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 154-3 | 0.00 | 0.00 | 1.00 | 0.00 | 0.12 | 1.00 |
| 159-12 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 160-4 | 0.00 | 0.00 | 1.00 | 0.00 | 0.16 | 1.00 |
| 160-14 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 160-20 | 0.00 | 0.00 | 1.00 | 0.00 | 0.59 | 1.00 |
| 170-27 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 170-33 | 0.19 | 0.19 | 1.00 | 0.85 | 1.00 | 1.00 |

Table B1. (cont'd)

Upland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 111-5 | 0.52 | 0.52 | 1.00 | 1.00 | 1.00 | 1.00 |
| 155-4 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 155-11 | 0.49 | 0.49 | 1.00 | 0.00 | 1.00 | 1.00 |
| 169-5 | 0.05 | 0.05 | 1.00 | 0.00 | 0.56 | 1.00 |
| 170-46 | 0.07 | 0.08 | 1.00 | 0.71 | 0.69 | 1.00 |
| 172-12 | 0.00 | 0.00 | 1.00 | 0.00 | 0.33 | 1.00 |
| 172-31 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 173-6 | 0.23 | 0.23 | 1.00 | 1.00 | 0.00 | 1.00 |
| 174-1 | 0.36 | 0.37 | 1.00 | 0.91 | 1.00 | 1.00 |

Oaks

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 114-4 | 0.00 | 0.49 | 0.00 | 0.00 | 0.00 | 0.00 |
| 116-3 | 0.00 | 0.00 | 0.18 | 0.90 | 0.00 | 0.00 |
| 156-2 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 156-6 | 0.00 | 0.00 | 1.00 | 0.00 | 0.64 | 1.00 |
| 159-19 | 0.13 | 0.17 | 1.00 | 0.00 | 0.00 | 1.00 |
| 161-3 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 161-7 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 167-7 | 0.40 | 1.00 | 0.00 | 0.97 | 0.56 | 1.00 |

Lowland Conifers

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 110-13 | 0.00 | 0.00 | 1.00 | 0.91 | 0.00 | 1.00 |
| 158-3 | 0.99 | 1.00 | 1.00 | 0.98 | 1.00 | 1.00 |
| 173-4 | 0.92 | 1.00 | 1.00 | 0.92 | 0.63 | 1.00 |
| 173-26 | 0.00 | 0.00 | 1.00 | 0.49 | 0.00 | 1.00 |
| 173-27 | 0.04 | 0.40 | 1.00 | 0.00 | 0.00 | 1.00 |

Young Jack Pine

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 152-17 | 0.09 | 0.18 | 0.00 | 1.00 | 0.00 | 1.00 |
| 167-21 | 0.51 | 1.00 | 0.00 | 0.53 | 1.00 | 1.00 |
| 168-3 | 0.94 | 1.00 | 0.00 | 0.97 | 0.00 | 1.00 |

Old Jack Pine

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 114-2 | 0.00 | 0.00 | 0.13 | 0.45 | 0.00 | 1.00 |
| 115-2 | 0.18 | 0.35 | 0.48 | 0.74 | 0.04 | 1.00 |
| 115-3 | 0.14 | 0.25 | 0.81 | 0.18 | 0.53 | 1.00 |
| 116-1 | 0.00 | 0.00 | 0.00 | 0.00 | 0.93 | 1.00 |
| 116-4 | 0.06 | 0.25 | 0.00 | 0.51 | 0.20 | 1.00 |
| 116-19 | 0.00 | 0.00 | 0.52 | 0.29 | 0.48 | 1.00 |
| 116-21 | 0.00 | 0.00 | 0.00 | 0.26 | 0.00 | 0.00 |
| 116-24 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.75 |
| 152-11 | 0.00 | 0.00 | 0.00 | 0.69 | 0.00 | 1.00 |
| 167-14 | 0.05 | 0.17 | 0.00 | 0.48 | 0.00 | 1.00 |

Table B1. (cont'd)

Young Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 155-15 | 0.08 | 0.21 | 1.00 | 0.30 | 0.00 | 1.00 |
| 156-9 | 0.10 | 0.42 | 1.00 | 0.90 | 0.73 | 0.26 |
| 169-4 | 0.03 | 0.26 | 0.00 | 0.80 | 0.00 | 1.00 |
| 170-10 | 0.91 | 1.00 | 1.00 | 0.90 | 0.00 | 1.00 |
| 173-20 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| 173-22 | 0.20 | 0.27 | 1.00 | 0.35 | 0.46 | 1.00 |
| 174-10 | 0.11 | 0.42 | 0.00 | 0.35 | 1.00 | 1.00 |

Old Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 152-14 | 0.00 | 0.02 | 0.93 | 0.00 | 0.00 | 1.00 |
| 153-9 | 0.00 | 0.00 | 0.82 | 0.33 | 0.00 | 1.00 |
| 153-19 | 0.05 | 0.08 | 1.00 | 0.17 | 0.04 | 1.00 |
| 160-11 | 0.01 | 0.33 | 0.00 | 0.41 | 0.00 | 0.16 |
| 161-4 | 0.00 | 0.00 | 0.01 | 0.00 | 0.00 | 0.75 |
| 167-4 | 0.00 | 0.00 | 0.93 | 0.00 | 0.50 | 0.00 |
| 167-5 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 174-2 | 0.08 | 0.30 | 0.75 | 0.00 | 0.09 | 1.00 |

Lowland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 172-21 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 0.26 |
| 172-28 | 0.00 | 0.00 | 0.17 | 0.00 | 0.00 | 0.00 |
| 173-2 | 0.11 | 1.00 | 0.00 | 0.00 | 1.00 | 0.60 |
| 173-19 | 0.11 | 0.12 | 1.00 | 0.00 | 0.00 | 1.00 |

Table B2. Ruffed grouse HSI score and SI values for vegetation stands sampled on Huron National Forest (HNF) closed site, 1994 and 1995.

Young Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 15-16 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 16-427 | 0.00 | 0.28 | 0.00 | 0.00 | 0.00 | 1.00 |
| 16-527 | 0.05 | 0.75 | 0.00 | 0.00 | 0.44 | 1.00 |
| 17-36 | 0.26 | 0.90 | 0.31 | 0.00 | 0.00 | 1.00 |
| 18-14 | 0.11 | 1.00 | 0.00 | 0.00 | 0.67 | 1.00 |
| 18-21 | 0.44 | 1.00 | 0.39 | 0.45 | 1.00 | 1.00 |
| 50-15 | 0.01 | 0.73 | 0.01 | 0.00 | 0.00 | 1.00 |
| 186-73 | 0.17 | 1.00 | 0.16 | 0.23 | 0.36 | 1.00 |
| 189-17 | 0.03 | 1.00 | 0.00 | 0.00 | 0.64 | 1.00 |
| 189-26 | 0.10 | 1.00 | 0.10 | 0.00 | 0.00 | 1.00 |
| 190-2 | 0.00 | 0.73 | 0.00 | 0.00 | 0.00 | 1.00 |
| 190-4 | 0.09 | 1.00 | 0.00 | 0.00 | 0.58 | 1.00 |
| 193-20 | 0.01 | 1.00 | 0.00 | 0.00 | 0.13 | 1.00 |
| 195-13 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 195-40 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 199-56 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |

Medium-Aged Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 15-10 | 0.00 | 0.00 | 1.00 | 0.00 | 0.36 | 1.00 |
| 15-11 | 0.15 | 0.16 | 1.00 | 0.00 | 0.56 | 1.00 |
| 16-26 | 0.98 | 0.98 | 1.00 | 0.00 | 1.00 | 1.00 |
| 16-31 | 0.00 | 0.00 | 1.00 | 0.97 | 0.61 | 1.00 |
| 17-31 | 0.97 | 1.00 | 1.00 | 0.00 | 0.64 | 1.00 |
| 49-1 | 0.45 | 0.45 | 1.00 | 0.00 | 1.00 | 1.00 |
| 186-14 | 0.40 | 0.40 | 1.00 | 0.97 | 1.00 | 1.00 |
| 186-56 | 0.24 | 0.24 | 1.00 | 0.00 | 1.00 | 1.00 |
| 189-25 | 0.73 | 0.73 | 1.00 | 0.00 | 1.00 | 1.00 |
| 191-6 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 192-8 | 0.83 | 0.96 | 0.82 | 0.00 | 1.00 | 1.00 |
| 192-38 | 0.05 | 0.19 | 0.34 | 0.00 | 0.00 | 1.00 |
| 194-47 | 0.37 | 0.48 | 1.00 | 0.00 | 0.00 | 1.00 |
| 195-22 | 0.16 | 0.16 | 1.00 | 0.00 | 0.00 | 1.00 |
| 196-1 | 0.98 | 1.00 | 0.58 | 1.00 | 0.00 | 1.00 |
| 196-6 | 1.00 | 1.00 | 1.00 | 0.84 | 1.00 | 1.00 |
| 196-24 | 0.99 | 0.99 | 1.00 | 0.00 | 1.00 | 1.00 |
| 199-41 | 0.40 | 0.40 | 1.00 | 0.00 | 1.00 | 1.00 |
| 199-47 | 0.42 | 0.44 | 1.00 | 0.00 | 0.63 | 1.00 |
| 212-20 | 0.61 | 0.62 | 1.00 | 0.00 | 0.00 | 1.00 |
| 213-24 | 0.68 | 0.68 | 1.00 | 0.00 | 1.00 | 1.00 |

Old Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 15-5 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 15-12 | 0.00 | 0.00 | 1.00 | 0.67 | 0.00 | 1.00 |
| 15-13 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 15-26 | 0.00 | 0.00 | 1.00 | 0.78 | 0.00 | 1.00 |

Table B2. (cont'd)

Old Aspen (cont'd)

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 16-111 | 0.11 | 0.11 | 1.00 | 0.00 | 1.00 | 1.00 |
| 17-4 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 49-15 | 0.00 | 0.00 | 1.00 | 0.78 | 0.96 | 1.00 |
| 52-7 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 52-18 | 0.00 | 0.00 | 1.00 | 0.00 | 0.80 | 1.00 |
| 186-71 | 0.90 | 0.93 | 1.00 | 1.00 | 0.00 | 1.00 |
| 186-75 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 189-24 | 0.02 | 0.03 | 1.00 | 0.00 | 0.00 | 1.00 |
| 190-5 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 191-9 | 0.00 | 0.00 | 1.00 | 0.49 | 0.33 | 1.00 |
| 191-32 | 0.01 | 0.01 | 1.00 | 0.00 | 1.00 | 1.00 |
| 192-18 | 0.03 | 0.03 | 1.00 | 0.82 | 1.00 | 1.00 |
| 192-21 | 0.00 | 0.00 | 1.00 | 0.45 | 0.00 | 1.00 |
| 195-9 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 195-30 | 0.31 | 0.39 | 1.00 | 0.68 | 0.00 | 1.00 |
| 199-81 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |

Upland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 17-14 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 18-13 | 0.00 | 0.00 | 1.00 | 0.83 | 0.00 | 1.00 |
| 49-2 | 0.49 | 0.51 | 1.00 | 0.00 | 0.00 | 1.00 |
| 50-13 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 51-12 | 0.00 | 0.00 | 1.00 | 0.00 | 0.58 | 1.00 |
| 51-19 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 52-4 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| 194-26 | 0.00 | 0.00 | 1.00 | 0.00 | 0.20 | 0.89 |
| 194-53 | 0.08 | 0.08 | 1.00 | 0.00 | 1.00 | 1.00 |
| 212-28 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |

Oaks

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 186-6 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.32 |
| 186-29 | 0.00 | 0.00 | 1.00 | 0.89 | 0.00 | 1.00 |
| 186-76 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 0.32 |
| 189-15 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.60 |
| 198-33 | 0.00 | 0.46 | 1.00 | 1.00 | 0.67 | 0.00 |
| 212-3 | 0.09 | 0.12 | 0.00 | 0.99 | 1.00 | 1.00 |
| 212-21 | 0.03 | 0.04 | 1.00 | 0.72 | 0.00 | 1.00 |
| 213-1 | 0.00 | 0.00 | 0.00 | 0.85 | 1.00 | 0.00 |

Lowland Conifers

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 186-38 | 0.60 | 1.00 | 1.00 | 0.80 | 0.00 | 0.75 |
| 186-40 | 0.28 | 1.00 | 1.00 | 0.28 | 0.00 | 1.00 |
| 186-66 | 0.29 | 0.64 | 1.00 | 0.46 | 0.00 | 1.00 |

Table B2. (cont'd)

Lowland Conifers (cont'd)

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 190-1 | 0.52 | 1.00 | 0.00 | 0.78 | 0.20 | 0.75 |
| 196-39 | 0.00 | 0.00 | 1.00 | 0.57 | 0.27 | 1.00 |
| 199-10 | 0.00 | 1.00 | 0.00 | 0.91 | 0.00 | 0.00 |
| 199-52 | 0.15 | 0.27 | 1.00 | 0.38 | 0.31 | 1.00 |

Young Jack Pine

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 185-7 | 0.00 | 0.01 | 0.00 | 1.00 | 0.00 | 1.00 |
| 185-37 | 0.00 | 0.63 | 0.00 | 1.00 | 0.00 | 0.00 |
| 197-11 | 0.75 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| 198-45 | 0.00 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| 199-79 | 0.00 | 0.02 | 0.00 | 0.00 | 0.33 | 0.89 |
| 200-4 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| 200-6 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| 200-11 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| 200-14 | 0.00 | 1.00 | 0.00 | 1.00 | 0.00 | 0.00 |
| 212-2 | 0.88 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 |

Old Jack Pine

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 192-15 | 0.00 | 0.00 | 1.00 | 0.68 | 0.00 | 1.00 |
| 197-3 | 0.00 | 0.33 | 0.00 | 0.00 | 0.00 | 0.00 |
| 197-12 | 0.07 | 0.28 | 0.00 | 0.42 | 0.64 | 1.00 |
| 198-21 | 0.00 | 0.19 | 0.00 | 0.00 | 0.00 | 1.00 |
| 198-37 | 0.00 | 0.32 | 0.59 | 0.00 | 0.00 | 0.00 |
| 198-42 | 0.00 | 0.00 | 0.52 | 0.00 | 0.00 | 1.00 |
| 199-1 | 0.00 | 1.00 | 0.00 | 0.87 | 0.00 | 0.00 |
| 199-59 | 0.00 | 0.29 | 0.00 | 0.00 | 0.00 | 0.96 |
| 200-5 | 0.00 | 0.62 | 0.00 | 0.00 | 0.00 | 0.00 |
| 200-7 | 0.00 | 0.14 | 0.00 | 0.00 | 0.00 | 0.00 |

Young Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 185-14 | 0.13 | 1.00 | 0.00 | 1.00 | 0.06 | 1.00 |
| 185-16 | 0.25 | 0.39 | 0.00 | 0.85 | 0.00 | 1.00 |
| 185-24 | 0.06 | 0.17 | 0.00 | 1.00 | 0.00 | 1.00 |
| 186-3 | 0.26 | 0.29 | 1.00 | 0.79 | 1.00 | 1.00 |
| 186-8 | 0.50 | 0.79 | 0.00 | 0.80 | 0.00 | 1.00 |
| 192-12 | 0.30 | 0.40 | 0.00 | 0.87 | 0.00 | 1.00 |
| 198-11 | 0.00 | 1.00 | 0.00 | 1.00 | 0.77 | 0.00 |
| 212-25 | 0.00 | 0.65 | 0.00 | 0.00 | 0.00 | 1.00 |

Old Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 185-21 | 0.00 | 0.00 | 0.98 | 0.23 | 0.10 | 1.00 |
| 191-7 | 0.00 | 0.00 | 1.00 | 0.23 | 0.00 | 1.00 |

Table B2. (cont'd)

Old Pines (cont'd)

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 197-22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 197-30 | 0.05 | 0.39 | 0.11 | 0.00 | 0.73 | 0.75 |
| 199-17 | 0.03 | 0.06 | 1.00 | 0.00 | 1.00 | 1.00 |
| 200-22 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 |
| 212-12 | 0.63 | 0.66 | 1.00 | 0.55 | 1.00 | 1.00 |

Lowland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 17-20 | 0.56 | 1.00 | 0.00 | 0.00 | 1.00 | 1.00 |
| 18-8 | 0.07 | 1.00 | 0.00 | 1.00 | 0.03 | 0.89 |
| 189-6 | 0.02 | 0.11 | 0.15 | 0.84 | 0.27 | 0.89 |

Table B3. Ruffed grouse HSI score and SI values for vegetation stands sampled on Pigeon River Country State Forest (PRCSF) open site, 1994 and 1995.

Young Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 3-48 | 0.18 | 1.00 | 0.00 | 0.80 | 0.00 | 1.00 |
| 6-83 | 0.00 | 0.49 | 0.00 | 0.00 | 0.00 | 1.00 |
| 7-12 | 0.92 | 1.00 | 0.85 | 0.97 | 0.00 | 1.00 |
| 7-29 | 0.02 | 0.08 | 0.00 | 1.00 | 0.00 | 1.00 |
| 8-9 | 0.13 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| 8-32 | 0.24 | 1.00 | 0.00 | 1.00 | 0.60 | 1.00 |
| 8-38 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 9-34 | 0.01 | 0.31 | 0.05 | 0.00 | 0.00 | 1.00 |
| 10-7 | 0.26 | 1.00 | 0.00 | 0.53 | 1.00 | 1.00 |
| 10-56 | 0.03 | 1.00 | 0.00 | 0.00 | 0.53 | 1.00 |
| 11-62 | 0.78 | 1.00 | 0.57 | 1.00 | 0.00 | 1.00 |
| 12-47 | 0.93 | 1.00 | 1.00 | 0.07 | 1.00 | 1.00 |
| 12-67 | 0.05 | 0.39 | 0.00 | 0.91 | 0.00 | 1.00 |
| 14-8 | 0.00 | 0.70 | 0.00 | 0.00 | 0.00 | 1.00 |
| 14-11 | 0.00 | 0.86 | 0.00 | 0.00 | 0.00 | 1.00 |
| 14-32 | 0.00 | 0.97 | 0.00 | 0.00 | 0.00 | 1.00 |
| 14-44 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 15-69 | 0.00 | 0.86 | 0.00 | 0.00 | 0.00 | 1.00 |
| 17-83 | 0.01 | 0.03 | 0.00 | 0.67 | 1.00 | 1.00 |

Medium-Aged Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 1-31 | 0.97 | 1.00 | 0.91 | 1.00 | 0.00 | 1.00 |
| 2-63 | 0.96 | 0.96 | 1.00 | 1.00 | 1.00 | 1.00 |
| 2-68 | 0.22 | 0.24 | 1.00 | 1.00 | 0.54 | 1.00 |
| 2-90 | 0.16 | 0.17 | 1.00 | 0.33 | 1.00 | 1.00 |
| 3-75 | 0.42 | 0.52 | 1.00 | 0.79 | 0.00 | 1.00 |
| 6-48 | 0.13 | 0.13 | 1.00 | 1.00 | 0.00 | 1.00 |
| 6-87 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 7-4 | 0.58 | 0.63 | 1.00 | 0.92 | 0.00 | 1.00 |
| 7-14 | 1.00 | 1.00 | 1.00 | 1.00 | 0.33 | 1.00 |
| 7-57 | 0.83 | 0.90 | 0.89 | 1.00 | 1.00 | 1.00 |
| 8-36 | 0.23 | 0.28 | 0.91 | 0.77 | 0.00 | 1.00 |
| 8-69 | 0.74 | 0.97 | 0.48 | 1.00 | 1.00 | 1.00 |
| 10-42 | 0.22 | 0.51 | 0.15 | 0.87 | 0.97 | 1.00 |
| 11-21 | 0.67 | 0.67 | 1.00 | 1.00 | 0.93 | 1.00 |
| 13-15 | 0.08 | 0.20 | 0.34 | 1.00 | 0.00 | 1.00 |
| 15-33 | 0.59 | 1.00 | 0.00 | 1.00 | 0.03 | 1.00 |
| 17-9 | 0.71 | 0.76 | 1.00 | 1.00 | 0.00 | 1.00 |
| 17-77 | 0.94 | 1.00 | 1.00 | 0.93 | 1.00 | 1.00 |

Old Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 2-95 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 4-46 | 0.59 | 0.87 | 1.00 | 0.47 | 1.00 | 1.00 |
| 7-9 | 0.02 | 0.04 | 0.99 | 0.49 | 0.00 | 1.00 |

Table B3. (cont'd)

Old Aspen (cont'd)

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 7-56 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 8-2 | 0.72 | 1.00 | 1.00 | 0.71 | 1.00 | 1.00 |
| 8-13 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 8-86 | 0.61 | 0.68 | 1.00 | 0.89 | 0.97 | 1.00 |
| 9-5 | 0.70 | 0.86 | 1.00 | 0.77 | 0.10 | 1.00 |
| 12-59 | 0.88 | 1.00 | 0.95 | 1.00 | 0.43 | 1.00 |
| 12-80 | 0.08 | 0.16 | 1.00 | 0.12 | 1.00 | 1.00 |
| 14-54 | 0.16 | 0.17 | 1.00 | 1.00 | 0.30 | 1.00 |
| 15-80 | 0.00 | 0.00 | 0.00 | 0.87 | 0.00 | 1.00 |
| 16-10 | 0.37 | 0.40 | 1.00 | 0.98 | 0.27 | 1.00 |
| 16-21 | 0.86 | 0.87 | 1.00 | 0.99 | 0.00 | 1.00 |
| 16-54 | 0.00 | 0.00 | 1.00 | 0.70 | 0.00 | 1.00 |
| 17-57 | 0.39 | 0.40 | 1.00 | 1.00 | 0.00 | 1.00 |
| 17-60 | 0.34 | 0.68 | 0.00 | 1.00 | 0.00 | 1.00 |
| 18-57 | 0.19 | 0.23 | 1.00 | 0.00 | 1.00 | 1.00 |

Mixed-Aged Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 5-44 | 0.22 | 0.26 | 1.00 | 0.83 | 0.83 | 1.00 |
| 17-44 | 0.36 | 0.38 | 1.00 | 0.96 | 0.77 | 1.00 |
| 18-49 | 0.06 | 0.06 | 1.00 | 0.85 | 0.00 | 1.00 |

Upland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 4-63 | 0.00 | 0.00 | 1.00 | 0.19 | 1.00 | 0.00 |
| 7-60 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 |
| 9-21 | 0.05 | 0.11 | 0.41 | 0.00 | 0.00 | 1.00 |
| 9-31 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 11-63 | 0.00 | 0.00 | 1.00 | 0.58 | 0.90 | 1.00 |
| 14-4 | 0.00 | 0.07 | 1.00 | 0.00 | 0.00 | 0.00 |
| 15-53 | 0.35 | 0.36 | 1.00 | 1.00 | 0.00 | 1.00 |
| 15-81 | 0.09 | 0.10 | 1.00 | 0.00 | 0.00 | 1.00 |
| 18-6 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.26 |

Lowland Conifers

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 2-28 | 0.81 | 1.00 | 0.18 | 0.91 | 1.00 | 0.89 |
| 5-46 | 0.99 | 1.00 | 0.00 | 1.00 | 1.00 | 1.00 |
| 10-31 | 0.06 | 0.42 | 0.00 | 0.15 | 0.00 | 1.00 |
| 17-2 | 0.28 | 1.00 | 1.00 | 0.43 | 0.00 | 0.60 |

Jack Pine

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 5-53 | 0.16 | 0.64 | 0.00 | 0.37 | 0.00 | 1.00 |
| 6-66 | 0.02 | 0.03 | 1.00 | 0.56 | 1.00 | 1.00 |
| 6-91 | 0.00 | 0.00 | 0.89 | 0.39 | 1.00 | 1.00 |

Table B3. (cont'd)

Jack Pine (cont'd)

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 9-41 | 0.48 | 0.97 | 0.00 | 0.76 | 0.00 | 1.00 |
| 13-38 | 0.74 | 1.00 | 1.00 | 0.73 | 0.00 | 1.00 |
| 17-64 | 0.44 | 0.75 | 0.62 | 0.75 | 1.00 | 0.89 |
| 18-22 | 0.05 | 0.09 | 0.00 | 0.72 | 0.00 | 0.75 |

Young Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 5-24 | 0.23 | 0.40 | 0.00 | 1.00 | 1.00 | 1.00 |
| 7-38 | 0.00 | 0.00 | 1.00 | 0.46 | 0.00 | 1.00 |

Old Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 4-28 | 0.27 | 0.56 | 0.00 | 1.00 | 0.00 | 1.00 |
| 5-27 | 0.24 | 0.43 | 1.00 | 0.53 | 1.00 | 1.00 |
| 5-56 | 0.01 | 0.27 | 0.00 | 0.05 | 0.00 | 1.00 |
| 8-23 | 0.49 | 0.76 | 1.00 | 0.55 | 0.33 | 1.00 |
| 8-40 | 0.20 | 0.33 | 1.00 | 0.56 | 0.00 | 1.00 |
| 9-24 | 0.38 | 0.61 | 0.00 | 0.67 | 1.00 | 1.00 |
| 9-42 | 0.28 | 0.50 | 1.00 | 0.52 | 0.00 | 1.00 |
| 16-35 | 0.03 | 0.10 | 0.45 | 0.21 | 0.00 | 1.00 |
| 17-34 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 17-55 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 0.32 |

Lowland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 15-13 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 18-32 | 0.17 | 0.17 | 1.00 | 0.00 | 1.00 | 1.00 |
| 18-36 | 0.15 | 0.67 | 1.00 | 1.00 | 0.00 | 0.26 |
| 18-37 | 0.17 | 1.00 | 1.00 | 0.00 | 0.17 | 0.89 |

Table B4. Ruffed grouse HSI score and SI values for vegetation stands sampled on Pigeon River Country State Forest (PRCSF) closed site, 1994 and 1995.

Young Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 37-24 | 0.00 | 0.00 | 0.00 | 0.40 | 0.00 | 1.00 |
| 40-21 | 0.00 | 0.00 | 0.00 | 0.67 | 0.00 | 1.00 |
| 40-36 | 0.35 | 0.87 | 0.00 | 1.00 | 0.70 | 1.00 |
| 41-15 | 0.31 | 1.00 | 0.00 | 1.00 | 0.60 | 1.00 |
| 41-63 | 0.00 | 0.92 | 0.00 | 0.00 | 0.00 | 1.00 |
| 41-67 | 0.08 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| 43-22 | 0.08 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| 44-15 | 0.00 | 1.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 47-25 | 0.54 | 0.67 | 0.84 | 0.37 | 1.00 | 1.00 |
| 47-35 | 0.04 | 0.89 | 0.00 | 1.00 | 0.00 | 1.00 |
| 47-41 | 0.03 | 1.00 | 0.00 | 0.78 | 0.00 | 1.00 |
| 47-48 | 0.83 | 0.88 | 1.00 | 0.86 | 1.00 | 1.00 |
| 47-62 | 0.17 | 1.00 | 0.00 | 0.99 | 0.00 | 1.00 |
| 48-3 | 0.06 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 |
| 49-9 | 0.05 | 1.00 | 0.00 | 0.43 | 0.00 | 1.00 |
| 49-35 | 0.08 | 1.00 | 0.00 | 1.00 | 0.00 | 1.00 |

Medium-Aged Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 37-50 | 0.06 | 0.24 | 0.01 | 0.43 | 1.00 | 1.00 |
| 38-28 | 0.09 | 0.39 | 0.05 | 1.00 | 0.00 | 1.00 |
| 40-11 | 0.34 | 0.89 | 0.00 | 1.00 | 0.57 | 1.00 |
| 40-13 | 0.21 | 0.40 | 0.00 | 0.64 | 0.00 | 1.00 |
| 40-26 | 0.15 | 0.29 | 0.43 | 0.97 | 0.00 | 1.00 |
| 40-27 | 0.09 | 0.50 | 0.19 | 0.00 | 0.00 | 1.00 |
| 40-35 | 0.27 | 0.27 | 1.00 | 0.97 | 1.00 | 1.00 |
| 41-7 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 41-36 | 0.40 | 0.43 | 1.00 | 0.88 | 1.00 | 1.00 |
| 41-54 | 0.00 | 0.00 | 1.00 | 0.87 | 0.00 | 1.00 |
| 42-44 | 0.30 | 0.30 | 1.00 | 1.00 | 1.00 | 1.00 |
| 43-10 | 0.28 | 0.62 | 0.00 | 1.00 | 1.00 | 1.00 |
| 43-18 | 0.45 | 0.48 | 1.00 | 0.96 | 0.67 | 1.00 |
| 43-33 | 0.88 | 0.90 | 1.00 | 1.00 | 0.13 | 1.00 |
| 43-44 | 0.40 | 0.45 | 1.00 | 1.00 | 0.00 | 1.00 |
| 46-4 | 0.26 | 1.00 | 0.00 | 0.57 | 0.00 | 1.00 |
| 47-46 | 0.95 | 1.00 | 1.00 | 0.89 | 1.00 | 1.00 |
| 48-31 | 0.13 | 0.88 | 0.00 | 0.47 | 0.00 | 1.00 |
| 48-38 | 0.00 | 0.00 | 1.00 | 0.71 | 0.00 | 1.00 |
| 49-32 | 0.04 | 0.13 | 0.00 | 0.93 | 0.00 | 1.00 |
| 49-57 | 1.00 | 1.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 49-61 | 0.30 | 0.53 | 0.11 | 0.87 | 0.57 | 1.00 |

Old Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 36-45 | 0.95 | 1.00 | 1.00 | 0.95 | 0.67 | 1.00 |
| 37-1 | 0.00 | 0.00 | 1.00 | 0.71 | 0.00 | 1.00 |

Table B4. (cont'd)

Old Aspen (cont'd)

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 39-37 | 0.21 | 0.21 | 1.00 | 1.00 | 0.00 | 1.00 |
| 39-53 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 40-30 | 0.00 | 0.02 | 1.00 | 0.00 | 0.03 | 1.00 |
| 41-39 | 0.00 | 0.00 | 1.00 | 0.98 | 0.33 | 1.00 |
| 42-18 | 0.00 | 0.00 | 1.00 | 0.98 | 0.93 | 1.00 |
| 43-14 | 0.00 | 0.00 | 1.00 | 0.71 | 0.83 | 1.00 |
| 46-9 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 47-39 | 0.72 | 1.00 | 1.00 | 0.72 | 0.00 | 1.00 |
| 47-50 | 0.00 | 0.00 | 1.00 | 1.00 | 0.00 | 1.00 |
| 48-14 | 0.00 | 0.00 | 1.00 | 0.97 | 0.00 | 1.00 |
| 48-37 | 0.34 | 0.39 | 1.00 | 0.87 | 0.33 | 1.00 |
| 49-6 | 0.03 | 0.35 | 0.00 | 0.95 | 0.00 | 1.00 |
| 49-10 | 0.00 | 0.00 | 1.00 | 1.00 | 1.00 | 1.00 |
| 49-29 | 0.33 | 0.34 | 1.00 | 1.00 | 0.00 | 1.00 |

Mixed-Aged Aspen

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 49-21 | 0.360 | 0.360 | 1.000 | 0.000 | 0.333 | 1.000 |
| 49-55 | 0.000 | 0.000 | 1.000 | 1.000 | 0.000 | 1.000 |

Upland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 37-7 | 0.00 | 0.00 | 1.00 | 0.65 | 0.00 | 0.00 |
| 37-48 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 39-21 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 39-38 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.46 |
| 40-1 | 0.17 | 0.18 | 1.00 | 1.00 | 0.00 | 1.00 |
| 43-12 | 0.15 | 0.16 | 1.00 | 0.86 | 0.17 | 1.00 |
| 47-16 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |
| 47-28 | 0.00 | 0.00 | 1.00 | 0.00 | 0.43 | 1.00 |
| 47-32 | 0.00 | 0.00 | 1.00 | 0.47 | 0.00 | 1.00 |
| 48-9 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 1.00 |

Lowland Conifers

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 37-15 | 0.51 | 1.00 | 0.00 | 0.61 | 0.00 | 1.00 |
| 40-10 | 0.52 | 1.00 | 0.00 | 0.86 | 1.00 | 0.60 |
| 40-38 | 0.06 | 0.54 | 0.00 | 0.09 | 0.23 | 1.00 |
| 41-4 | 0.37 | 1.00 | 0.00 | 0.72 | 0.47 | 0.60 |
| 43-4 | 0.23 | 0.62 | 0.61 | 0.38 | 0.07 | 1.00 |
| 43-16 | 0.96 | 1.00 | 0.29 | 1.00 | 1.00 | 1.00 |
| 46-20 | 0.14 | 1.00 | 0.00 | 0.18 | 0.00 | 1.00 |
| 48-32 | 0.01 | 1.00 | 1.00 | 0.00 | 0.00 | 1.00 |

Table B4. (cont'd)

Jack Pine

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 34-70 | 0.00 | 0.00 | 0.00 | 0.58 | 1.00 | 1.00 |
| 35-47 | 0.00 | 0.00 | 0.00 | 0.07 | 0.00 | 1.00 |
| 36-20 | 0.44 | 0.58 | 1.00 | 0.75 | 0.00 | 1.00 |
| 37-17 | 0.38 | 1.00 | 0.00 | 0.84 | 0.33 | 0.46 |
| 39-47 | 0.06 | 1.00 | 0.00 | 0.07 | 0.00 | 0.89 |
| 40-23 | 0.00 | 0.01 | 1.00 | 0.00 | 0.00 | 0.60 |
| 40-32 | 0.64 | 0.86 | 0.00 | 1.00 | 0.00 | 0.75 |
| 41-61 | 0.01 | 0.85 | 0.00 | 0.08 | 0.00 | 1.00 |
| 42-13 | 0.01 | 0.11 | 0.97 | 0.00 | 0.00 | 1.00 |
| 46-22 | 0.92 | 1.00 | 0.06 | 0.96 | 0.23 | 1.00 |

Young Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 35-51 | 0.00 | 0.50 | 0.00 | 0.77 | 0.00 | 0.00 |
| 37-33 | 0.01 | 0.01 | 0.00 | 1.00 | 0.00 | 0.75 |
| 37-53 | 0.81 | 1.00 | 0.00 | 0.83 | 0.17 | 1.00 |
| 38-21 | 0.57 | 0.68 | 0.00 | 0.84 | 0.00 | 1.00 |
| 41-45 | 0.78 | 1.00 | 0.74 | 0.91 | 0.10 | 0.89 |
| 41-77 | 0.18 | 0.62 | 0.00 | 0.70 | 0.07 | 1.00 |
| 47-5 | 0.97 | 1.00 | 0.45 | 1.00 | 0.87 | 1.00 |
| 49-17 | 0.00 | 0.00 | 0.00 | 0.65 | 0.00 | 1.00 |

Old Pines

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 36-1 | 0.09 | 0.14 | 1.00 | 0.60 | 0.47 | 1.00 |
| 36-24 | 0.97 | 1.00 | 1.00 | 0.96 | 1.00 | 1.00 |
| 36-30 | 0.00 | 0.00 | 0.00 | 0.87 | 0.00 | 1.00 |
| 41-28 | 0.00 | 0.00 | 0.00 | 0.00 | 0.00 | 1.00 |
| 41-70 | 0.37 | 0.81 | 0.73 | 0.39 | 0.00 | 1.00 |
| 42-24 | 0.27 | 0.39 | 1.00 | 0.67 | 0.30 | 1.00 |
| 42-43 | 0.00 | 0.00 | 1.00 | 0.00 | 1.00 | 1.00 |
| 46-29 | 0.03 | 0.04 | 0.29 | 0.71 | 1.00 | 1.00 |
| 49-48 | 0.32 | 0.45 | 0.61 | 0.78 | 0.00 | 1.00 |
| 50-3 | 0.01 | 0.06 | 1.00 | 0.10 | 1.00 | 1.00 |

Lowland Hardwoods

| | | SI values | | | | |
|---|---|---|---|---|---|---|
| Stand | HSI | V1 | V2 | V3 | V4 | V5 |
| 39-36 | 0.00 | 0.00 | 1.00 | 0.00 | 0.00 | 0.89 |
| 40-18 | 0.74 | 1.00 | 0.00 | 0.58 | 1.00 | 1.00 |
| 41-73 | 0.72 | 1.00 | 0.00 | 0.00 | 1.00 | 0.72 |
| 49-19 | 0.15 | 0.37 | 0.00 | 0.00 | 0.70 | 0.89 |

# APPENDIX C

Raptor survey data collected on Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1994 and 1995.

Table C1. Raptor survey data collected on Huron National Forest (HNF) open site, 1994.

| | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey Date | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/25/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6/2/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| 6/8/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 5 | 6 |
| 6/16/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 3 |
| 6/23/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6/30/94 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 3 | 6 |
| 7/10/94 | 0 | 0 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 4 |
| 7/14/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/22/94 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 7/28/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 3 |
| 8/5/94 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 6 |
| 8/11/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8/18/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/25/94 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 9/1/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9/8/94 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 3 |
| 9/16/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/22/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 9/29/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 10/6/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/13/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10/20/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/27/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/3/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11/10/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/17/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 11/23/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/1/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/8/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 2 | 1 | 0 | 6 | 0 | 17 | 1 | 0 | 0 | 0 | 24 | 51 |

Table C2. Raptor survey data collected on Huron National Forest (HNF) closed site, 1994.

| Survey Date | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/24/94 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 6/1/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/7/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6/14/94 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 2 | 4 |
| 6/21/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6/28/94 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 4 |
| 7/5/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7/12/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/19/94 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 3 |
| 7/26/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/2/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 8/9/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 8/16/94 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 8/23/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 |
| 8/30/94 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 9/6/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 2 | 3 |
| 9/14/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 9/20/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/28/94 | 0 | 0 | 0 | 4 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 5 |
| 10/4/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 10/11/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 10/19/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/25/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/2/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/8/94 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 11/15/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/22/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/29/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/6/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 1 | 0 | 17 | 0 | 3 | 3 | 1 | 0 | 0 | 19 | 44 |

Table C3. Raptor survey data collected on Huron National Forest (HNF) open site, 1995.

| | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey Date | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/18/95 | 0 | 0 | 1 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 3 |
| 5/25/95 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 2 | 0 | 3 | 7 |
| 6/1/95 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 3 |
| 6/8/95 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 3 |
| 6/15/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/22/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 3 | 4 |
| 6/29/95 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 | 0 | 0 | 3 | 7 |
| 7/6/95 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 |
| 7/13/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 7/20/95 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 4 |
| 7/27/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 8/3/95 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/10/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 8/18/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 4 |
| 8/24/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/31/95 | 0 | 1 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 5 |
| 9/7/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/14/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9/21/95 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 9/28/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 10/5/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10/12/95 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 3 |
| 10/19/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 2 | 4 |
| 10/26/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/2/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/9/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/16/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 8 | 1 | 11 | 0 | 3 | 2 | 3 | 3 | 1 | 33 | 65 |

Table C4. Raptor survey data collected on Huron National Forest (HNF) closed site, 1995.

| Survey Date | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/16/95 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 5/24/95 | 0 | 0 | 0 | 1 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 4 |
| 5/30/95 | 0 | 0 | 0 | 2 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 7 |
| 6/6/95 | 0 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 1 | 3 |
| 6/13/95 | 0 | 1 | 0 | 2 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 6 |
| 6/20/95 | 0 | 0 | 0 | 0 | 0 | 2 | 1 | 0 | 0 | 0 | 1 | 4 |
| 6/27/95 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 3 |
| 7/4/95 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 |
| 7/11/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7/18/95 | 0 | 1 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 5 |
| 7/25/95 | 1 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 1 | 4 |
| 8/2/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8/8/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/15/95 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 8/22/95 | 0 | 0 | 0 | 1 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 2 |
| 8/30/95 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 9/5/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 9/12/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/19/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/26/95 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 10/4/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10/10/95 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 | 2 |
| 10/17/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10/24/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/31/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 11/7/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/24/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 1 | 3 | 0 | 20 | 2 | 12 | 4 | 0 | 0 | 0 | 22 | 64 |

Table C5 Raptor survey data collected on Pigeon River Country State Forest (PRCSF)

Table C5. Raptor survey data collected on Pigeon River Country State Forest (PRCSF) open site, 1994.

| | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey Date | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/27/94 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 5/31/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/9/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6/15/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/21/94 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6/28/94 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7/8/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7/13/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/20/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 7/27/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 8/5/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8/10/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 8/15/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/24/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/1/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 4 | 5 |
| 9/7/94 | 0 | 0 | 0 | 0 | 1 | 1 | 0 | 0 | 0 | 0 | 1 | 3 |
| 9/14/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9/21/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/28/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/5/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/12/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10/19/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/28/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 11/2/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/8/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/17/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/21/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/29/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/7/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/14/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 3 | 4 | 2 | 0 | 0 | 0 | 0 | 16 | 25 |

Table C6. Raptor survey data collected on Pigeon River Country State Forest (PRCSF) closed site, 1994.

| | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey Date | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/25/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 5/30/94 | 1 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 5 |
| 6/7/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/14/94 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 6/19/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/27/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/5/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 7/12/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/17/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/25/94 | 0 | 0 | 0 | 2 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 3 |
| 8/1/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/9/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/17/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 6 | 7 |
| 8/22/94 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/29/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/5/94 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9/12/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 9/19/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9/27/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/3/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 1 |
| 10/10/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/17/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/24/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/1/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/9/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 11/16/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/21/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/30/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/6/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 12/13/94 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 1 | 0 | 0 | 4 | 1 | 2 | 0 | 3 | 0 | 0 | 18 | 29 |

Table C7. Raptor survey data collected on Pigeon River Country State Forest (PRCSF) open site, 1995.

| Survey Date | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/16/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 5/22/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5/30/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 3 | 3 |
| 6/6/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/12/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 2 |
| 6/19/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 6/27/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/3/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7/10/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/17/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/24/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 7/31/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/7/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/15/95 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/21/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/28/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 9/5/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9/11/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 3 |
| 9/18/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9/25/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 10/2/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/10/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/16/95 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 | 2 |
| 10/24/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 10/31/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 11/6/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/13/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/20/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/28/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/4/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/11/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 2 | 0 | 2 | 0 | 2 | 0 | 0 | 18 | 25 |

Table C8. Raptor survey data collected on Pigeon River Country State Forest (PRCSF) closed site, 1995.

| | No. of raptors observed | | | | | | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Survey Date | Sharp-shinned Hawk | Cooper's Hawk | Northern Goshawk | Red-tailed Hawk | Red-shouldered Hawk | Broad-winged Hawk | American Kestrel | Northern Harrier | Bald Eagle | Barred Owl | Species Unknown | Total |
| 5/17/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5/24/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 5/31/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6/7/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6/14/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6/21/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 6/28/95 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 1 |
| 7/5/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/12/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/19/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 7/26/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/2/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/10/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 2 |
| 8/16/95 | 0 | 0 | 0 | 1 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 |
| 8/22/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 8/30/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/6/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/13/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 1 | 1 |
| 9/20/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 9/27/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/4/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/11/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/18/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 10/25/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/1/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/8/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/15/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/22/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 11/30/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/6/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| 12/13/95 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total | 0 | 0 | 0 | 2 | 0 | 0 | 1 | 0 | 0 | 0 | 2 | 5 |

## APPENDIX D

Ruffed grouse trapping record for Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1993 and 1994.

Table D1. Ruffed grouse trapping record for Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1993.

| | 1993 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HNF | | | | PRCSF | | | |
| | Open | | Closed | | Open | | Closed | |
| Date | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped |
| 8/4 | - | - | - | - | 23 | 0 | 23 | 0 |
| 8/5 | - | - | 12 | 2 | 23 | 2 | 23 | 0 |
| 8/6 | 12 | 0 | 12 | 0 | 23 | 2 | 23 | 0 |
| 8/7 | 12 | 0 | 24 | 0 | 22 | 0 | 23 | 1 |
| 8/8 | 12 | 0 | 24 | 0 | 22 | 0 | 23 | 1 |
| 8/9 | 23 | 0 | 24 | 4 | 23 | 0 | 23 | 0 |
| 8/10 | 23 | 0 | 24 | 0 | 23 | 2 | 23 | 1 |
| 8/11 | 23 | 0 | 24 | 0 | 34 | 0 | 23 | 0 |
| 8/12 | 25 | 0 | 24 | 1 | 34 | 0 | 23 | 0 |
| 8/13 | 25 | 3 | 24 | 0 | 34 | 0 | 23 | 0 |
| 8/14 | 11 | 0 | 24 | 1 | 34 | 1 | 23 | 0 |
| 8/15 | 13 | 0 | 12 | 0 | 34 | 2 | 23 | 0 |
| 8/16 | 13 | 0 | 24 | 0 | 24 | 0 | 23 | 0 |
| 8/17 | 13 | 0 | 25 | 7 | 26 | 0 | 26 | 0 |
| 8/18 | 24 | 1 | 25 | 1 | 26 | 2 | 26 | 0 |
| 8/19 | 24 | 9 | 25 | 0 | 26 | 0 | 26 | 0 |
| 8/20 | 24 | 3 | 25 | 1 | 26 | 0 | 26 | 2 |
| 8/21 | 23 | 2 | 12 | 0 | 26 | 0 | 27 | 0 |
| 8/22 | 23 | 0 | 12 | 0 | 26 | 1 | 27 | 0 |
| 8/23 | 23 | 0 | 12 | 2 | 26 | 0 | 27 | 0 |
| 8/24 | 23 | 0 | 12 | 1 | 26 | 1 | 27 | 0 |
| 8/25 | 25 | 0 | 25 | 0 | 26 | 3 | 27 | 0 |
| 8/26 | 26 | 0 | 28 | 1 | 26 | 1 | 27 | 0 |
| 8/27 | 29 | 0 | 14 | 0 | 26 | 0 | 27 | 3 |
| 8/28 | 14 | 7 | 29 | 2 | 26 | 2 | 27 | 0 |
| 8/29 | 28 | 0 | 14 | 0 | 27 | 2 | 15 | 0 |
| 8/30 | 28 | 0 | 14 | 0 | 27 | 0 | 15 | 0 |
| 8/31 | 28 | 1 | 14 | 0 | 36 | 0 | 15 | 1 |
| 9/1 | 32 | 4 | 14 | 0 | 38 | 0 | 15 | 1 |
| 9/2 | 32 | 0 | 16 | 0 | 38 | 2 | 15 | 2 |
| 9/3 | 33 | 1 | 29 | 2 | 38 | 4 | 15 | 0 |
| 9/4 | 34 | 0 | 29 | 0 | 38 | 1 | 15 | 0 |
| 9/5 | 34 | 2 | 29 | 1 | 38 | 1 | 15 | 0 |
| 9/6 | 37 | 0 | 29 | 1 | 38 | 1 | 15 | 0 |
| 9/7 | 37 | 0 | 16 | 1 | 38 | 1 | 15 | 0 |
| 9/8 | 37 | 0 | 16 | 0 | 38 | 1 | 15 | 1 |
| 9/9 | 37 | 0 | 16 | 0 | 36 | 5 | 15 | 0 |
| 9/10 | 37 | 0 | 29 | 0 | 36 | 0 | 15 | 0 |
| 9/11 | 37 | 0 | 29 | 4 | 36 | 1 | 15 | 0 |
| 9/12 | 37 | 1 | 29 | 0 | 36 | 3 | 15 | 0 |
| 9/13 | 37 | 3 | 29 | 0 | 36 | 1 | 15 | 0 |
| 9/14 | - | - | 29 | 2 | - | - | - | - |
| 9/15 | - | - | 29 | 1 | - | - | - | - |
| 9/16 | - | - | 29 | 4 | - | - | - | - |
| 9/17 | - | - | 19 | 0 | - | - | 23 | 1 |
| 9/18 | - | - | 19 | 1 | - | - | 34 | 3 |

Table D1. (cont'd)

| | 1993 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HNF | | | | PRCSF | | | |
| | Open | | Closed | | Open | | Closed | |
| Date | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped |
| 9/19 | - | - | 19 | 1 | - | - | 34 | 2 |
| 9/20 | - | - | 19 | 0 | - | - | 34 | 1 |
| 9/21 | - | - | 28 | 0 | - | - | 34 | 3 |
| 9/22 | - | - | 32 | 0 | - | - | 31 | 2 |
| 9/23 | - | - | 34 | 0 | - | - | 31 | 4 |
| 9/24 | - | - | 34 | 4 | - | - | 31 | 2 |
| 9/25 | - | - | 34 | 1 | - | - | 31 | 0 |
| 9/26 | - | - | 34 | 1 | - | - | 31 | 1 |
| 9/27 | - | - | 34 | 0 | - | - | 31 | 0 |
| 9/28 | - | - | 34 | 3 | - | - | 31 | 0 |
| 9/29 | - | - | 34 | 0 | - | - | 31 | 0 |
| 9/30 | - | - | 34 | 1 | - | - | - | - |
| Total | 1008 | 37 | 1343 | 51 | 1239 | 42 | 1266 | 32 |

[a] No traps were set.

Table D2. Ruffed grouse trapping record for Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1994.

| | 1994 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HNF | | | | PRCSF | | | |
| | Open | | Closed | | Open | | Closed | |
| Date | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped |
| 8/6 | 25 | 0 | - | - | - | - | - | - |
| 8/7 | 25 | 7 | - | - | 6 | 0 | 23 | 1 |
| 8/8 | 26 | 4 | - | - | 6 | 0 | 28 | 0 |
| 8/9 | 38 | 0 | 5 | 0 | 12 | 0 | 28 | 0 |
| 8/10 | 37 | 5 | 17 | 2 | 16 | 0 | 26 | 2 |
| 8/11 | 37 | 7 | 17 | 0 | 22 | 0 | 28 | 0 |
| 8/12 | 39 | 3 | 18 | 2 | 22 | 1 | 28 | 1 |
| 8/13 | 39 | 3 | 17 | 3 | 22 | 2 | 28 | 0 |
| 8/14 | 39 | 0 | 17 | 1 | 27 | 0 | 27 | 2 |
| 8/15 | 39 | 3 | 17 | 1 | 29 | 2 | 28 | 1 |
| 8/16 | 39 | 1 | 17 | 1 | 30 | 1 | 28 | 0 |
| 8/17 | 39 | 0 | 17 | 3 | 30 | 1 | 28 | 0 |
| 8/18 | 39 | 0 | 18 | 0 | 30 | 1 | 28 | 0 |
| 8/19 | 39 | 3 | 18 | 2 | 30 | 0 | 28 | 0 |
| 8/20 | 39 | 2 | 18 | 0 | 30 | 2 | 28 | 0 |
| 8/21 | 39 | 0 | 18 | 1 | 29 | 0 | 28 | 0 |
| 8/22 | 39 | 1 | 18 | 1 | 29 | 0 | 28 | 0 |
| 8/23 | 39 | 6 | 18 | 0 | 29 | 0 | 28 | 1 |
| 8/24 | 37 | 1 | 18 | 1 | 30 | 0 | 28 | 0 |
| 8/25 | 37 | 5 | 18 | 1 | 30 | 0 | 29 | 3 |
| 8/26 | 37 | 3 | 18 | 2 | 33 | 0 | 29 | 1 |
| 8/27 | 36 | 2 | 19 | 0 | 33 | 0 | 17 | 3 |
| 8/28 | 36 | 0 | 19 | 0 | 32 | 0 | 17 | 0 |
| 8/29 | 36 | 1 | 19 | 4 | 33 | 0 | 17 | 0 |
| 8/30 | 38 | 8 | 19 | 0 | 33 | 0 | 17 | 0 |
| 8/31 | 38 | 5 | 19 | 0 | 35 | 0 | 17 | 0 |
| 9/1 | 38 | 5 | 19 | 0 | 33 | 9 | 17 | 0 |
| 9/2 | 40 | 3 | 19 | 0 | 33 | 0 | 17 | 0 |
| 9/3 | 40 | 6 | 19 | 1 | 35 | 0 | 17 | 0 |
| 9/4 | 40 | 2 | 19 | 0 | 35 | 2 | 17 | 0 |
| 9/5 | 40 | 3 | 20 | 0 | 35 | 1 | 17 | 0 |
| 9/6 | 40 | 7 | 20 | 1 | 35 | 2 | 17 | 1 |
| 9/7 | 40 | 7 | 20 | 0 | 35 | 4 | 17 | 1 |
| 9/8 | 18 | 1 | 28 | 3 | 35 | 1 | 17 | 0 |
| 9/9 | 18 | 2 | 33 | 0 | 35 | 4 | 17 | 1 |
| 9/10 | 18 | 0 | 33 | 3 | 34 | 0 | 17 | 0 |
| 9/11 | - | - | 33 | 4 | 34 | 1 | 17 | 0 |
| 9/12 | - | - | 40 | 1 | 33 | 0 | 17 | 0 |
| 9/13 | - | - | 40 | 9 | 33 | 2 | 17 | 1 |
| 9/14 | - | - | 40 | 1 | 34 | 1 | 17 | 0 |
| 9/15 | - | - | 40 | 1 | 34 | 0 | 17 | 0 |
| 9/16 | - | - | 40 | 1 | 33 | 1 | 17 | 1 |
| 9/17 | - | - | 40 | 1 | 33 | 2 | 17 | 1 |
| 9/18 | - | - | 40 | 3 | 32 | 1 | 17 | 0 |
| 9/19 | - | - | 40 | 1 | 34 | 3 | 17 | 0 |
| 9/20 | - | - | 40 | 5 | 38 | 1 | 19 | 0 |

Table D2. (cont'd)

| | 1994 | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| | HNF | | | | PRCSF | | | |
| | Open | | Closed | | Open | | Closed | |
| Date | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped | No. of traps set | No. of grouse trapped |
| 9/21 | - | - | 42 | 4 | 38 | 0 | 19 | 0 |
| 9/22 | - | - | 42 | 6 | 38 | 3 | 29 | 0 |
| 9/23 | - | - | 42 | 4 | 18 | 2 | 29 | 4 |
| 9/24 | - | - | 42 | 2 | 17 | 1 | 29 | 1 |
| 9/25 | - | - | 42 | 0 | 19 | 2 | 29 | 1 |
| 9/26 | - | - | 42 | 0 | 18 | 0 | 29 | 1 |
| 9/27 | - | - | 42 | 0 | 18 | 1 | 32 | 2 |
| 9/28 | - | - | 42 | 0 | 18 | 0 | 32 | 0 |
| 9/29 | - | - | 42 | 2 | 17 | 0 | 32 | 0 |
| 9/30 | - | - | 32 | 1 | 18 | 0 | 32 | 1 |
| 10/1 | - | - | 32 | 3 | 18 | 1 | 32 | 1 |
| 10/2 | - | - | 32 | 5 | 18 | 1 | 32 | 1 |
| 10/3 | - | - | 32 | 2 | 18 | 0 | 32 | 1 |
| 10/4 | - | - | - | - | 18 | 0 | 32 | 0 |
| 10/5 | - | - | - | - | - | - | 32 | 0 |
| 10/6 | - | - | - | - | - | - | 33 | 1 |
| 10/7 | - | - | - | - | - | - | 32 | 1 |
| 10/8 | - | - | - | - | - | - | 33 | 3 |
| 10/9 | - | - | - | - | - | - | 32 | 0 |
| 10/10 | - | - | - | - | - | - | 32 | 1 |
| 10/11 | - | - | - | - | - | - | 30 | 3 |
| 10/12 | - | - | - | - | - | - | 27 | 1 |
| 10/13 | - | - | - | - | - | - | 22 | 1 |
| 10/14 | - | - | - | - | - | - | 22 | 0 |
| 10/15 | - | - | - | - | - | - | 22 | 2 |
| 10/16 | - | - | - | - | - | - | 21 | 0 |
| 10/17 | - | - | - | - | - | - | 16 | 0 |
| Total | 1283 | 106 | 1528 | 89 | 1632 | 56 | 1755 | 47 |

[a] No traps were set.

## APPENDIX E

Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1993 and 1994.

Table E1. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Huron National Forest (HNF) open site, 1993.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 11/18/93 | HY | UNK | 455 | 57 | mortality: mammalian predator |
| 2 | 8/13/93 | —[a] | HY | UNK | 425 | 65 | ——[a] |
| 3 | 8/19/93 | 1/31/94 | AHY | F | 380 | 65 | mortality: avian predator |
| 4 | 8/19/93 | — | HY | M | 330 | 57 | —— |
| 5 | 8/19/93 | — | HY | F | 295 | 60 | —— |
| 6 | 8/19/93 | — | HY | UNK | 270 | 58 | —— |
| 7 | 8/19/93 | — | HY | UNK | 260 | 59 | —— |
| 8 | 8/19/93 | — | HY | UNK | 310 | 68 | —— |
| 9 | 8/19/93 | — | HY | UNK | 315 | 62 | —— |
| 10 | 8/19/93 | — | HY | M | 325 | 61 | —— |
| 11 | 9/1/93 | 9/4/93 | HY | M | 445 | 64 | mortality: mammalian predator |
| 12 | 9/1/93 | 12/31/93 | HY | M | 450 | 65 | mortality: flew into something |
| 13 | 9/5/93 | 5/4/94 | AHY | M | 530 | 60 | mortality: no diagnosis |
| 101 | 8/13/93 | 9/4/93 | AHY | F | 500 | 65 | mortality: avian predator |
| 102 | 8/18/93 | 1/13/94 | AHY | F | 405 | 58 | mortality: pneumonia |
| 103 | 8/19/93 | 9/20/93 | AHY | F | 545 | 67 | mortality: shot |
| 104 | 8/20/93 | 1/13/94 | AHY | F | 430 | 64 | mortality: neck constriction |
| 105 | 8/20/93 | — | HY | M | 395 | 64 | —— |
| 106 | 8/20/93 | — | HY | F | 375 | 63 | —— |
| 107 | 8/21/93 | 1/31/94 | AHY | F | 525 | 71 | mortality: avian predator |
| 108 | 8/21/93 | 12/12/93 | UNK | F | 430 | 61 | mortality: shot |
| 109 | 8/28/93 | — | HY | M | 405 | 54 | —— |
| 110 | 8/28/93 | — | HY | M | 380 | 62 | —— |
| 111 | 8/28/93 | — | HY | F | 360 | 59 | —— |
| 112 | 8/28/93 | 12/8/93 | AHY | F | 430 | 62 | mortality: avian predator |
| 113 | 8/31/93 | — | HY | M | 320 | 60 | —— |
| 114 | 8/28/93 | — | HY | UNK | 360 | 59 | —— |
| 115 | 8/28/93 | — | HY | M | 385 | 58 | —— |
| 116 | 9/1/93 | 10/31/93 | HY | M | 510 | 63 | mortality: avian predator |
| 117 | 9/1/93 | 9/11/93 | HY | F | 430 | 63 | mortality: mammalian predator |
| 118 | 9/3/93 | 10/4/93 | HY | F | 500 | 65 | censored |
| 119 | 9/5/93 | 9/26/93 | HY | M | 465 | 59 | mortality: shot |
| 120 | 9/12/93 | 11/1/93 | HY | M | 490 | 58 | mortality: avian predator |
| 121 | 9/13/93 | 1/26/94 | AHY | M | 520 | 64 | mortality: avian predator |
| 122 | 9/13/93 | 3/3/94 | UNK | F | 455 | 56 | mortality: avian predator |
| 123 | 9/13/93 | 5/12/94 | UNK | F | 455 | 58 | mortality: avian predator |
| 193 | 8/28/93 | — | HY | M | 380 | 54 | —— |

[a] Entries without 'date out of study' and 'fate' data are birds that were banded only.

Table E2. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Huron National Forest (HNF) closed site, 1993.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 2601 | 8/5/93 | —[a] | HY | UNK | 250 | 55 | —— |
| 2602[b] | 8/5/93 | 9/19/93 | HY | F | 380 | 59 | mortality: stress |
| 2603[c] | 8/9/93 | 11/11/93 | HY | M | 515 | 62 | mortality: avian predator |
| 2604 | 8/9/93 | — | HY | UNK | 360 | 54 | —— |
| 2605 | 8/9/93 | 9/7/93 | AHY | F | 510 | 58 | mortality: avian predator |
| 2606 | 8/12/93 | 12/9/93 | AHY | F | 520 | 57 | mortality: no diagnosis |
| 2607 | 8/18/93 | 4/5/94 | AHY | F | 570 | 60 | censored |
| 2608[d] | 8/23/93 | 7/17/94 | AHY | F | 540 | 60 | mortality: no diagnosis |
| 2609 | 8/23/93 | 4/19/94 | HY | F | 570 | 65 | mortality: avian predator |
| 2610 | 8/24/93 | 5/29/94 | UNK | M | 470 | 67 | mortality: avian predator |
| 2611 | 8/26/93 | 9/16/93 | HY | M | 480 | 66 | mortality: mammalian predator |
| 2612 | 9/3/93 | 8/4/94 | HY | M | 430 | 56 | alive |
| 2613 | 9/3/93 | 3/1/94 | AHY | F | 420 | 57 | censored |
| 2614 | 9/5/93 | 10/22/93 | AHY | F | 420 | 62 | mortality: no diagnosis |
| 2615 | 9/6/93 | 9/10/93 | AHY | M | 500 | 60 | mortality: avian predator |
| 2616 | 9/7/93 | 5/4/94 | HY | F | 500 | 62 | mortality: avian predator |
| 2617 | 9/11/93 | — | HY | F | 420 | 54 | —— |
| 2618 | 9/11/93 | 9/12/93 | HY | M | 440 | 64 | mortality: stress |
| 2619 | 9/14/93 | — | HY | F | 320 | 51 | —— |
| 2620 | 9/14/93 | 9/16/93 | UNK | M | 470 | 55 | mortality: no diagnosis |
| 2621 | 9/15/93 | 2/14/94 | HY | F | 435 | 57 | mortality: avian predator |
| 2622 | 9/16/93 | 9/20/93 | HY | F | 450 | 57 | mortality: stress |
| 2623 | 9/16/93 | 9/20/93 | UNK | F | 480 | 55 | mortality: hit by car |
| 2624 | 9/16/93 | 7/18/94 | AHY | M | 580 | 60 | mortality: avian predator |
| 2625 | 9/18/93 | 11/26/93 | AHY | M | 540 | 62 | mortality: avian predator |
| 2626 | 9/19/93 | 3/14/94 | AHY | F | 560 | 62 | mortality: mammalian predator |
| 2627 | 9/25/93 | 11/28/93 | AHY | M | 540 | 56 | mortality: avian predator |
| 2628 | 9/28/93 | 12/15/93 | HY | F | 435 | 60 | mortality: avian predator |
| 2629 | 9/28/93 | 10/15/93 | HY | F | 475 | 58 | censored |
| 2630 | 9/28/93 | 2/14/94 | UNK | M | 540 | 61 | mortality: avian predator |
| 2631 | 9/30/93 | 1/7/94 | AHY | M | 570 | 65 | mortality: no diagnosis |
| 2701 | 8/14/93 | 11/1/93 | AHY | M | 530 | 60 | mortality: avian predator |
| 2702 | 8/17/93 | — | HY | UNK | 420 | 70 | —— |
| 2703[e] | 8/17/93 | 5/9/94 | HY | UNK | 450 | 61 | mortality: mammalian predator |
| 2704 | 8/17/93 | — | HY | UNK | 410 | 64 | —— |
| 2705 | 8/17/93 | 8/28/93 | HY | F | 460 | 65 | censored |
| 2706 | 8/17/93 | — | HY | UNK | 340 | 68 | —— |
| 2707 | 8/17/93 | 5/21/94 | HY | M | 460 | 64 | censored |
| 2708 | 8/17/93 | — | HY | M | 420 | 62 | —— |
| 2709 | 8/20/93 | — | HY | F | 390 | 56 | —— |
| 2710 | 8/28/93 | — | HY | UNK | 400 | 58 | —— |
| 2711 | 8/28/93 | 9/30/93 | HY | UNK | 420 | 65 | mortality: avian predator |
| 2712 | 9/11/93 | 9/14/93 | HY | F | 390 | 62 | mortality: stress |
| 2713 | 9/11/93 | 9/13/93 | AHY | F | 430 | 58 | mortality: stress |
| 2714 | 9/24/93 | 9/30/93 | AHY | M | 600 | 68 | mortality: avian predator |
| 2715 | 9/26/93 | 1/31/94 | UNK | F | 490 | 62 | mortality: avian predator |

[a] Entries without 'date out of study' and 'fate' data are birds that were banded only.

[b] This bird was banded on 8/5/93, it was retrapped and radio-tagged on 9/14/93.

[c] This bird was banded on 8/9/93, it was retrapped and radio-tagged on 9/28/93 .

[d] This bird was recaptured on nest on 5/23/94, its radio transmitter was replaced.

[e] This bird was banded on 8/17/93, it was retrapped and radio-tagged on 8/27/93.

Table E3. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Pigeon River Country State Forest (PRCSF) open site, 1993.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 4001 | 8/15/93 | 1/23/94 | HY | F | 455 | 60 | mortality: avian predator |
| 4002 | 8/18/93 | 3/12/94 | AHY | F | 555 | 60 | censored |
| 4003 | 8/24/93 | 8/4/94 | AHY | F | 515 | 60 | alive |
| 4004 | 8/25/93 | 9/20/93 | AHY | F | 475 | 59 | mortality: mammalian predator |
| 4005 | 9/12/93 | 9/20/93 | HY | F | 460 | 60 | censored |
| 4006 | 9/12/93 | 9/15/93 | HY | M | 400 | 55 | mortality: shot |
| 4007 | 9/12/93 | 9/15/93 | AHY | M | 490 | 59 | mortality: shot |
| 4008 | 9/14/93 | 12/18/93 | HY | F | 490 | 55 | censored |
| 4601 | 9/2/93 | 1/4/94 | AHY | M | 535 | 66 | mortality: mammalian predator |
| 4602 | 9/2/93 | 12/31/93 | AHY | F | 520 | 63 | mortality: avian predator |
| 4603 | 9/3/93 | 10/3/93 | AHY | F | 485 | 58 | mortality: shot |
| 4604 | 9/3/93 | 9/16/93 | HY | M | 470 | 55 | mortality: shot |
| 4605 | 9/4/93 | 5/16/94 | AHY | M | 535 | 66 | censored |
| 4606 | 9/7/93 | 12/31/93 | AHY | M | 480 | 65 | mortality: avian predator |
| 4607 | 9/8/93 | 9/8/93 | AHY | M | 540 | 61 | censored |
| 4608 | 9/9/93 | 9/10/93 | AHY | M | 510 | 62 | mortality: mammalian predator |
| 4701 | 8/5/93 | 6/23/94 | AHY | F | 480 | 60 | censored |
| 4702 | 8/5/93 | 1/19/94 | HY | M | 340 | 55 | censored |
| 4703 | 8/6/93 | 8/13/93 | AHY | M | 575 | 63 | mortality: avian predator |
| 4704 | 8/6/93 | 12/31/93 | HY | F | 485 | 59 | mortality: avian predator |
| 4705 | 8/10/93 | 8/30/93 | AHY | F | 515 | 56 | mortality: trauma/suffocation |
| 4706 | 8/10/93 | 10/1/93 | HY | M | 400 | 55 | censored |
| 4707 | 8/14/93 | 8/4/94 | AHY | F | 395 | 64 | alive |
| 4708 | 8/15/93 | 1/11/94 | AHY | M | 530 | 66 | mortality: avian predator |
| 4709 | 8/18/93 | 9/13/93 | HY | F | 430 | 55 | mortality: avian predator |
| 4710 | 8/22/93 | 9/17/93 | AHY | F | 470 | 59 | mortality: trauma/suffocation |
| 4711 | 8/25/93 | 9/20/93 | HY | F | 460 | 60 | censored |
| 4712 | 8/26/93 | 11/2/93 | HY | M | 510 | 62 | censored |
| 4713 | 8/25/93 | —[a] | HY | UNK | 440 | 59 | —— |
| 4714 | 8/28/93 | 9/13/93 | HY | F | 395 | 59 | mortality: pulmonary congestion |
| 4715 | 8/28/93 | — | HY | F | 375 | 57 | —— |
| 4716 | 9/3/93 | 2/5/94 | AHY | M | 475 | 66 | mortality: avian predator |
| 4717 | 9/3/93 | 9/6/93 | HY | F | 415 | 63 | mortality: stress |
| 4718 | 9/5/93 | 11/16/93 | HY | F | 410 | 59 | mortality: avian predator |
| 4719 | 9/11/93 | 11/17/93 | AHY | M | 575 | 60 | mortality: avian predator |
| 4722 | 9/6/93 | 10/6/93 | HY | F | 405 | 58 | mortality: shot |
| 6007 | 8/29/93 | 9/2/93 | HY | M | 450 | 62 | censored |
| 6008 | 8/29/93 | 10/11/93 | AHY | M | 510 | 60 | mortality: shot |

[a] Entries without 'date out of study' and 'fate' data are birds that were banded only.

Table E4. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Pigeon River Country State Forest (PRCSF) closed site, 1993.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 6001 | 8/8/93 | 1/23/94 | AHY | M | 440 | 59 | mortality: mammalian predator |
| 6002 | 8/20/93 | 8/21/93 | HY | F | 335 | 54 | mortality: stress |
| 6003 | 8/20/93 | 8/21/93 | AHY | F | 415 | 60 | mortality: stress |
| 6004 | 8/27/93 | 8/4/94 | HY | F | 430 | 58 | alive |
| 6005 | 8/27/93 | 6/28/94 | HY | F | 425 | 59 | censored |
| 6006 | 8/27/93 | 10/7/93 | AHY | F | 460 | 56 | mortality: avian predator |
| 6009 | 9/18/93 | 6/10/94 | AHY | F | 470 | 57 | censored |
| 6010 | 9/18/93 | 12/9/93 | AHY | M | 490 | 58 | mortality: no diagnosis |
| 6011 | 9/18/93 | 9/20/93 | HY | M | 465 | 59 | mortality: stress |
| 6012 | 9/21/93 | —[a] | AHY | M | — | — | —— |
| 6013 | 9/21/93 | 5/17/94 | AHY | M | 540 | 57 | mortality: avian predator |
| 6014 | 9/22/93 | 1/19/94 | HY | M | 505 | 54 | mortality: exposure/malnutrition |
| 6015 | 9/22/93 | 4/17/94 | AHY | M | 630 | 62 | censored |
| 6016 | 9/23/93 | 1/30/94 | HY | M | 525 | 59 | mortality: mammalian predator |
| 6017 | 9/23/93 | — | AHY | M | 590 | 65 | —— |
| 6018 | 9/24/93 | 10/2/93 | HY | F | 465 | 56 | mortality: drowned |
| 6101 | 8/7/93 | 10/4/93 | AHY | M | 550 | 60 | mortality: avian predator |
| 6102 | 8/10/93 | 12/23/93 | AHY | F | 445 | 59 | censored |
| 6103[b] | 8/31/93 | 5/22/94 | HY | F | 390 | 57 | mortality: mammalian predator |
| 6104 | 9/1/93 | 7/23/94 | AHY | F | 570 | 64 | censored |
| 6105 | 9/2/93 | 9/5/93 | HY | F | 400 | 60 | mortality: mammalian predator |
| 6106 | 9/2/93 | 8/4/94 | AHY | M | 530 | 63 | alive |
| 6107 | 9/8/93 | 2/20/94 | AHY | M | 520 | 66 | censored |
| 6108 | 9/19/93 | 10/2/93 | AHY | F | 415 | 54 | mortality: avian predator |
| 6109 | 9/19/93 | 12/3/93 | HY | F | 470 | 56 | censored |
| 6110 | 9/21/93 | 8/4/94 | AHY | M | 570 | 59 | alive |
| 6211 | 9/24/93 | 12/18/93 | AHY | M | 510 | 62 | censored |
| 6301 | 9/20/93 | 1/11/94 | AHY | M | 660 | 59 | censored |
| 6302 | 9/23/93 | 8/4/94 | AHY | F | 445 | 59 | alive |
| 6303 | 9/23/93 | 6/29/94 | AHY | M | 570 | 61 | censored |

[a] Entries without 'date out of study' and 'fate' data are birds that were banded only.

[b] This bird was recaptured on nest on 5/20/94, its radio transmitter was replaced.

Table E5. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Huron National Forest (HNF) open site, 1994.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 14 | 8/7/94 | 7/23/95 | HY | M | 350 | 55 | censored |
| 15 | 8/8/94 | —[a] | HY | UNK | 300 | 55 | —— |
| 16 | 8/8/94 | 9/26/94 | HY | M | 340 | 60 | mortality: abscess, suffocation |
| 17 | 8/8/94 | — | HY | M | 280 | 50 | —— |
| 18 | 8/10/94 | 8/16/94 | HY | F | 420 | 65 | mortality: mammalian predator |
| 19 | 8/11/94 | 8/17/94 | HY | UNK | 360 | 55 | mortality: avian predator |
| 20 | 8/11/94 | — | HY | UNK | 300 | 62 | —— |
| 21 | 8/11/94 | 8/18/94 | HY | F | 350 | 60 | mortality: no diagnosis |
| 22 | 8/11/94 | — | HY | F | 330 | 58 | —— |
| 24 | 8/11/94 | 8/13/94 | HY | M | 370 | 60 | mortality: stress |
| 25 | 8/13/94 | 8/14/94 | HY | F | 350 | 60 | mortality: stress |
| 26 | 8/16/94 | — | HY | F | 320 | 52 | —— |
| 27 | 8/23/94 | 9/1/94 | HY | F | 395 | 64 | mortality: mammalian predator |
| 28 | 8/23/94 | 9/18/94 | HY | F | 405 | 58 | mortality: shot |
| 29 | 8/25/94 | 3/2/95 | AHY | F | 590 | 62 | mortality: mammalian predator |
| 30 | 8/26/94 | 4/18/95 | HY | M | 460 | 58 | mortality: avian predator |
| 31[b] | 8/26/94 | 8/4/95 | HY | F | 410 | 61 | alive |
| 32 | 8/26/94 | 4/24/95 | AHY | F | 515 | 64 | censored |
| 33 | 8/29/94 | 10/4/94 | HY | F | 370 | 55 | mortality: mammalian predator |
| 34 | 8/30/94 | — | HY | F | 390 | 53 | —— |
| 35[c] | 8/30/94 | 8/4/95 | HY | M | 435 | 59 | alive |
| 36 | 8/30/94 | — | HY | F | 360 | 59 | —— |
| 37 | 8/30/94 | — | HY | UNK | 430 | 55 | —— |
| 38 | 8/30/94 | 12/13/94 | HY | F | 470 | 55 | censored |
| 39 | 8/31/94 | 3/15/95 | HY | F | 400 | 57 | mortality: mammalian predator |
| 40 | 9/1/94 | 6/24/95 | AHY | F | 575 | 61 | censored |
| 41 | 9/1/94 | — | HY | F | 360 | 55 | —— |
| 42 | 9/3/94 | 12/8/94 | HY | M | 470 | 63 | mortality: avian predator |
| 43 | 9/4/94 | 10/27/94 | AHY | M | 555 | 59 | mortality: avian predator |
| 44 | 9/6/94 | 8/4/95 | HY | M | 500 | 59 | alive |
| 45 | 9/6/94 | 8/4/95 | HY | M | 575 | 61 | alive |
| 46 | 9/6/94 | — | HY | M | 455 | 56 | —— |
| 47 | 9/6/94 | 3/22/95 | HY | M | 480 | 57 | mortality: avian predator |
| 48 | 9/6/94 | 10/10/94 | HY | M | 430 | 58 | mortality: no diagnosis |
| 49 | 9/7/94 | 9/15/94 | HY | M | 355 | 57 | mortality: mammalian predator |
| 50 | 9/7/94 | — | HY | M | 470 | 59 | —— |
| 51 | 9/7/94 | 9/12/94 | HY | M | 450 | 57 | mortality: stress |
| 52 | 9/7/94 | — | HY | F | 400 | 58 | —— |
| 53 | 9/7/94 | 11/12/94 | AHY | M | 545 | 61 | mortality: shot |
| 54 | 9/7/94 | — | HY | M | 440 | 56 | —— |
| 124 | 8/7/94 | 5/27/95 | AHY | F | 415 | 58 | mortality: no diagnosis |
| 125 | 8/7/94 | — | HY | UNK | 270 | 56 | —— |
| 126 | 8/7/94 | — | HY | UNK | 300 | 57 | —— |
| 127 | 8/7/94 | — | HY | UNK | 270 | 56 | —— |
| 128 | 8/7/94 | — | HY | UNK | 230 | 52 | —— |
| 129 | 8/7/94 | — | HY | F | 225 | 52 | —— |
| 130 | 8/10/94 | — | HY | F | 315 | 61 | —— |
| 131 | 8/10/94 | — | HY | F | 285 | 59 | —— |
| 132 | 8/10/94 | 8/14/94 | HY | F | 365 | 63 | mortality: stress |
| 133 | 8/10/94 | 9/27/94 | HY | F | 395 | 63 | mortality: flew into side of house |
| 134 | 8/11/94 | 9/5/94 | HY | F | 320 | 50 | mortality: trauma |
| 135 | 8/11/94 | 8/4/95 | HY | M | 350 | 65 | alive |
| 136 | 8/12/94 | 10/6/94 | AHY | F | 490 | 52 | mortality: mammalian predator |

Table E5. (cont'd)

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 137 | 8/13/94 | — | HY | UNK | 300 | 58 | ------ |
| 138 | 8/13/94 | — | HY | F | 320 | 60 | ------ |
| 139 | 8/15/94 | 9/13/94 | HY | F | 370 | 59 | censored |
| 140[d] | 8/15/94 | 8/4/95 | HY | F | 390 | 62 | alive |
| 141 | 8/15/94 | 8/23/94 | HY | F | 360 | 61 | mortality: avian predator |
| 142 | 8/19/94 | 8/25/94 | HY | M | 440 | 60 | mortality: trauma, suffocation |
| 143[e] | 8/19/94 | 8/4/95 | HY | F | 380 | 54 | alive |
| 144 | 8/19/94 | 8/22/94 | HY | F | 380 | 60 | mortality: stress |
| 145 | 8/20/94 | 2/7/95 | HY | M | 350 | 55 | censored |
| 146[f] | 8/20/94 | 8/4/95 | HY | F | 420 | 58 | alive |
| 147[g] | 8/22/94 | 6/20/95 | AHY | F | 445 | 59 | mortality: unknown |
| 148 | 8/23/94 | 8/4/95 | AHY | M | 565 | 64 | alive |
| 149 | 8/23/94 | 3/28/95 | HY | F | 350 | 54 | mortality: avian predator |
| 150 | 8/23/94 | 10/28/94 | AHY | M | 410 | 55 | censored |
| 151 | 8/23/94 | 8/4/95 | AHY | M | 540 | 59 | alive |
| 152 | 8/24/94 | 11/17/94 | HY | F | 360 | 57 | mortality: avian predator |
| 153 | 8/25/94 | — | HY | M | 360 | 54 | ------ |
| 154 | 8/25/94 | 8/4/95 | AHY | M | 540 | 58 | alive |
| 155 | 8/25/94 | 4/25/95 | AHY | F | 410 | 60 | mortality: mammalian predator |
| 156[h] | 8/25/94 | 8/4/95 | AHY | F | 470 | 59 | alive |
| 157 | 8/27/94 | 9/16/94 | HY | M | 420 | 58 | mortality: shot |
| 158 | 8/27/94 | 8/4/95 | HY | M | 410 | 60 | alive |
| 159 | 8/30/94 | 9/1/94 | HY | F | 370 | 58 | mortality: pulmonary congestion |
| 160 | 8/30/94 | — | HY | M | 390 | 58 | ------ |
| 161 | 8/30/94 | — | AHY | M | 520 | 64 | ------ |
| 162 | 8/31/94 | 9/2/94 | HY | F | 430 | 60 | mortality: mammalian predator |
| 163 | 8/31/94 | 6/9/95 | HY | F | 390 | 54 | censored |
| 164[i] | 8/31/94 | 6/21/95 | HY | F | 410 | 58 | mortality: mammalian predator |
| 165 | 9/1/94 | 9/12/94 | HY | F | 400 | 61 | mortality: avian predator |
| 166 | 9/1/94 | 9/3/94 | HY | F | 440 | 56 | mortality: stress |
| 167 | 9/1/94 | 8/4/95 | AHY | M | 470 | 65 | alive |
| 168[j] | 9/2/94 | 8/4/95 | AHY | F | 405 | 59 | alive |
| 169[k] | 9/2/94 | 8/4/95 | HY | F | 470 | 61 | alive |
| 170 | 9/2/94 | — | AHY | M | 420 | 60 | ------ |
| 171 | 9/3/94 | 7/17/95 | HY | M | 410 | 59 | mortality: avian predator |
| 172 | 9/3/94 | 8/4/95 | HY | M | 475 | 62 | alive |
| 173[l] | 9/3/94 | 8/4/95 | UNK | F | 445 | 57 | alive |
| 174 | 9/3/94 | 10/1/94 | UNK | M | 495 | 60 | mortality: shot |
| 175 | 9/3/94 | 10/10/94 | HY | M | 395 | 55 | mortality: shot |
| 176 | 9/4/94 | 1/9/95 | HY | M | 450 | 55 | censored |
| 177 | 9/5/94 | 8/4/95 | HY | M | 465 | 58 | alive |
| 178 | 9/5/94 | 5/26/95 | HY | F | 355 | 58 | mortality: mammalian predator |
| 179 | 9/5/94 | 8/4/95 | HY | M | 445 | 59 | alive |
| 180 | 9/6/94 | 10/6/94 | HY | F | 375 | 58 | mortality: shot |
| 181 | 9/6/94 | 4/25/95 | HY | M | 435 | 60 | mortality: pulmonary congestion |
| 182 | 9/8/94 | 8/4/95 | AHY | M | 460 | 60 | alive |
| 183 | 9/9/94 | 9/16/94 | HY | M | 465 | 55 | mortality: trauma |
| 184 | 9/9/94 | — | HY | M | 430 | 55 | ------ |

[a] Entries without 'date out of study' and 'fate' data are birds that were banded only.

[b] This bird was recaptured by night-lighting on 6/14/95, its radio transmitter was replaced.

[c] This bird was recaptured by night-lighting on 6/12/95, its radio transmitter was replaced.

[d] This bird was recaptured on nest on 6/2/95, its radio transmitter was replaced.

[e] This bird was recaptured on nest on 6/1/95, its radio transmitter was replaced.

Table E5. (cont'd)

[f] This bird was recaptured on nest on 6/23/95, its radio transmitter was replaced.
[g] This bird was recaptured on nest on 5/26/95, its radio transmitter was replaced.
[h] This bird was recaptured by night-lighting on 8/3/95, its radio transmitter was replaced.
[i] This bird was recaptured on nest on 6/19/95, its radio transmitter was replaced.
[j] This bird was recaptured on nest on 6/15/95, its radio transmitter was replaced.
[k] This bird was recaptured by night-lighting on 7/26/95, its radio transmitter was replaced.
[l] This bird was recaptured on nest on 6/12/95, its radio transmitter was replaced.

Table E6. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Huron National Forest (HNF) closed site, 1994.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 2001 | 9/12/94 | 9/16/94 | HY | F | 455 | 64 | mortality: mammalian predator |
| 2002 | 9/20/94 | 10/22/94 | AHY | M | 510 | 57 | mortality: no diagnosis |
| 2003 | 9/20/94 | 8/4/95 | HY | F | 515 | 55 | alive |
| 2004 | 9/21/94 | 10/23/94 | AHY | F | 520 | 59 | mortality: abscess/suffocation |
| 2612[a] | 10/3/94 | 8/4/95 | AHY | M | 570 | 59 | alive |
| 2633 | 9/8/94 | 10/6/94 | HY | F | 395 | 55 | censored |
| 2634 | 9/8/94 | —[b] | HY | M | 480 | 58 | —— |
| 2635 | 9/8/94 | 9/19/94 | HY | M | 510 | 61 | mortality: pulmonary congestion |
| 2637 | 9/10/94 | 10/16/94 | HY | F | 480 | 58 | censored |
| 2638 | 9/11/94 | 10/19/94 | HY | M | 490 | 56 | mortality: avian predator |
| 2639 | 9/13/94 | 11/2/94 | HY | F | 370 | 55 | censored |
| 2640 | 9/16/94 | 3/25/95 | HY | F | 420 | 55 | censored |
| 2641 | 9/17/94 | 6/21/95 | AHY | F | 465 | 59 | mortality: avian predator |
| 2642 | 9/18/94 | 5/3/95 | HY | M | 515 | 57 | mortality: mammalian predator |
| 2643 | 9/18/94 | 11/28/94 | AHY | M | 555 | 60 | mortality: avian predator |
| 2644 | 9/19/94 | 8/4/95 | HY | M | 520 | 57 | alive |
| 2645 | 9/21/94 | 12/10/94 | HY | F | 470 | 58 | censored |
| 2646 | 9/21/94 | 8/4/95 | AHY | M | 520 | 61 | alive |
| 2647 | 9/23/94 | 12/31/94 | AHY | M | 570 | 61 | mortality: avian predator |
| 2648 | 9/24/94 | 3/25/95 | AHY | M | 550 | 55 | censored |
| 2649 | 10/1/94 | 1/17/95 | AHY | M | 650 | 66 | mortality: mammalian predator |
| 2650 | 10/2/94 | — | HY | M | 550 | 63 | —— |
| 2651 | 10/2/94 | 12/1/94 | HY | M | 650 | 65 | mortality: avian predator |
| 2652 | 10/2/94 | 10/30/94 | HY | F | 470 | 58 | censored |
| 2653 | 10/3/94 | — | HY | M | 550 | 59 | —— |
| 2677 | 9/29/94 | 11/11/94 | AHY | M | 610 | 65 | mortality: avian predator |
| 2716 | 8/10/94 | 5/3/95 | AHY | F | 490 | 56 | mortality: mammalian predator |
| 2717 | 8/12/94 | 1/24/95 | AHY | F | 440 | 54 | mortality: no diagnosis |
| 2718 | 8/12/94 | 12/31/94 | HY | UNK | 335 | 50 | mortality: no diagnosis |
| 2719 | 8/13/94 | — | HY | F | 390 | 50 | —— |
| 2720 | 8/13/94 | 11/13/94 | HY | M | 455 | 58 | mortality: trauma/abscess |
| 2721 | 8/13/94 | — | AHY | M | 600 | 56 | —— |
| 2722 | 8/14/94 | 8/20/94 | AHY | M | 535 | 62 | mortality: pulmonary congestion |
| 2724[c] | 8/15/94 | 8/4/95 | AHY | F | 530 | 58 | alive |
| 2725 | 8/16/94 | 8/20/94 | AHY | M | 470 | 58 | mortality: stress |
| 2726[d] | 8/17/94 | 8/4/95 | HY | F | 390 | 56 | alive |
| 2727 | 8/17/94 | 1/8/95 | AHY | F | 465 | 58 | censored |
| 2728 | 8/19/94 | 8/21/94 | AHY | F | 430 | 68 | mortality: mammalian predator |
| 2729 | 8/19/94 | — | HY | F | 315 | 55 | —— |
| 2730 | 8/21/94 | 3/1/95 | HY | M | 430 | 55 | mortality: no diagnosis |
| 2731 | 8/22/94 | 9/26/94 | HY | F | 370 | 56 | mortality: avian predator |
| 2732 | 8/24/94 | 4/21/95 | AHY | F | 485 | 61 | censored |
| 2733 | 8/25/94 | 3/1/95 | AHY | M | 435 | 60 | mortality: mammalian predator |
| 2734 | 8/26/94 | 12/31/94 | HY | F | 390 | 56 | mortality: avian predator |
| 2735 | 8/26/94 | 8/29/94 | AHY | M | 460 | 60 | mortality: avian predator |
| 2736 | 8/29/94 | 8/30/94 | HY | M | 435 | 59 | mortality: stress |
| 2737 | 8/29/94 | 9/1/94 | HY | M | 480 | 64 | mortality: stress |
| 2738 | 8/29/94 | 9/1/94 | AHY | F | 455 | 59 | mortality: pulmonary congestion |
| 2739[e] | 8/29/94 | 8/4/95 | AHY | M | 440 | 61 | alive |
| 2740 | 9/3/94 | 12/4/94 | AHY | M | 490 | 62 | mortality: mammalian predator |
| 2741 | 9/6/94 | 9/9/94 | HY | M | 510 | 59 | mortality: mammalian predator |
| 2742 | 9/10/94 | 11/24/94 | AHY | M | 550 | 56 | mortality: avian predator |
| 2743 | 9/10/94 | — | UNK | M | 500 | 59 | —— |

Table E6. (cont'd)

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 2744 | 9/11/94 | 9/17/94 | HY | M | 490 | 60 | mortality: trauma |
| 2745[f] | 9/11/94 | 5/22/95 | HY | F | 410 | 56 | mortality: no diagnosis |
| 2746 | 9/13/94 | 10/3/94 | HY | F | 370 | 55 | censored |
| 2747 | 9/13/94 | 8/4/95 | HY | M | 470 | 58 | alive |
| 2748 | 9/13/94 | — | HY | F | 445 | 57 | —— |
| 2749 | 9/13/94 | 2/14/95 | HY | M | 470 | 60 | mortality: mammalian predator |
| 2750 | 9/13/94 | 2/14/95 | HY | F | 415 | 57 | mortality: avian predator |
| 2751 | 9/13/94 | 12/25/94 | AHY | M | 495 | 59 | mortality: avian predator |
| 2752 | 9/13/94 | 3/1/95 | HY | M | 510 | 58 | mortality: avian predator |
| 2753 | 9/13/94 | — | HY | M | 345 | 53 | —— |
| 2754 | 9/14/94 | 12/9/94 | AHY | M | 445 | 57 | mortality: mammalian predator |
| 2755 | 9/15/94 | 10/23/94 | HY | F | 395 | 56 | mortality: avian predator |
| 2756 | 9/18/94 | — | HY | M | 545 | 60 | —— |
| 2757 | 9/20/94 | — | HY | M | 440 | 56 | —— |
| 2758 | 9/20/94 | 3/11/95 | HY | M | 485 | 57 | censored |
| 2759 | 9/20/94 | 8/4/95 | AHY | M | 550 | 59 | alive |
| 2760 | 9/21/94 | 8/4/95 | HY | M | 490 | 61 | alive |
| 2761 | 9/22/94 | 10/3/94 | HY | M | 450 | 58 | censored |
| 2762 | 9/22/94 | 5/16/95 | HY | F | 405 | 57 | mortality: avian predator |
| 2763 | 9/22/94 | 6/18/95 | HY | F | 390 | 53 | censored |
| 2764 | 9/22/94 | — | HY | M | 420 | 56 | —— |
| 2765 | 9/22/94 | — | HY | M | 445 | 57 | —— |
| 2766 | 9/23/94 | 1/17/95 | HY | M | 445 | 54 | mortality: avian predator |
| 2767 | 9/23/94 | 12/25/94 | AHY | M | 580 | 58 | mortality: avian predator |
| 2768 | 9/23/94 | 8/4/95 | HY | M | 535 | 58 | alive |
| 2769 | 9/24/94 | — | AHY | F | 470 | 57 | —— |
| 2770 | 9/29/94 | 11/12/94 | HY | F | 430 | 57 | censored |
| 2771 | 9/30/94 | 1/24/95 | HY | F | 480 | 59 | mortality: avian predator |
| 2772 | 10/1/94 | 10/5/94 | HY | M | 530 | 60 | mortality: pulmonary congestion |
| 2773 | 10/1/94 | 12/31/94 | HY | M | 570 | 58 | mortality: avian predator |
| 2774 | 10/2/94 | 5/10/95 | HY | M | 515 | 64 | mortality: avian predator |
| 2775 | 10/2/94 | 1/1/95 | AHY | F | 470 | 59 | mortality: no diagnosis |
| 2776 | 10/3/94 | — | HY | M | 535 | 60 | —— |

[a] This 1993 bird was recaptured by night-lighting on 10/3/94 and 7/13/95, its radio transmitter was replaced on both occasions.

[b] Entries without 'date out of study' and 'fate' data are birds that were banded only.

[c] This bird was recaptured on nest on 6/9/95, its radio transmitter was replaced.

[d] This bird was recaptured by night-lighting on 7/17/95, its radio transmitter was replaced.

[e] This bird was recaptured by night-lighting on 8/2/95, its radio transmitter was replaced.

[f] This bird was recaptured on nest on 5/17/95, its radio transmitter was replaced.

Table E7. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Pigeon River Country State Forest (PRCSF) open site, 1994.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 4003[a] | 8/5/94 | 8/24/94 | AHY | F | 515 | 60 | censored |
| 4609 | 8/12/94 | 10/12/94 | AHY | M | 530 | 50 | mortality: mammalian predator |
| 4610 | 8/13/94 | 8/28/94 | HY | M | 425 | 50 | mortality: unknown cause |
| 4611 | 8/13/94 | 12/7/94 | HY | F | 365 | 40 | censored |
| 4612 | 8/15/94 | 8/21/94 | AHY | M | 490 | 60 | mortality: collar twisted |
| 4614 | 8/15/94 | 8/21/94 | HY | M | 380 | 40 | mortality: collar twisted |
| 4615 | 8/16/94 | 10/1/94 | HY | M | 380 | 60 | mortality: shot |
| 4616 | 8/18/94 | 9/15/94 | AHY | M | 480 | 65 | censored |
| 4617 | 8/20/94 | 1/25/95 | AHY | F | 430 | 75 | mortality: avian predator |
| 4618 | 8/20/94 | 9/4/94 | HY | UNK | 360 | 60 | censored |
| 4619 | 9/1/94 | 10/9/94 | HY | M | 500 | 60 | mortality: shot |
| 4620 | 9/1/94 | 9/3/94 | AHY | M | 500 | 72 | mortality: stress |
| 4621 | 9/1/94 | —[b] | AHY | M | 500 | 60 | —— |
| 4622 | 9/1/94 | 4/21/95 | AHY | M | 450 | 65 | censored |
| 4624 | 9/4/94 | 9/5/94 | HY | F | 465 | 57 | censored |
| 4625 | 9/5/94 | 2/22/95 | UNK | F | 465 | 59 | mortality: avian predator |
| 4626 | 9/7/94 | — | HY | F | 545 | 60 | —— |
| 4627 | 9/6/94 | 9/9/94 | HY | M | 455 | 58 | censored: transmitter removed |
| 4628 | 9/7/94 | 11/17/94 | HY | M | 580 | 60 | mortality: avian predator |
| 4629 | 9/7/94 | 9/17/94 | HY | M | 530 | 59 | mortality: shot |
| 4630 | 9/7/94 | — | HY | M | 550 | 58 | —— |
| 4631 | 9/11/94 | 4/18/95 | AHY | UNK | 510 | 60 | censored |
| 4633 | 9/13/94 | 1/17/95 | AHY | M | 535 | 62 | censored |
| 4634 | 9/13/94 | 12/19/94 | AHY | F | 525 | 59 | mortality: unknown cause |
| 4707 | 9/4/94 | 11/10/94 | AHY | F | 420 | 65 | mortality: avian predator |
| 4720 | 9/1/94 | 8/4/95 | HY | F | 380 | 58 | alive |
| 4721 | 9/1/94 | 7/8/95 | HY | UNK | 450 | 62 | censored |
| 4723 | 9/1/94 | 10/12/94 | HY | UNK | 465 | 57 | censored |
| 4724 | 9/1/94 | — | HY | F | 455 | 59 | —— |
| 4725 | 9/1/94 | 9/2/94 | HY | F | 390 | 57 | mortality: stress |
| 4726 | 9/6/94 | 9/12/94 | AHY | F | 420 | 57 | censored: transmitter removed |
| 4727 | 9/8/94 | 6/23/95 | AHY | M | 515 | 60 | censored |
| 4728 | 9/16/94 | 8/4/95 | AHY | M | 520 | 64 | alive |
| 4729 | 9/9/94 | — | HY | M | — | — | —— |
| 4730 | 9/9/94 | — | HY | F | — | — | —— |
| 4731 | 9/9/94 | — | AHY | M | 520 | 55 | —— |
| 4732 | 9/9/94 | 8/4/95 | HY | F | 410 | 54 | alive |
| 4733 | 9/17/94 | 3/14/95 | AHY | F | 480 | 58 | censored |
| 4734 | 9/17/94 | 11/10/94 | HY | M | 485 | 62 | mortality: avian predator |
| 4735 | 9/18/94 | 10/8/94 | HY | M | 525 | 62 | censored |
| 4736 | 9/19/94 | 1/25/95 | AHY | M | 500 | 60 | censored |
| 4737 | 9/19/94 | 9/26/94 | AHY | F | 460 | 61 | mortality: trauma |
| 4738 | 9/19/94 | 2/1/95 | AHY | M | 520 | 62 | mortality: avian predator |
| 4739 | 9/22/94 | 10/22/94 | HY | F | 470 | 59 | censored |
| 4740 | 9/21/94 | 12/16/94 | AHY | M | 515 | 65 | censored |
| 4741 | 9/22/94 | 10/15/94 | UNK | M | 540 | 60 | mortality: shot |
| 4742 | 9/22/94 | 10/14/94 | HY | M | 540 | 60 | mortality: shot |
| 4743 | 9/23/94 | 4/25/95 | AHY | M | 530 | 58 | mortality: mammalian predator |
| 4744 | 9/23/94 | 8/4/95 | AHY | M | 535 | 58 | alive |
| 4745 | 9/24/94 | 1/4/95 | AHY | F | 510 | 58 | censored |
| 4746 | 9/25/94 | 5/19/95 | HY | F | 475 | 57 | mortality: avian predator |
| 4747 | 9/25/94 | 10/19/94 | HY | F | 475 | 58 | censored |
| 4748 | 9/27/94 | 2/22/95 | HY | F | 575 | 61 | mortality: avian predator |

Table E7. (cont'd)

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 4749 | 10/1/94 | 10/12/94 | AHY | F | 425 | 65 | censored |
| 4750 | 10/2/94 | 4/21/95 | HY | M | 515 | 57 | mortality: avian predator |

[a] This 1993 bird was alive with a functioning transmitter at the start of the 1994 trapping season.

[b] Entries without 'date out of study' and 'fate' data are birds that were banded only.

Table E8. Band number, date entered study, date exited study, age, sex, weight, wing cord length, and fate data collected on ruffed grouse trapped on Pigeon River Country State Forest (PRCSF) closed site, 1994.

| Band no. | Date entered study | Date exited study | Age | Sex | Weight (g) | Wing cord (mm) | Fate |
|---|---|---|---|---|---|---|---|
| 6004[a] | 8/5/94 | 8/15/94 | AHY | F | 430 | 58 | censored |
| 6106 | 8/7/94 | 9/28/94 | AHY | M | 500 | — | censored: transmitter removed |
| 6110 | 10/7/94 | 8/4/95 | AHY | M | 585 | 60 | alive |
| 6112 | 8/23/94 | 2/28/95 | AHY | F | 465 | 55 | mortality: avian predator |
| 6113 | 8/10/94 | 9/24/94 | AHY | F | 460 | 61 | mortality: unknown cause |
| 6114 | 8/14/94 | 2/17/95 | UNK | F | 445 | 57 | mortality: avian predator |
| 6115 | 8/14/94 | 10/30/94 | HY | M | 445 | 62 | mortality: avian predator |
| 6116 | 8/25/94 | 8/4/95 | AHY | F | 555 | 57 | alive |
| 6117 | 8/25/94 | 10/3/94 | HY | F | 415 | 54 | censored |
| 6118 | 8/25/94 | 8/28/94 | UNK | M | 500 | 57 | mortality: collar twisted |
| 6120 | 8/26/94 | 8/27/94 | HY | F | 415 | 58 | censored: transmitter removed |
| 6121 | 8/27/94 | —[b] | HY | F | 460 | 56 | —— |
| 6122 | 8/27/94 | 8/28/94 | UNK | M | 510 | 60 | mortality: mammalian predator |
| 6123 | 8/27/94 | — | AHY | M | 505 | 58 | —— |
| 6124[c] | 9/6/94 | 8/4/95 | AHY | F | 500 | 57 | alive |
| 6125 | 9/7/94 | 9/18/94 | AHY | M | 420 | 50 | censored |
| 6126 | 9/9/94 | 4/24/95 | AHY | M | 585 | 70 | mortality: avian predator |
| 6127 | 9/13/94 | — | HY | UNK | 465 | 55 | —— |
| 6128 | 9/16/94 | 12/1/94 | AHY | M | 605 | 60 | mortality: avian predator |
| 6129 | 9/17/94 | 9/23/94 | HY | F | 400 | 50 | mortality: avian predator |
| 6130 | 9/23/94 | 8/4/95 | HY | F | 465 | 57 | alive |
| 6131 | 9/23/94 | 10/1/94 | AHY | UNK | 575 | 62 | mortality: avian predator |
| 6132 | 9/23/94 | 11/7/94 | AHY | M | 510 | 60 | mortality: unknown predator |
| 6133 | 9/23/94 | 11/1/94 | HY | M | 440 | 57 | censored |
| 6134 | 9/24/94 | 10/22/94 | HY | F | 430 | 58 | censored |
| 6135 | 9/27/94 | 8/4/95 | AHY | M | 540 | — | alive |
| 6136 | 9/30/94 | 2/1/95 | AHY | M | 535 | 58 | mortality: avian predator |
| 6137 | 10/1/94 | 3/15/95 | UNK | M | 585 | 57 | mortality: unknown cause |
| 6138[d] | 10/3/94 | 8/4/95 | HY | F | 470 | 58 | alive |
| 6139 | 10/11/94 | 7/2/95 | AHY | F | 475 | 56 | censored |
| 6140[e] | 10/12/94 | 2/1/95 | AHY | F | 505 | 56 | censored |
| 6141 | 10/13/94 | 10/15/94 | HY | M | 585 | 62 | censored: transmitter removed |
| 6142[f] | 10/15/94 | 8/4/95 | HY | F | 470 | 55 | alive |
| 6143 | 10/15/94 | 11/16/94 | HY | UNK | 495 | 57 | censored |
| 6302[a] | 8/5/94 | 12/8/94 | AHY | F | 445 | 59 | censored |
| 6304 | 8/10/94 | 5/20/95 | AHY | F | 460 | 70 | mortality: unknown cause |
| 6305 | 8/12/94 | 9/2/94 | AHY | M | 430 | 75 | mortality: mammalian predator |
| 6306 | 8/15/94 | 9/10/94 | AHY | M | 450 | 80 | censored |
| 6307 | 9/25/94 | 2/1/95 | AHY | M | 475 | 60 | mortality: avian predator |
| 6308 | 9/26/94 | 2/22/95 | HY | F | 500 | 59 | censored |
| 6309 | 9/27/94 | 12/20/94 | AHY | M | 555 | 63 | censored |
| 6311 | 10/8/94 | 8/4/95 | UNK | F | 515 | 57 | alive |
| 6312 | 10/8/94 | 10/19/94 | AHY | F | 585 | 58 | censored |
| 6313 | 10/8/94 | 1/25/95 | HY | F | 535 | 63 | mortality: avian predator |
| 6314 | 10/8/94 | 1/8/95 | HY | F | 470 | 59 | mortality: avian predator |
| 6315 | 10/10/94 | 12/15/94 | AHY | UNK | 455 | 58 | mortality: avian predator |
| 6316 | 10/11/94 | — | UNK | M | 550 | 60 | —— |
| 6317 | 10/11/94 | 11/22/94 | HY | M | 630 | 60 | mortality: avian predator |

[a] This 1993 bird was alive with a functioning transmitter at the start of the 1994 trapping season.

[b] Entries without 'date out of study' and 'fate' data are birds that were banded only.

[c] This bird was recaptured on nest on 6/1/95, its radio transmitter was replaced.

[d] This bird was recaptured on nest on 6/22/95, its radio transmitter was replaced.

Table E8. (cont'd)

[e] This bird's actual fate was mortality due to the collar choking it. Since this is not a natural cause of death and the bird lived well beyond 5 days it has been classified as censored.

[f] This bird was recaptured on nest on 5/30/95, its radio transmitter was replaced.

## APPENDIX F

Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Huron National Forest (HNF) and Pigeon River Country State Forest (PRCSF) study areas, 1993 and 1994.

Table F1. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 2 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 7 | 8/19/93 | 5 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 8 | 8/20/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 9 | 8/21/93 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 20 | 9/1/93 | 12 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 13 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 23 | 9/4/93 | 13 | 1 | 0 | 0 | 0.9231 | 7.10E-02 |
| 24 | 9/5/93 | 14 | 0 | 0 | 2 | 0.9231 | 6.84E-02 |
| 30 | 9/11/93 | 14 | 1 | 0 | 0 | 0.8571 | 8.66E-02 |
| 31 | 9/12/93 | 14 | 0 | 0 | 1 | 0.8571 | 8.66E-02 |
| 32 | 9/13/93 | 17 | 0 | 0 | 3 | 0.8571 | 7.86E-02 |
| 39 | 9/20/93 | 17 | 1 | 0 | 0 | 0.8067 | 8.60E-02 |
| 40 | 9/21/93 | 16 | 0 | 0 | 0 | 0.8067 | 8.87E-02 |
| 45 | 9/26/93 | 16 | 1 | 0 | 0 | 0.7563 | 9.33E-02 |
| 46 | 9/27/93 | 15 | 0 | 0 | 0 | 0.7563 | 9.64E-02 |
| 53 | 10/4/93 | 15 | 0 | 1 | 0 | 0.7563 | 9.64E-02 |
| 54 | 10/5/93 | 14 | 0 | 0 | 0 | 0.7563 | 9.98E-02 |
| 80 | 10/31/93 | 14 | 1 | 0 | 0 | 0.7023 | 1.02E-01 |
| 81 | 11/1/93 | 13 | 1 | 0 | 0 | 0.6483 | 1.07E-01 |
| 82 | 11/2/93 | 12 | 0 | 0 | 0 | 0.6483 | 1.11E-01 |
| 98 | 11/18/93 | 12 | 1 | 0 | 0 | 0.5942 | 1.09E-01 |
| 99 | 11/19/93 | 11 | 0 | 0 | 0 | 0.5942 | 1.14E-01 |
| 118 | 12/8/93 | 11 | 1 | 0 | 0 | 0.5402 | 1.10E-01 |
| 119 | 12/9/93 | 10 | 0 | 0 | 0 | 0.5402 | 1.16E-01 |
| 122 | 12/12/93 | 10 | 1 | 0 | 0 | 0.4862 | 1.10E-01 |
| 123 | 12/13/93 | 9 | 0 | 0 | 0 | 0.4862 | 1.16E-01 |
| 141 | 12/31/93 | 9 | 1 | 0 | 0 | 0.4322 | 1.09E-01 |
| 142 | 1/1/94 | 8 | 0 | 0 | 0 | 0.4322 | 1.15E-01 |
| 154 | 1/13/94 | 8 | 2 | 0 | 0 | 0.3241 | 9.42E-02 |
| 155 | 1/14/94 | 6 | 0 | 0 | 0 | 0.3241 | 1.09E-01 |
| 167 | 1/26/94 | 6 | 1 | 0 | 0 | 0.2701 | 9.42E-02 |
| 168 | 1/27/94 | 5 | 0 | 0 | 0 | 0.2701 | 1.03E-01 |
| 172 | 1/31/94 | 5 | 2 | 0 | 0 | 0.1621 | 6.63E-02 |
| 173 | 2/1/94 | 3 | 0 | 0 | 0 | 0.1621 | 8.57E-02 |
| 203 | 3/3/94 | 3 | 1 | 0 | 0 | 0.1080 | 5.89E-02 |
| 204 | 3/4/94 | 2 | 0 | 0 | 0 | 0.1080 | 7.22E-02 |
| 265 | 5/4/94 | 2 | 1 | 0 | 0 | 0.0540 | 3.72E-02 |
| 266 | 5/5/94 | 1 | 0 | 0 | 0 | 0.0540 | 5.25E-02 |
| 273 | 5/12/94 | 1 | 1 | 0 | 0 | 0.0000 | 0.00E+00 |

Table F2. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 1 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 7 | 8/19/93 | 4 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 8 | 8/20/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 9 | 8/21/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 23 | 9/4/93 | 7 | 1 | 0 | 0 | 0.8571 | 1.22E-01 |
| 24 | 9/5/93 | 7 | 0 | 0 | 1 | 0.8571 | 1.22E-01 |
| 32 | 9/13/93 | 8 | 0 | 0 | 1 | 0.8571 | 1.15E-01 |
| 39 | 9/20/93 | 8 | 1 | 0 | 0 | 0.7500 | 1.33E-01 |
| 40 | 9/21/93 | 7 | 0 | 0 | 0 | 0.7500 | 1.42E-01 |
| 118 | 12/8/93 | 7 | 1 | 0 | 0 | 0.6429 | 1.45E-01 |
| 119 | 12/9/93 | 6 | 0 | 0 | 0 | 0.6429 | 1.57E-01 |
| 154 | 1/13/94 | 6 | 2 | 0 | 0 | 0.4286 | 1.32E-01 |
| 155 | 1/14/94 | 4 | 0 | 0 | 0 | 0.4286 | 1.62E-01 |
| 167 | 1/26/94 | 4 | 1 | 0 | 0 | 0.3214 | 1.32E-01 |
| 168 | 1/27/94 | 3 | 0 | 0 | 0 | 0.3214 | 1.53E-01 |
| 172 | 1/31/94 | 3 | 2 | 0 | 0 | 0.1071 | 5.85E-02 |
| 173 | 2/1/94 | 1 | 0 | 0 | 0 | 0.1071 | 1.01E-01 |
| 265 | 5/4/94 | 1 | 1 | 0 | 0 | 0.0000 | 0.00E+00 |

Table F3. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 1 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 20 | 9/1/93 | 4 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 24 | 9/5/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 30 | 9/11/93 | 6 | 1 | 0 | 0 | 0.8333 | 1.39E-01 |
| 31 | 9/12/93 | 6 | 0 | 0 | 1 | 0.8333 | 1.39E-01 |
| 45 | 9/26/93 | 6 | 1 | 0 | 0 | 0.6944 | 1.57E-01 |
| 46 | 9/27/93 | 5 | 0 | 0 | 0 | 0.6944 | 1.72E-01 |
| 53 | 10/4/93 | 5 | 0 | 1 | 0 | 0.6944 | 1.72E-01 |
| 54 | 10/5/93 | 4 | 0 | 0 | 0 | 0.6944 | 1.92E-01 |
| 80 | 10/31/93 | 4 | 1 | 0 | 0 | 0.5208 | 1.80E-01 |
| 81 | 11/1/93 | 3 | 1 | 0 | 0 | 0.3472 | 1.62E-01 |
| 82 | 11/2/93 | 2 | 0 | 0 | 0 | 0.3472 | 1.98E-01 |
| 98 | 11/18/93 | 2 | 1 | 0 | 0 | 0.1736 | 1.12E-01 |
| 99 | 11/19/93 | 1 | 0 | 0 | 0 | 0.1736 | 1.58E-01 |
| 141 | 12/31/93 | 1 | 1 | 0 | 0 | 0.0000 | 0.00E+00 |

Table F4. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 9/1/93 | 2 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 5 | 9/5/93 | 4 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 12 | 9/12/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 9/13/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 26 | 9/26/93 | 6 | 1 | 0 | 0 | 0.8333 | 1.39E-01 |
| 27 | 9/27/93 | 5 | 0 | 0 | 0 | 0.8333 | 1.52E-01 |
| 61 | 10/31/93 | 5 | 1 | 0 | 0 | 0.6667 | 1.72E-01 |
| 62 | 11/1/93 | 4 | 1 | 0 | 0 | 0.5000 | 1.77E-01 |
| 63 | 11/2/93 | 3 | 0 | 0 | 0 | 0.5000 | 2.04E-01 |
| 122 | 12/31/93 | 3 | 1 | 0 | 0 | 0.3333 | 1.57E-01 |
| 123 | 1/1/94 | 2 | 0 | 0 | 0 | 0.3333 | 1.92E-01 |
| 148 | 1/26/94 | 2 | 1 | 0 | 0 | 0.1667 | 1.08E-01 |
| 149 | 1/27/94 | 1 | 0 | 0 | 0 | 0.1667 | 1.52E-01 |
| 246 | 5/4/94 | 1 | 1 | 0 | 0 | 0.0000 | 0.00E+00 |

Table F5. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 1 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 7 | 8/19/93 | 4 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 8 | 8/20/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 9 | 8/21/93 | 7 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 20 | 9/1/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 23 | 9/4/93 | 10 | 1 | 0 | 0 | 0.9000 | 9.00E-02 |
| 24 | 9/5/93 | 9 | 0 | 0 | 0 | 0.9000 | 9.49E-02 |
| 30 | 9/11/93 | 9 | 1 | 0 | 0 | 0.8000 | 1.19E-01 |
| 31 | 9/12/93 | 8 | 0 | 0 | 0 | 0.8000 | 1.26E-01 |
| 32 | 9/13/93 | 10 | 0 | 0 | 2 | 0.8000 | 1.13E-01 |
| 39 | 9/20/93 | 10 | 1 | 0 | 0 | 0.7200 | 1.20E-01 |
| 40 | 9/21/93 | 9 | 0 | 0 | 0 | 0.7200 | 1.27E-01 |
| 53 | 10/4/93 | 9 | 0 | 1 | 0 | 0.7200 | 1.27E-01 |
| 54 | 10/5/93 | 8 | 0 | 0 | 0 | 0.7200 | 1.35E-01 |
| 118 | 12/8/93 | 8 | 1 | 0 | 0 | 0.6300 | 1.35E-01 |
| 119 | 12/9/93 | 7 | 0 | 0 | 0 | 0.6300 | 1.45E-01 |
| 122 | 12/12/93 | 7 | 1 | 0 | 0 | 0.5400 | 1.38E-01 |
| 123 | 12/13/93 | 6 | 0 | 0 | 0 | 0.5400 | 1.50E-01 |
| 154 | 1/13/94 | 6 | 2 | 0 | 0 | 0.3600 | 1.18E-01 |
| 155 | 1/14/94 | 4 | 0 | 0 | 0 | 0.3600 | 1.44E-01 |
| 172 | 1/31/94 | 4 | 2 | 0 | 0 | 0.1800 | 8.15E-02 |
| 173 | 2/1/94 | 2 | 0 | 0 | 0 | 0.1800 | 1.15E-01 |
| 203 | 3/3/94 | 2 | 1 | 0 | 0 | 0.0900 | 6.07E-02 |
| 204 | 3/4/94 | 1 | 0 | 0 | 0 | 0.0900 | 8.59E-02 |
| 273 | 5/12/94 | 1 | 1 | 0 | 0 | 0.0000 | 0.00E+00 |

Table F6. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 5 | 8/17/93 | 5 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/23/93 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 12 | 8/24/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 14 | 8/26/93 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 15 | 8/27/93 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 12 | 0 | 1 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 13 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 24 | 9/5/93 | 14 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 26 | 9/7/93 | 15 | 1 | 0 | 1 | 0.9333 | 6.22E-02 |
| 27 | 9/8/93 | 14 | 0 | 0 | 0 | 0.9333 | 6.44E-02 |
| 34 | 9/15/93 | 15 | 0 | 0 | 1 | 0.9333 | 6.22E-02 |
| 35 | 9/16/93 | 16 | 1 | 0 | 1 | 0.8750 | 7.73E-02 |
| 36 | 9/17/93 | 15 | 0 | 0 | 0 | 0.8750 | 7.99E-02 |
| 37 | 9/18/93 | 16 | 0 | 0 | 1 | 0.8750 | 7.73E-02 |
| 38 | 9/19/93 | 17 | 0 | 0 | 1 | 0.8750 | 7.50E-02 |
| 43 | 9/24/93 | 18 | 0 | 0 | 1 | 0.8750 | 7.29E-02 |
| 44 | 9/25/93 | 19 | 0 | 0 | 1 | 0.8750 | 7.10E-02 |
| 45 | 9/26/93 | 20 | 0 | 0 | 1 | 0.8750 | 6.92E-02 |
| 47 | 9/28/93 | 24 | 0 | 0 | 4 | 0.8750 | 6.31E-02 |
| 49 | 9/30/93 | 25 | 2 | 0 | 1 | 0.8050 | 7.11E-02 |
| 50 | 10/1/93 | 23 | 0 | 0 | 0 | 0.8050 | 7.41E-02 |
| 64 | 10/15/93 | 23 | 0 | 1 | 0 | 0.8050 | 7.41E-02 |
| 65 | 10/16/93 | 22 | 0 | 0 | 0 | 0.8050 | 7.58E-02 |
| 71 | 10/22/93 | 22 | 1 | 0 | 0 | 0.7684 | 7.88E-02 |
| 72 | 10/23/93 | 21 | 0 | 0 | 0 | 0.7684 | 8.07E-02 |
| 81 | 11/1/93 | 21 | 1 | 0 | 0 | 0.7318 | 8.27E-02 |
| 82 | 11/2/93 | 20 | 0 | 0 | 0 | 0.7318 | 8.47E-02 |
| 91 | 11/11/93 | 20 | 1 | 0 | 0 | 0.6952 | 8.58E-02 |
| 92 | 11/12/93 | 19 | 0 | 0 | 0 | 0.6952 | 8.81E-02 |
| 106 | 11/26/93 | 19 | 1 | 0 | 0 | 0.6586 | 8.83E-02 |
| 107 | 11/27/93 | 18 | 0 | 0 | 0 | 0.6586 | 9.07E-02 |
| 108 | 11/28/93 | 18 | 1 | 0 | 0 | 0.6220 | 9.01E-02 |
| 109 | 11/29/93 | 17 | 0 | 0 | 0 | 0.6220 | 9.28E-02 |
| 119 | 12/9/93 | 17 | 1 | 0 | 0 | 0.5855 | 9.14E-02 |
| 120 | 12/10/93 | 16 | 0 | 0 | 0 | 0.5855 | 9.42E-02 |
| 125 | 12/15/93 | 16 | 1 | 0 | 0 | 0.5489 | 9.22E-02 |
| 126 | 12/16/93 | 15 | 0 | 0 | 0 | 0.5489 | 9.52E-02 |
| 148 | 1/7/94 | 15 | 1 | 0 | 0 | 0.5123 | 9.24E-02 |
| 149 | 1/8/94 | 14 | 0 | 0 | 0 | 0.5123 | 9.56E-02 |
| 172 | 1/31/94 | 14 | 1 | 0 | 0 | 0.4757 | 9.21E-02 |
| 173 | 2/1/94 | 13 | 0 | 0 | 0 | 0.4757 | 9.55E-02 |
| 186 | 2/14/94 | 13 | 2 | 0 | 0 | 0.4025 | 8.63E-02 |
| 187 | 2/15/94 | 11 | 0 | 0 | 0 | 0.4025 | 9.38E-02 |
| 201 | 3/1/94 | 11 | 0 | 1 | 0 | 0.4025 | 9.38E-02 |
| 202 | 3/2/94 | 10 | 0 | 0 | 0 | 0.4025 | 9.84E-02 |
| 214 | 3/14/94 | 10 | 1 | 0 | 0 | 0.3623 | 9.15E-02 |
| 215 | 3/15/94 | 9 | 0 | 0 | 0 | 0.3623 | 9.64E-02 |

Table F6. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 236 | 4/5/94 | 9 | 0 | 1 | 0 | 0.3623 | 9.64E-02 |
| 237 | 4/6/94 | 8 | 0 | 0 | 0 | 0.3623 | 1.02E-01 |
| 250 | 4/19/94 | 8 | 1 | 0 | 0 | 0.3170 | 9.26E-02 |
| 251 | 4/20/94 | 7 | 0 | 0 | 0 | 0.3170 | 9.90E-02 |
| 265 | 5/4/94 | 7 | 1 | 0 | 0 | 0.2717 | 8.76E-02 |
| 266 | 5/5/94 | 6 | 0 | 0 | 0 | 0.2717 | 9.47E-02 |
| 270 | 5/9/94 | 6 | 1 | 0 | 0 | 0.2264 | 8.13E-02 |
| 271 | 5/10/94 | 5 | 0 | 0 | 0 | 0.2264 | 8.91E-02 |
| 276 | 5/15/94 | 5 | 0 | 5 | 0 | 0.2264 | 8.91E-02 |

Table F7. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/23/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 24 | 9/5/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 26 | 9/7/93 | 7 | 1 | 0 | 0 | 0.8571 | 1.22E-01 |
| 27 | 9/8/93 | 6 | 0 | 0 | 0 | 0.8571 | 1.32E-01 |
| 35 | 9/16/93 | 7 | 0 | 0 | 1 | 0.8571 | 1.22E-01 |
| 37 | 9/18/93 | 8 | 0 | 0 | 1 | 0.8571 | 1.15E-01 |
| 38 | 9/19/93 | 9 | 0 | 0 | 1 | 0.8571 | 1.08E-01 |
| 43 | 9/24/93 | 10 | 0 | 0 | 1 | 0.8571 | 1.02E-01 |
| 44 | 9/25/93 | 11 | 0 | 0 | 1 | 0.8571 | 9.77E-02 |
| 49 | 9/30/93 | 12 | 1 | 0 | 1 | 0.7857 | 1.05E-01 |
| 50 | 10/1/93 | 11 | 0 | 0 | 0 | 0.7857 | 1.10E-01 |
| 71 | 10/22/93 | 11 | 1 | 0 | 0 | 0.7143 | 1.15E-01 |
| 72 | 10/23/93 | 10 | 0 | 0 | 0 | 0.7143 | 1.21E-01 |
| 81 | 11/1/93 | 10 | 1 | 0 | 0 | 0.6429 | 1.21E-01 |
| 82 | 11/2/93 | 9 | 0 | 0 | 0 | 0.6429 | 1.28E-01 |
| 106 | 11/26/93 | 9 | 1 | 0 | 0 | 0.5714 | 1.25E-01 |
| 107 | 11/27/93 | 8 | 0 | 0 | 0 | 0.5714 | 1.32E-01 |
| 108 | 11/28/93 | 8 | 1 | 0 | 0 | 0.5000 | 1.25E-01 |
| 109 | 11/29/93 | 7 | 0 | 0 | 0 | 0.5000 | 1.34E-01 |
| 119 | 12/9/93 | 7 | 1 | 0 | 0 | 0.4286 | 1.22E-01 |
| 120 | 12/10/93 | 6 | 0 | 0 | 0 | 0.4286 | 1.32E-01 |
| 148 | 1/7/94 | 6 | 1 | 0 | 0 | 0.3571 | 1.17E-01 |
| 149 | 1/8/94 | 5 | 0 | 0 | 0 | 0.3571 | 1.28E-01 |
| 201 | 3/1/94 | 5 | 0 | 1 | 0 | 0.3571 | 1.28E-01 |
| 202 | 3/2/94 | 4 | 0 | 0 | 0 | 0.3571 | 1.43E-01 |
| 214 | 3/14/94 | 4 | 1 | 0 | 0 | 0.2679 | 1.15E-01 |
| 215 | 3/15/94 | 3 | 0 | 0 | 0 | 0.2679 | 1.32E-01 |
| 236 | 4/5/94 | 3 | 0 | 1 | 0 | 0.2679 | 1.32E-01 |
| 237 | 4/6/94 | 2 | 0 | 0 | 0 | 0.2679 | 1.62E-01 |
| 276 | 5/15/94 | 2 | 0 | 2 | 0 | 0.2679 | 1.62E-01 |

Table F8. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/17/93 | 2 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 7 | 8/23/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 10 | 8/26/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/27/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/28/93 | 6 | 0 | 1 | 1 | 1.0000 | 0.00E+00 |
| 18 | 9/3/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/7/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 30 | 9/15/93 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 31 | 9/16/93 | 8 | 1 | 0 | 0 | 0.8750 | 1.09E-01 |
| 32 | 9/17/93 | 7 | 0 | 0 | 0 | 0.8750 | 1.17E-01 |
| 43 | 9/28/93 | 10 | 0 | 0 | 3 | 0.8750 | 9.78E-02 |
| 45 | 9/30/93 | 10 | 1 | 0 | 0 | 0.7875 | 1.15E-01 |
| 46 | 10/1/93 | 9 | 0 | 0 | 0 | 0.7875 | 1.21E-01 |
| 60 | 10/15/93 | 9 | 0 | 1 | 0 | 0.7875 | 1.21E-01 |
| 61 | 10/16/93 | 8 | 0 | 0 | 0 | 0.7875 | 1.28E-01 |
| 87 | 11/11/93 | 8 | 1 | 0 | 0 | 0.6891 | 1.36E-01 |
| 88 | 11/12/93 | 7 | 0 | 0 | 0 | 0.6891 | 1.45E-01 |
| 121 | 12/15/93 | 7 | 1 | 0 | 0 | 0.5906 | 1.43E-01 |
| 122 | 12/16/93 | 6 | 0 | 0 | 0 | 0.5906 | 1.54E-01 |
| 182 | 2/14/94 | 6 | 1 | 0 | 0 | 0.4922 | 1.43E-01 |
| 183 | 2/15/94 | 5 | 0 | 0 | 0 | 0.4922 | 1.57E-01 |
| 246 | 4/19/94 | 5 | 1 | 0 | 0 | 0.3938 | 1.37E-01 |
| 247 | 4/20/94 | 4 | 0 | 0 | 0 | 0.3938 | 1.53E-01 |
| 261 | 5/4/94 | 4 | 1 | 0 | 0 | 0.2953 | 1.24E-01 |
| 262 | 5/5/94 | 3 | 0 | 0 | 0 | 0.2953 | 1.43E-01 |
| 266 | 5/9/94 | 3 | 1 | 0 | 0 | 0.1969 | 1.02E-01 |
| 267 | 5/10/94 | 2 | 0 | 0 | 0 | 0.1969 | 1.25E-01 |
| 272 | 5/15/94 | 2 | 0 | 2 | 0 | 0.1969 | 1.25E-01 |

Table F9. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/14/93 | 1 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 4 | 8/17/93 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/24/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/26/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 21 | 9/3/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 34 | 9/16/93 | 6 | 1 | 0 | 1 | 0.8333 | 1.39E-01 |
| 35 | 9/17/93 | 5 | 0 | 0 | 0 | 0.8333 | 1.52E-01 |
| 36 | 9/18/93 | 6 | 0 | 0 | 1 | 0.8333 | 1.39E-01 |
| 42 | 9/24/93 | 7 | 0 | 0 | 1 | 0.8333 | 1.29E-01 |
| 43 | 9/25/93 | 8 | 0 | 0 | 1 | 0.8333 | 1.20E-01 |
| 46 | 9/28/93 | 10 | 0 | 0 | 2 | 0.8333 | 1.08E-01 |
| 48 | 9/30/93 | 11 | 1 | 0 | 1 | 0.7576 | 1.12E-01 |
| 49 | 10/1/93 | 10 | 0 | 0 | 0 | 0.7576 | 1.18E-01 |
| 80 | 11/1/93 | 10 | 1 | 0 | 0 | 0.6818 | 1.22E-01 |
| 81 | 11/2/93 | 9 | 0 | 0 | 0 | 0.6818 | 1.28E-01 |
| 90 | 11/11/93 | 9 | 1 | 0 | 0 | 0.6061 | 1.27E-01 |
| 91 | 11/12/93 | 8 | 0 | 0 | 0 | 0.6061 | 1.34E-01 |
| 105 | 11/26/93 | 8 | 1 | 0 | 0 | 0.5303 | 1.28E-01 |
| 106 | 11/27/93 | 7 | 0 | 0 | 0 | 0.5303 | 1.37E-01 |
| 107 | 11/28/93 | 7 | 1 | 0 | 0 | 0.4545 | 1.27E-01 |
| 108 | 11/29/93 | 6 | 0 | 0 | 0 | 0.4545 | 1.37E-01 |
| 147 | 1/7/94 | 6 | 1 | 0 | 0 | 0.3788 | 1.22E-01 |
| 148 | 1/8/94 | 5 | 0 | 0 | 0 | 0.3788 | 1.34E-01 |
| 185 | 2/14/94 | 5 | 1 | 0 | 0 | 0.3030 | 1.13E-01 |
| 186 | 2/15/94 | 4 | 0 | 0 | 0 | 0.3030 | 1.26E-01 |
| 275 | 5/15/94 | 4 | 0 | 4 | 0 | 0.3030 | 1.26E-01 |

Table F10. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 5 | 8/17/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/23/93 | 6 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 6 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 24 | 9/5/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 26 | 9/7/93 | 8 | 1 | 0 | 1 | 0.8750 | 1.09E-01 |
| 27 | 9/8/93 | 7 | 0 | 0 | 0 | 0.8750 | 1.17E-01 |
| 34 | 9/15/93 | 8 | 0 | 0 | 1 | 0.8750 | 1.09E-01 |
| 38 | 9/19/93 | 9 | 0 | 0 | 1 | 0.8750 | 1.03E-01 |
| 45 | 9/26/93 | 10 | 0 | 0 | 1 | 0.8750 | 9.78E-02 |
| 47 | 9/28/93 | 12 | 0 | 0 | 2 | 0.8750 | 8.93E-02 |
| 64 | 10/15/93 | 12 | 0 | 1 | 0 | 0.8750 | 8.93E-02 |
| 65 | 10/16/93 | 11 | 0 | 0 | 0 | 0.8750 | 9.33E-02 |
| 71 | 10/22/93 | 11 | 1 | 0 | 0 | 0.7955 | 1.08E-01 |
| 72 | 10/23/93 | 10 | 0 | 0 | 0 | 0.7955 | 1.14E-01 |
| 119 | 12/9/93 | 10 | 1 | 0 | 0 | 0.7159 | 1.21E-01 |
| 120 | 12/10/93 | 9 | 0 | 0 | 0 | 0.7159 | 1.27E-01 |
| 125 | 12/15/93 | 9 | 1 | 0 | 0 | 0.6364 | 1.28E-01 |
| 126 | 12/16/93 | 8 | 0 | 0 | 0 | 0.6364 | 1.36E-01 |
| 172 | 1/31/94 | 8 | 1 | 0 | 0 | 0.5568 | 1.31E-01 |
| 173 | 2/1/94 | 7 | 0 | 0 | 0 | 0.5568 | 1.40E-01 |
| 186 | 2/14/94 | 7 | 1 | 0 | 0 | 0.4773 | 1.30E-01 |
| 187 | 2/15/94 | 6 | 0 | 0 | 0 | 0.4773 | 1.41E-01 |
| 201 | 3/1/94 | 6 | 0 | 1 | 0 | 0.4773 | 1.41E-01 |
| 202 | 3/2/94 | 5 | 0 | 0 | 0 | 0.4773 | 1.54E-01 |
| 214 | 3/14/94 | 5 | 1 | 0 | 0 | 0.3818 | 1.34E-01 |
| 215 | 3/15/94 | 4 | 0 | 0 | 0 | 0.3818 | 1.50E-01 |
| 236 | 4/5/94 | 4 | 0 | 1 | 0 | 0.3818 | 1.50E-01 |
| 237 | 4/6/94 | 3 | 0 | 0 | 0 | 0.3818 | 1.73E-01 |
| 250 | 4/19/94 | 3 | 1 | 0 | 0 | 0.2545 | 1.27E-01 |
| 251 | 4/20/94 | 2 | 0 | 0 | 0 | 0.2545 | 1.55E-01 |
| 265 | 5/4/94 | 2 | 1 | 0 | 0 | 0.1273 | 8.41E-02 |
| 266 | 5/5/94 | 1 | 0 | 0 | 0 | 0.1273 | 1.19E-01 |
| 276 | 5/15/94 | 1 | 0 | 1 | 0 | 0.1273 | 1.19E-01 |

Table F11. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 5 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 3 | 8/15/93 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 10 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 10 | 8/22/93 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/93 | 12 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/93 | 14 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 14 | 8/26/93 | 15 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 16 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 17 | 8/29/93 | 17 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 18 | 8/30/93 | 17 | 1 | 0 | 0 | 0.9412 | 5.54E-02 |
| 19 | 8/31/93 | 16 | 0 | 0 | 0 | 0.9412 | 5.71E-02 |
| 21 | 9/2/93 | 18 | 0 | 0 | 2 | 0.9412 | 5.38E-02 |
| 22 | 9/3/93 | 21 | 0 | 0 | 3 | 0.9412 | 4.98E-02 |
| 23 | 9/4/93 | 22 | 0 | 0 | 1 | 0.9412 | 4.87E-02 |
| 24 | 9/5/93 | 23 | 0 | 0 | 1 | 0.9412 | 4.76E-02 |
| 25 | 9/6/93 | 24 | 0 | 0 | 1 | 0.9412 | 4.66E-02 |
| 26 | 9/7/93 | 25 | 0 | 0 | 1 | 0.9412 | 4.57E-02 |
| 30 | 9/11/93 | 26 | 0 | 0 | 1 | 0.9412 | 4.48E-02 |
| 31 | 9/12/93 | 27 | 0 | 0 | 1 | 0.9412 | 4.39E-02 |
| 32 | 9/13/93 | 27 | 2 | 0 | 0 | 0.8715 | 6.01E-02 |
| 33 | 9/14/93 | 26 | 0 | 0 | 1 | 0.8715 | 6.13E-02 |
| 35 | 9/16/93 | 26 | 1 | 0 | 0 | 0.8379 | 6.62E-02 |
| 36 | 9/17/93 | 25 | 1 | 0 | 0 | 0.8044 | 7.11E-02 |
| 37 | 9/18/93 | 24 | 0 | 0 | 0 | 0.8044 | 7.26E-02 |
| 39 | 9/20/93 | 24 | 1 | 2 | 0 | 0.7709 | 7.53E-02 |
| 40 | 9/21/93 | 21 | 0 | 0 | 0 | 0.7709 | 8.05E-02 |
| 50 | 10/1/93 | 21 | 0 | 1 | 0 | 0.7709 | 8.05E-02 |
| 51 | 10/2/93 | 20 | 0 | 0 | 0 | 0.7709 | 8.25E-02 |
| 52 | 10/3/93 | 20 | 1 | 0 | 0 | 0.7324 | 8.47E-02 |
| 53 | 10/4/93 | 19 | 0 | 0 | 0 | 0.7324 | 8.69E-02 |
| 55 | 10/6/93 | 19 | 1 | 0 | 0 | 0.6938 | 8.81E-02 |
| 56 | 10/7/93 | 18 | 0 | 0 | 0 | 0.6938 | 9.05E-02 |
| 60 | 10/11/93 | 18 | 1 | 0 | 0 | 0.6553 | 9.07E-02 |
| 61 | 10/12/93 | 17 | 0 | 0 | 0 | 0.6553 | 9.33E-02 |
| 82 | 11/2/93 | 17 | 0 | 1 | 0 | 0.6553 | 9.33E-02 |
| 83 | 11/3/93 | 16 | 0 | 0 | 0 | 0.6553 | 9.62E-02 |
| 96 | 11/16/93 | 16 | 1 | 0 | 0 | 0.6143 | 9.54E-02 |
| 97 | 11/17/93 | 15 | 1 | 0 | 0 | 0.5734 | 9.67E-02 |
| 98 | 11/18/93 | 14 | 0 | 0 | 0 | 0.5734 | 1.00E-01 |
| 128 | 12/18/93 | 14 | 0 | 1 | 0 | 0.5734 | 1.00E-01 |
| 129 | 12/19/93 | 13 | 0 | 0 | 0 | 0.5734 | 1.04E-01 |
| 141 | 12/31/93 | 13 | 3 | 0 | 0 | 0.4410 | 9.15E-02 |
| 142 | 1/1/94 | 10 | 0 | 0 | 0 | 0.4410 | 1.04E-01 |
| 145 | 1/4/94 | 10 | 1 | 0 | 0 | 0.3969 | 9.75E-02 |
| 146 | 1/5/94 | 9 | 0 | 0 | 0 | 0.3969 | 1.03E-01 |
| 152 | 1/11/94 | 9 | 1 | 0 | 0 | 0.3528 | 9.46E-02 |
| 153 | 1/12/94 | 8 | 0 | 0 | 0 | 0.3528 | 1.00E-01 |
| 160 | 1/19/94 | 8 | 0 | 1 | 0 | 0.3528 | 1.00E-01 |

Table F11. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 161 | 1/20/94 | 7 | 0 | 0 | 0 | 0.3528 | 1.07E-01 |
| 164 | 1/23/94 | 7 | 1 | 0 | 0 | 0.3024 | 9.55E-02 |
| 165 | 1/24/94 | 6 | 0 | 0 | 0 | 0.3024 | 1.03E-01 |
| 177 | 2/5/94 | 6 | 1 | 0 | 0 | 0.2520 | 8.90E-02 |
| 178 | 2/6/94 | 5 | 0 | 0 | 0 | 0.2520 | 9.75E-02 |
| 212 | 3/12/94 | 5 | 0 | 1 | 0 | 0.2520 | 9.75E-02 |
| 213 | 3/13/94 | 4 | 0 | 0 | 0 | 0.2520 | 1.09E-01 |
| 276 | 5/15/94 | 4 | 0 | 4 | 0 | 0.2520 | 1.09E-01 |

Table F12. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 3 | 8/15/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 10 | 8/22/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/93 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 17 | 8/29/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 18 | 8/30/93 | 9 | 1 | 0 | 0 | 0.8889 | 9.88E-02 |
| 19 | 8/31/93 | 8 | 0 | 0 | 0 | 0.8889 | 1.05E-01 |
| 21 | 9/2/93 | 10 | 0 | 0 | 2 | 0.8889 | 9.37E-02 |
| 22 | 9/3/93 | 12 | 0 | 0 | 2 | 0.8889 | 8.55E-02 |
| 23 | 9/4/93 | 13 | 0 | 0 | 1 | 0.8889 | 8.22E-02 |
| 26 | 9/7/93 | 14 | 0 | 0 | 1 | 0.8889 | 7.92E-02 |
| 30 | 9/11/93 | 15 | 0 | 0 | 1 | 0.8889 | 7.65E-02 |
| 36 | 9/17/93 | 15 | 1 | 0 | 0 | 0.8296 | 8.84E-02 |
| 37 | 9/18/93 | 14 | 0 | 0 | 0 | 0.8296 | 9.15E-02 |
| 39 | 9/20/93 | 14 | 1 | 0 | 0 | 0.7704 | 9.87E-02 |
| 40 | 9/21/93 | 13 | 0 | 0 | 0 | 0.7704 | 1.02E-01 |
| 52 | 10/3/93 | 13 | 1 | 0 | 0 | 0.7111 | 1.06E-01 |
| 53 | 10/4/93 | 12 | 0 | 0 | 0 | 0.7111 | 1.10E-01 |
| 60 | 10/11/93 | 12 | 1 | 0 | 0 | 0.6519 | 1.11E-01 |
| 61 | 10/12/93 | 11 | 0 | 0 | 0 | 0.6519 | 1.16E-01 |
| 97 | 11/17/93 | 11 | 1 | 0 | 0 | 0.5926 | 1.14E-01 |
| 98 | 11/18/93 | 10 | 0 | 0 | 0 | 0.5926 | 1.20E-01 |
| 141 | 12/31/93 | 10 | 2 | 0 | 0 | 0.4741 | 1.09E-01 |
| 142 | 1/1/94 | 8 | 0 | 0 | 0 | 0.4741 | 1.22E-01 |
| 145 | 1/4/94 | 8 | 1 | 0 | 0 | 0.4148 | 1.12E-01 |
| 146 | 1/5/94 | 7 | 0 | 0 | 0 | 0.4148 | 1.20E-01 |
| 152 | 1/11/94 | 7 | 1 | 0 | 0 | 0.3556 | 1.08E-01 |
| 153 | 1/12/94 | 6 | 0 | 0 | 0 | 0.3556 | 1.17E-01 |
| 177 | 2/5/94 | 6 | 1 | 0 | 0 | 0.2963 | 1.01E-01 |
| 178 | 2/6/94 | 5 | 0 | 0 | 0 | 0.2963 | 1.11E-01 |
| 212 | 3/12/94 | 5 | 0 | 1 | 0 | 0.2963 | 1.11E-01 |
| 213 | 3/13/94 | 4 | 0 | 0 | 0 | 0.2963 | 1.24E-01 |
| 276 | 5/15/94 | 4 | 0 | 4 | 0 | 0.2963 | 1.24E-01 |

Table F13. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 3 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 14 | 8/26/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 24 | 9/5/93 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 25 | 9/6/93 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 31 | 9/12/93 | 12 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 32 | 9/13/93 | 12 | 2 | 0 | 0 | 0.8333 | 9.82E-02 |
| 33 | 9/14/93 | 11 | 0 | 0 | 1 | 0.8333 | 1.03E-01 |
| 35 | 9/16/93 | 11 | 1 | 0 | 0 | 0.7576 | 1.12E-01 |
| 36 | 9/17/93 | 10 | 0 | 0 | 0 | 0.7576 | 1.18E-01 |
| 39 | 9/20/93 | 10 | 0 | 2 | 0 | 0.7576 | 1.18E-01 |
| 40 | 9/21/93 | 8 | 0 | 0 | 0 | 0.7576 | 1.32E-01 |
| 50 | 10/1/93 | 8 | 0 | 1 | 0 | 0.7576 | 1.32E-01 |
| 51 | 10/2/93 | 7 | 0 | 0 | 0 | 0.7576 | 1.41E-01 |
| 55 | 10/6/93 | 7 | 1 | 0 | 0 | 0.6494 | 1.45E-01 |
| 56 | 10/7/93 | 6 | 0 | 0 | 0 | 0.6494 | 1.57E-01 |
| 82 | 11/2/93 | 6 | 0 | 1 | 0 | 0.6494 | 1.57E-01 |
| 83 | 11/3/93 | 5 | 0 | 0 | 0 | 0.6494 | 1.72E-01 |
| 96 | 11/16/93 | 5 | 1 | 0 | 0 | 0.5195 | 1.61E-01 |
| 97 | 11/17/93 | 4 | 0 | 0 | 0 | 0.5195 | 1.80E-01 |
| 128 | 12/18/93 | 4 | 0 | 1 | 0 | 0.5195 | 1.80E-01 |
| 129 | 12/19/93 | 3 | 0 | 0 | 0 | 0.5195 | 2.08E-01 |
| 141 | 12/31/93 | 3 | 1 | 0 | 0 | 0.3463 | 1.62E-01 |
| 142 | 1/1/94 | 2 | 0 | 0 | 0 | 0.3463 | 1.98E-01 |
| 160 | 1/19/94 | 2 | 0 | 1 | 0 | 0.3463 | 1.98E-01 |
| 161 | 1/20/94 | 1 | 0 | 0 | 0 | 0.3463 | 2.80E-01 |
| 164 | 1/23/94 | 1 | 1 | 0 | 0 | 0.0000 | 0.00E+00 |

Table F14. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 14 | 8/26/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 17 | 8/29/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 21 | 9/2/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/93 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 23 | 9/4/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 26 | 9/7/93 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 30 | 9/11/93 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 35 | 9/16/93 | 11 | 1 | 0 | 0 | 0.9091 | 8.26E-02 |
| 36 | 9/17/93 | 10 | 0 | 0 | 0 | 0.9091 | 8.67E-02 |
| 50 | 10/1/93 | 10 | 0 | 1 | 0 | 0.9091 | 8.67E-02 |
| 51 | 10/2/93 | 9 | 0 | 0 | 0 | 0.9091 | 9.14E-02 |
| 60 | 10/11/93 | 9 | 1 | 0 | 0 | 0.8081 | 1.18E-01 |
| 61 | 10/12/93 | 8 | 0 | 0 | 0 | 0.8081 | 1.25E-01 |
| 82 | 11/2/93 | 8 | 0 | 1 | 0 | 0.8081 | 1.25E-01 |
| 83 | 11/3/93 | 7 | 0 | 0 | 0 | 0.8081 | 1.34E-01 |
| 97 | 11/17/93 | 7 | 1 | 0 | 0 | 0.6926 | 1.45E-01 |
| 98 | 11/18/93 | 6 | 0 | 0 | 0 | 0.6926 | 1.57E-01 |
| 141 | 12/31/93 | 6 | 1 | 0 | 0 | 0.5772 | 1.53E-01 |
| 142 | 1/1/94 | 5 | 0 | 0 | 0 | 0.5772 | 1.68E-01 |
| 145 | 1/4/94 | 5 | 1 | 0 | 0 | 0.4618 | 1.52E-01 |
| 146 | 1/5/94 | 4 | 0 | 0 | 0 | 0.4618 | 1.69E-01 |
| 152 | 1/11/94 | 4 | 1 | 0 | 0 | 0.3463 | 1.40E-01 |
| 153 | 1/12/94 | 3 | 0 | 0 | 0 | 0.3463 | 1.62E-01 |
| 160 | 1/19/94 | 3 | 0 | 1 | 0 | 0.3463 | 1.62E-01 |
| 161 | 1/20/94 | 2 | 0 | 0 | 0 | 0.3463 | 1.98E-01 |
| 177 | 2/5/94 | 2 | 1 | 0 | 0 | 0.1732 | 1.11E-01 |
| 178 | 2/6/94 | 1 | 0 | 0 | 0 | 0.1732 | 1.57E-01 |
| 276 | 5/15/94 | 1 | 0 | 1 | 0 | 0.1732 | 1.57E-01 |

Table F15. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 3 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 3 | 8/15/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/93 | 7 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 10 | 8/22/93 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/93 | 11 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 16 | 8/28/93 | 12 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 18 | 8/30/93 | 12 | 1 | 0 | 0 | 0.9167 | 7.64E-02 |
| 19 | 8/31/93 | 11 | 0 | 0 | 0 | 0.9167 | 7.98E-02 |
| 21 | 9/2/93 | 12 | 0 | 0 | 1 | 0.9167 | 7.64E-02 |
| 22 | 9/3/93 | 13 | 0 | 0 | 1 | 0.9167 | 7.34E-02 |
| 24 | 9/5/93 | 14 | 0 | 0 | 1 | 0.9167 | 7.07E-02 |
| 25 | 9/6/93 | 15 | 0 | 0 | 1 | 0.9167 | 6.83E-02 |
| 31 | 9/12/93 | 16 | 0 | 0 | 1 | 0.9167 | 6.62E-02 |
| 32 | 9/13/93 | 16 | 2 | 0 | 0 | 0.8021 | 8.92E-02 |
| 33 | 9/14/93 | 15 | 0 | 0 | 1 | 0.8021 | 9.21E-02 |
| 36 | 9/17/93 | 15 | 1 | 0 | 0 | 0.7486 | 9.69E-02 |
| 37 | 9/18/93 | 14 | 0 | 0 | 0 | 0.7486 | 1.00E-01 |
| 39 | 9/20/93 | 14 | 1 | 2 | 0 | 0.6951 | 1.03E-01 |
| 40 | 9/21/93 | 11 | 0 | 0 | 0 | 0.6951 | 1.16E-01 |
| 52 | 10/3/93 | 11 | 1 | 0 | 0 | 0.6319 | 1.16E-01 |
| 53 | 10/4/93 | 10 | 0 | 0 | 0 | 0.6319 | 1.21E-01 |
| 55 | 10/6/93 | 10 | 1 | 0 | 0 | 0.5688 | 1.18E-01 |
| 56 | 10/7/93 | 9 | 0 | 0 | 0 | 0.5688 | 1.24E-01 |
| 96 | 11/16/93 | 9 | 1 | 0 | 0 | 0.5056 | 1.18E-01 |
| 97 | 11/17/93 | 8 | 0 | 0 | 0 | 0.5056 | 1.26E-01 |
| 128 | 12/18/93 | 8 | 0 | 1 | 0 | 0.5056 | 1.26E-01 |
| 129 | 12/19/93 | 7 | 0 | 0 | 0 | 0.5056 | 1.34E-01 |
| 141 | 12/31/93 | 7 | 2 | 0 | 0 | 0.3611 | 1.09E-01 |
| 142 | 1/1/94 | 5 | 0 | 0 | 0 | 0.3611 | 1.29E-01 |
| 164 | 1/23/94 | 5 | 1 | 0 | 0 | 0.2889 | 1.09E-01 |
| 165 | 1/24/94 | 4 | 0 | 0 | 0 | 0.2889 | 1.22E-01 |
| 212 | 3/12/94 | 4 | 0 | 1 | 0 | 0.2889 | 1.22E-01 |
| 213 | 3/13/94 | 3 | 0 | 0 | 0 | 0.2889 | 1.41E-01 |
| 276 | 5/15/94 | 3 | 0 | 3 | 0 | 0.2889 | 1.41E-01 |

Table F16. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 3 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 15 | 8/27/93 | 6 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 19 | 8/31/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 20 | 9/1/93 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 21 | 9/2/93 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/93 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 37 | 9/18/93 | 12 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 38 | 9/19/93 | 14 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 39 | 9/20/93 | 15 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 40 | 9/21/93 | 17 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 41 | 9/22/93 | 19 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 42 | 9/23/93 | 22 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 43 | 9/24/93 | 24 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 51 | 10/2/93 | 24 | 2 | 0 | 0 | 0.9167 | 5.40E-02 |
| 52 | 10/3/93 | 22 | 0 | 0 | 0 | 0.9167 | 5.64E-02 |
| 53 | 10/4/93 | 22 | 1 | 0 | 0 | 0.8750 | 6.60E-02 |
| 54 | 10/5/93 | 21 | 0 | 0 | 0 | 0.8750 | 6.75E-02 |
| 56 | 10/7/93 | 21 | 1 | 0 | 0 | 0.8333 | 7.42E-02 |
| 57 | 10/8/93 | 20 | 0 | 0 | 0 | 0.8333 | 7.61E-02 |
| 113 | 12/3/93 | 20 | 0 | 1 | 0 | 0.8333 | 7.61E-02 |
| 114 | 12/4/93 | 19 | 0 | 0 | 0 | 0.8333 | 7.80E-02 |
| 119 | 12/9/93 | 19 | 1 | 0 | 0 | 0.7895 | 8.31E-02 |
| 120 | 12/10/93 | 18 | 0 | 0 | 0 | 0.7895 | 8.54E-02 |
| 128 | 12/18/93 | 18 | 0 | 1 | 0 | 0.7895 | 8.54E-02 |
| 129 | 12/19/93 | 17 | 0 | 0 | 0 | 0.7895 | 8.79E-02 |
| 133 | 12/23/93 | 17 | 0 | 1 | 0 | 0.7895 | 8.79E-02 |
| 134 | 12/24/93 | 16 | 0 | 0 | 0 | 0.7895 | 9.06E-02 |
| 152 | 1/11/94 | 16 | 0 | 1 | 0 | 0.7895 | 9.06E-02 |
| 153 | 1/12/94 | 15 | 0 | 0 | 0 | 0.7895 | 9.35E-02 |
| 160 | 1/19/94 | 15 | 1 | 0 | 0 | 0.7368 | 9.76E-02 |
| 161 | 1/20/94 | 14 | 0 | 0 | 0 | 0.7368 | 1.01E-01 |
| 164 | 1/23/94 | 14 | 1 | 0 | 0 | 0.6842 | 1.03E-01 |
| 165 | 1/24/94 | 13 | 0 | 0 | 0 | 0.6842 | 1.07E-01 |
| 171 | 1/30/94 | 13 | 1 | 0 | 0 | 0.6316 | 1.06E-01 |
| 172 | 1/31/94 | 12 | 0 | 0 | 0 | 0.6316 | 1.11E-01 |
| 192 | 2/20/94 | 12 | 0 | 1 | 0 | 0.6316 | 1.11E-01 |
| 193 | 2/21/94 | 11 | 0 | 0 | 0 | 0.6316 | 1.16E-01 |
| 248 | 4/17/94 | 11 | 0 | 1 | 0 | 0.6316 | 1.16E-01 |
| 249 | 4/18/94 | 10 | 0 | 0 | 0 | 0.6316 | 1.21E-01 |
| 276 | 5/15/94 | 10 | 0 | 10 | 0 | 0.6316 | 1.21E-01 |

Table F17. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 3 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 15 | 8/27/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 20 | 9/1/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 21 | 9/2/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 37 | 9/18/93 | 9 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 38 | 9/19/93 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 39 | 9/20/93 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 40 | 9/21/93 | 13 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 41 | 9/22/93 | 14 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 42 | 9/23/93 | 16 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 43 | 9/24/93 | 17 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 51 | 10/2/93 | 17 | 1 | 0 | 0 | 0.9412 | 5.54E-02 |
| 52 | 10/3/93 | 16 | 0 | 0 | 0 | 0.9412 | 5.71E-02 |
| 53 | 10/4/93 | 16 | 1 | 0 | 0 | 0.8824 | 7.57E-02 |
| 54 | 10/5/93 | 15 | 0 | 0 | 0 | 0.8824 | 7.81E-02 |
| 56 | 10/7/93 | 15 | 1 | 0 | 0 | 0.8235 | 8.93E-02 |
| 57 | 10/8/93 | 14 | 0 | 0 | 0 | 0.8235 | 9.25E-02 |
| 119 | 12/9/93 | 14 | 1 | 0 | 0 | 0.7647 | 9.91E-02 |
| 120 | 12/10/93 | 13 | 0 | 0 | 0 | 0.7647 | 1.03E-01 |
| 128 | 12/18/93 | 13 | 0 | 1 | 0 | 0.7647 | 1.03E-01 |
| 129 | 12/19/93 | 12 | 0 | 0 | 0 | 0.7647 | 1.07E-01 |
| 133 | 12/23/93 | 12 | 0 | 1 | 0 | 0.7647 | 1.07E-01 |
| 134 | 12/24/93 | 11 | 0 | 0 | 0 | 0.7647 | 1.12E-01 |
| 152 | 1/11/94 | 11 | 0 | 1 | 0 | 0.7647 | 1.12E-01 |
| 153 | 1/12/94 | 10 | 0 | 0 | 0 | 0.7647 | 1.17E-01 |
| 164 | 1/23/94 | 10 | 1 | 0 | 0 | 0.6882 | 1.22E-01 |
| 165 | 1/24/94 | 9 | 0 | 0 | 0 | 0.6882 | 1.28E-01 |
| 192 | 2/20/94 | 9 | 0 | 1 | 0 | 0.6882 | 1.28E-01 |
| 193 | 2/21/94 | 8 | 0 | 0 | 0 | 0.6882 | 1.36E-01 |
| 248 | 4/17/94 | 8 | 0 | 1 | 0 | 0.6882 | 1.36E-01 |
| 249 | 4/18/94 | 7 | 0 | 0 | 0 | 0.6882 | 1.45E-01 |
| 276 | 5/15/94 | 7 | 0 | 7 | 0 | 0.6882 | 1.45E-01 |

Table F18. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/27/93 | 2 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 5 | 8/31/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 24 | 9/19/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/22/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 28 | 9/23/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 29 | 9/24/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 37 | 10/2/93 | 7 | 1 | 0 | 0 | 0.8571 | 1.22E-01 |
| 38 | 10/3/93 | 6 | 0 | 0 | 0 | 0.8571 | 1.32E-01 |
| 99 | 12/3/93 | 6 | 0 | 1 | 0 | 0.8571 | 1.32E-01 |
| 100 | 12/4/93 | 5 | 0 | 0 | 0 | 0.8571 | 1.45E-01 |
| 146 | 1/19/94 | 5 | 1 | 0 | 0 | 0.6857 | 1.72E-01 |
| 147 | 1/20/94 | 4 | 0 | 0 | 0 | 0.6857 | 1.92E-01 |
| 157 | 1/30/94 | 4 | 1 | 0 | 0 | 0.5143 | 1.79E-01 |
| 158 | 1/31/94 | 3 | 0 | 0 | 0 | 0.5143 | 2.07E-01 |
| 262 | 5/15/94 | 3 | 0 | 3 | 0 | 0.5143 | 2.07E-01 |

Table F19. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 21 | 9/2/93 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/93 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 37 | 9/18/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 39 | 9/20/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 40 | 9/21/93 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 41 | 9/22/93 | 10 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 42 | 9/23/93 | 12 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 43 | 9/24/93 | 13 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 53 | 10/4/93 | 13 | 1 | 0 | 0 | 0.9231 | 7.10E-02 |
| 54 | 10/5/93 | 12 | 0 | 0 | 0 | 0.9231 | 7.39E-02 |
| 119 | 12/9/93 | 12 | 1 | 0 | 0 | 0.8462 | 9.58E-02 |
| 120 | 12/10/93 | 11 | 0 | 0 | 0 | 0.8462 | 1.00E-01 |
| 128 | 12/18/93 | 11 | 0 | 1 | 0 | 0.8462 | 1.00E-01 |
| 129 | 12/19/93 | 10 | 0 | 0 | 0 | 0.8462 | 1.05E-01 |
| 152 | 1/11/94 | 10 | 0 | 1 | 0 | 0.8462 | 1.05E-01 |
| 153 | 1/12/94 | 9 | 0 | 0 | 0 | 0.8462 | 1.11E-01 |
| 160 | 1/19/94 | 9 | 1 | 0 | 0 | 0.7521 | 1.25E-01 |
| 161 | 1/20/94 | 8 | 0 | 0 | 0 | 0.7521 | 1.32E-01 |
| 164 | 1/23/94 | 8 | 1 | 0 | 0 | 0.6581 | 1.36E-01 |
| 165 | 1/24/94 | 7 | 0 | 0 | 0 | 0.6581 | 1.45E-01 |
| 171 | 1/30/94 | 7 | 1 | 0 | 0 | 0.5641 | 1.41E-01 |
| 172 | 1/31/94 | 6 | 0 | 0 | 0 | 0.5641 | 1.52E-01 |
| 192 | 2/20/94 | 6 | 0 | 1 | 0 | 0.5641 | 1.52E-01 |
| 193 | 2/21/94 | 5 | 0 | 0 | 0 | 0.5641 | 1.67E-01 |
| 248 | 4/17/94 | 5 | 0 | 1 | 0 | 0.5641 | 1.67E-01 |
| 249 | 4/18/94 | 4 | 0 | 0 | 0 | 0.5641 | 1.86E-01 |
| 276 | 5/15/94 | 4 | 0 | 4 | 0 | 0.5641 | 1.86E-01 |

Table F20. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1993.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/93 | 1 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 15 | 8/27/93 | 4 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 19 | 8/31/93 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 20 | 9/1/93 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 37 | 9/18/93 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 38 | 9/19/93 | 9 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 42 | 9/23/93 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 43 | 9/24/93 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 51 | 10/2/93 | 11 | 2 | 0 | 0 | 0.8182 | 1.05E-01 |
| 52 | 10/3/93 | 9 | 0 | 0 | 0 | 0.8182 | 1.16E-01 |
| 56 | 10/7/93 | 9 | 1 | 0 | 0 | 0.7273 | 1.27E-01 |
| 57 | 10/8/93 | 8 | 0 | 0 | 0 | 0.7273 | 1.34E-01 |
| 113 | 12/3/93 | 8 | 0 | 1 | 0 | 0.7273 | 1.34E-01 |
| 114 | 12/4/93 | 7 | 0 | 0 | 0 | 0.7273 | 1.44E-01 |
| 133 | 12/23/93 | 7 | 0 | 1 | 0 | 0.7273 | 1.44E-01 |
| 134 | 12/24/93 | 6 | 0 | 0 | 0 | 0.7273 | 1.55E-01 |
| 276 | 5/15/94 | 6 | 0 | 6 | 0 | 0.7273 | 1.55E-01 |

Table F21. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 10 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 13 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 4 | 8/16/94 | 13 | 1 | 0 | 0 | 0.9231 | 7.10E-02 |
| 5 | 8/17/94 | 12 | 1 | 0 | 0 | 0.8462 | 9.58E-02 |
| 6 | 8/18/94 | 11 | 1 | 0 | 0 | 0.7692 | 1.11E-01 |
| 7 | 8/19/94 | 12 | 0 | 0 | 2 | 0.7692 | 1.07E-01 |
| 8 | 8/20/94 | 14 | 0 | 0 | 2 | 0.7692 | 9.88E-02 |
| 10 | 8/22/94 | 15 | 0 | 0 | 1 | 0.7692 | 9.54E-02 |
| 11 | 8/23/94 | 21 | 1 | 0 | 6 | 0.7326 | 8.27E-02 |
| 12 | 8/24/94 | 21 | 0 | 0 | 1 | 0.7326 | 8.27E-02 |
| 13 | 8/25/94 | 25 | 1 | 0 | 4 | 0.7033 | 7.66E-02 |
| 14 | 8/26/94 | 27 | 0 | 0 | 3 | 0.7033 | 7.37E-02 |
| 15 | 8/27/94 | 29 | 0 | 0 | 2 | 0.7033 | 7.11E-02 |
| 17 | 8/29/94 | 30 | 0 | 0 | 1 | 0.7033 | 6.99E-02 |
| 18 | 8/30/94 | 32 | 0 | 0 | 2 | 0.7033 | 6.77E-02 |
| 19 | 8/31/94 | 35 | 0 | 0 | 3 | 0.7033 | 6.48E-02 |
| 20 | 9/1/94 | 38 | 1 | 0 | 3 | 0.6848 | 6.24E-02 |
| 21 | 9/2/94 | 39 | 0 | 0 | 2 | 0.6848 | 6.16E-02 |
| 22 | 9/3/94 | 45 | 0 | 0 | 6 | 0.6848 | 5.73E-02 |
| 23 | 9/4/94 | 47 | 0 | 0 | 2 | 0.6848 | 5.61E-02 |
| 24 | 9/5/94 | 50 | 1 | 0 | 3 | 0.6711 | 5.44E-02 |
| 25 | 9/6/94 | 55 | 0 | 0 | 6 | 0.6711 | 5.19E-02 |
| 26 | 9/7/94 | 57 | 0 | 0 | 2 | 0.6711 | 5.10E-02 |
| 27 | 9/8/94 | 58 | 0 | 0 | 1 | 0.6711 | 5.05E-02 |
| 28 | 9/9/94 | 59 | 0 | 0 | 1 | 0.6711 | 5.01E-02 |
| 31 | 9/12/94 | 59 | 1 | 0 | 0 | 0.6597 | 5.01E-02 |
| 32 | 9/13/94 | 58 | 0 | 1 | 0 | 0.6597 | 5.05E-02 |
| 33 | 9/14/94 | 57 | 0 | 0 | 0 | 0.6597 | 5.10E-02 |
| 34 | 9/15/94 | 57 | 1 | 0 | 0 | 0.6481 | 5.09E-02 |
| 35 | 9/16/94 | 56 | 2 | 0 | 0 | 0.6250 | 5.11E-02 |
| 36 | 9/17/94 | 54 | 0 | 0 | 0 | 0.6250 | 5.21E-02 |
| 37 | 9/18/94 | 54 | 1 | 0 | 0 | 0.6134 | 5.19E-02 |
| 38 | 9/19/94 | 53 | 0 | 0 | 0 | 0.6134 | 5.24E-02 |
| 45 | 9/26/94 | 53 | 1 | 0 | 0 | 0.6018 | 5.22E-02 |
| 46 | 9/27/94 | 52 | 1 | 0 | 0 | 0.5903 | 5.24E-02 |
| 47 | 9/28/94 | 51 | 0 | 0 | 0 | 0.5903 | 5.29E-02 |
| 50 | 10/1/94 | 51 | 1 | 0 | 0 | 0.5787 | 5.26E-02 |
| 51 | 10/2/94 | 50 | 0 | 0 | 0 | 0.5787 | 5.31E-02 |
| 53 | 10/4/94 | 50 | 1 | 0 | 0 | 0.5671 | 5.28E-02 |
| 54 | 10/5/94 | 49 | 0 | 0 | 0 | 0.5671 | 5.33E-02 |
| 55 | 10/6/94 | 49 | 2 | 0 | 0 | 0.5440 | 5.25E-02 |
| 56 | 10/7/94 | 47 | 0 | 0 | 0 | 0.5440 | 5.36E-02 |
| 59 | 10/10/94 | 47 | 2 | 0 | 0 | 0.5208 | 5.26E-02 |
| 60 | 10/11/94 | 45 | 0 | 0 | 0 | 0.5208 | 5.37E-02 |
| 76 | 10/27/94 | 45 | 1 | 0 | 0 | 0.5093 | 5.32E-02 |
| 77 | 10/28/94 | 44 | 0 | 1 | 0 | 0.5093 | 5.38E-02 |
| 78 | 10/29/94 | 43 | 0 | 0 | 0 | 0.5093 | 5.44E-02 |
| 92 | 11/12/94 | 43 | 1 | 0 | 0 | 0.4974 | 5.38E-02 |
| 93 | 11/13/94 | 42 | 0 | 0 | 0 | 0.4974 | 5.44E-02 |
| 97 | 11/17/94 | 42 | 1 | 0 | 0 | 0.4856 | 5.37E-02 |

Table F21. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 98 | 11/18/94 | 41 | 0 | 0 | 0 | 0.4856 | 5.44E-02 |
| 118 | 12/8/94 | 41 | 1 | 0 | 0 | 0.4737 | 5.37E-02 |
| 119 | 12/9/94 | 40 | 0 | 0 | 0 | 0.4737 | 5.43E-02 |
| 123 | 12/13/94 | 40 | 0 | 1 | 0 | 0.4737 | 5.43E-02 |
| 124 | 12/14/94 | 39 | 0 | 0 | 0 | 0.4737 | 5.50E-02 |
| 150 | 1/9/95 | 39 | 0 | 1 | 0 | 0.4737 | 5.50E-02 |
| 151 | 1/10/95 | 38 | 0 | 0 | 0 | 0.4737 | 5.57E-02 |
| 179 | 2/7/95 | 38 | 0 | 1 | 0 | 0.4737 | 5.57E-02 |
| 180 | 2/8/95 | 37 | 0 | 0 | 0 | 0.4737 | 5.65E-02 |
| 202 | 3/2/95 | 37 | 1 | 0 | 0 | 0.4609 | 5.56E-02 |
| 203 | 3/3/95 | 36 | 0 | 0 | 0 | 0.4609 | 5.64E-02 |
| 215 | 3/15/95 | 36 | 1 | 0 | 0 | 0.4481 | 5.55E-02 |
| 216 | 3/16/95 | 35 | 0 | 0 | 0 | 0.4481 | 5.63E-02 |
| 222 | 3/22/95 | 35 | 1 | 0 | 0 | 0.4353 | 5.53E-02 |
| 223 | 3/23/95 | 34 | 0 | 0 | 0 | 0.4353 | 5.61E-02 |
| 228 | 3/28/95 | 34 | 1 | 0 | 0 | 0.4225 | 5.51E-02 |
| 229 | 3/29/95 | 33 | 0 | 0 | 0 | 0.4225 | 5.59E-02 |
| 249 | 4/18/95 | 33 | 1 | 0 | 0 | 0.4097 | 5.48E-02 |
| 250 | 4/19/95 | 32 | 0 | 0 | 0 | 0.4097 | 5.56E-02 |
| 255 | 4/24/95 | 32 | 0 | 1 | 0 | 0.4097 | 5.56E-02 |
| 256 | 4/25/95 | 31 | 2 | 0 | 0 | 0.3833 | 5.41E-02 |
| 257 | 4/26/95 | 29 | 0 | 0 | 0 | 0.3833 | 5.59E-02 |
| 287 | 5/26/95 | 29 | 1 | 0 | 0 | 0.3701 | 5.45E-02 |
| 288 | 5/27/95 | 28 | 1 | 0 | 0 | 0.3568 | 5.41E-02 |
| 289 | 5/28/95 | 27 | 0 | 0 | 0 | 0.3568 | 5.51E-02 |
| 301 | 6/9/95 | 27 | 0 | 1 | 0 | 0.3568 | 5.51E-02 |
| 302 | 6/10/95 | 26 | 0 | 0 | 0 | 0.3568 | 5.61E-02 |
| 312 | 6/20/95 | 26 | 1 | 0 | 0 | 0.3431 | 5.45E-02 |
| 313 | 6/21/95 | 25 | 1 | 0 | 0 | 0.3294 | 5.39E-02 |
| 314 | 6/22/95 | 24 | 0 | 0 | 0 | 0.3294 | 5.51E-02 |
| 316 | 6/24/95 | 24 | 0 | 1 | 0 | 0.3294 | 5.51E-02 |
| 317 | 6/25/95 | 23 | 0 | 0 | 0 | 0.3294 | 5.62E-02 |
| 339 | 7/17/95 | 23 | 1 | 0 | 0 | 0.3151 | 5.44E-02 |
| 340 | 7/18/95 | 22 | 0 | 0 | 0 | 0.3151 | 5.56E-02 |
| 345 | 7/23/95 | 22 | 0 | 1 | 0 | 0.3151 | 5.56E-02 |
| 346 | 7/24/95 | 21 | 0 | 0 | 0 | 0.3151 | 5.69E-02 |
| 357 | 8/4/95 | 21 | 0 | 21 | 0 | 0.3151 | 5.69E-02 |

Table F22. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 10 | 8/22/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/23/94 | 6 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 10 | 0 | 0 | 4 | 1.0000 | 0.00E+00 |
| 14 | 8/26/94 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 20 | 9/1/94 | 13 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 21 | 9/2/94 | 14 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 23 | 9/4/94 | 15 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 26 | 9/7/94 | 16 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/94 | 17 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 55 | 10/6/94 | 17 | 1 | 0 | 0 | 0.9412 | 5.54E-02 |
| 56 | 10/7/94 | 16 | 0 | 0 | 0 | 0.9412 | 5.71E-02 |
| 76 | 10/27/94 | 16 | 1 | 0 | 0 | 0.8824 | 7.57E-02 |
| 77 | 10/28/94 | 15 | 0 | 1 | 0 | 0.8824 | 7.81E-02 |
| 78 | 10/29/94 | 14 | 0 | 0 | 0 | 0.8824 | 8.09E-02 |
| 92 | 11/12/94 | 14 | 1 | 0 | 0 | 0.8193 | 9.31E-02 |
| 93 | 11/13/94 | 13 | 0 | 0 | 0 | 0.8193 | 9.66E-02 |
| 202 | 3/2/95 | 13 | 1 | 0 | 0 | 0.7563 | 1.04E-01 |
| 203 | 3/3/95 | 12 | 0 | 0 | 0 | 0.7563 | 1.08E-01 |
| 255 | 4/24/95 | 12 | 0 | 1 | 0 | 0.7563 | 1.08E-01 |
| 256 | 4/25/95 | 11 | 1 | 0 | 0 | 0.6875 | 1.16E-01 |
| 257 | 4/26/95 | 10 | 0 | 0 | 0 | 0.6875 | 1.22E-01 |
| 288 | 5/27/95 | 10 | 1 | 0 | 0 | 0.6188 | 1.21E-01 |
| 289 | 5/28/95 | 9 | 0 | 0 | 0 | 0.6188 | 1.27E-01 |
| 312 | 6/20/95 | 9 | 1 | 0 | 0 | 0.5500 | 1.23E-01 |
| 313 | 6/21/95 | 8 | 0 | 0 | 0 | 0.5500 | 1.30E-01 |
| 316 | 6/24/95 | 8 | 0 | 1 | 0 | 0.5500 | 1.30E-01 |
| 317 | 6/25/95 | 7 | 0 | 0 | 0 | 0.5500 | 1.39E-01 |
| 357 | 8/4/95 | 7 | 0 | 7 | 0 | 0.5500 | 1.39E-01 |

Table F23. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 8 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 11 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 4 | 8/16/94 | 11 | 1 | 0 | 0 | 0.9091 | 8.26E-02 |
| 5 | 8/17/94 | 10 | 1 | 0 | 0 | 0.8182 | 1.10E-01 |
| 6 | 8/18/94 | 9 | 1 | 0 | 0 | 0.7273 | 1.27E-01 |
| 7 | 8/19/94 | 10 | 0 | 0 | 2 | 0.7273 | 1.20E-01 |
| 8 | 8/20/94 | 12 | 0 | 0 | 2 | 0.7273 | 1.10E-01 |
| 11 | 8/23/94 | 15 | 1 | 0 | 3 | 0.6788 | 9.93E-02 |
| 12 | 8/24/94 | 15 | 0 | 0 | 1 | 0.6788 | 9.93E-02 |
| 13 | 8/25/94 | 15 | 1 | 0 | 0 | 0.6335 | 9.90E-02 |
| 14 | 8/26/94 | 16 | 0 | 0 | 2 | 0.6335 | 9.59E-02 |
| 15 | 8/27/94 | 18 | 0 | 0 | 2 | 0.6335 | 9.04E-02 |
| 17 | 8/29/94 | 19 | 0 | 0 | 1 | 0.6335 | 8.80E-02 |
| 18 | 8/30/94 | 21 | 0 | 0 | 2 | 0.6335 | 8.37E-02 |
| 19 | 8/31/94 | 24 | 0 | 0 | 3 | 0.6335 | 7.83E-02 |
| 20 | 9/1/94 | 25 | 1 | 0 | 1 | 0.6082 | 7.61E-02 |
| 21 | 9/2/94 | 25 | 0 | 0 | 1 | 0.6082 | 7.61E-02 |
| 22 | 9/3/94 | 29 | 0 | 0 | 4 | 0.6082 | 7.07E-02 |
| 23 | 9/4/94 | 30 | 0 | 0 | 1 | 0.6082 | 6.95E-02 |
| 24 | 9/5/94 | 33 | 1 | 0 | 3 | 0.5898 | 6.58E-02 |
| 25 | 9/6/94 | 38 | 0 | 0 | 6 | 0.5898 | 6.13E-02 |
| 26 | 9/7/94 | 39 | 0 | 0 | 1 | 0.5898 | 6.05E-02 |
| 28 | 9/9/94 | 40 | 0 | 0 | 1 | 0.5898 | 5.97E-02 |
| 31 | 9/12/94 | 40 | 1 | 0 | 0 | 0.5750 | 5.93E-02 |
| 32 | 9/13/94 | 39 | 0 | 1 | 0 | 0.5750 | 6.00E-02 |
| 33 | 9/14/94 | 38 | 0 | 0 | 0 | 0.5750 | 6.08E-02 |
| 34 | 9/15/94 | 38 | 1 | 0 | 0 | 0.5599 | 6.03E-02 |
| 35 | 9/16/94 | 37 | 2 | 0 | 0 | 0.5296 | 5.97E-02 |
| 36 | 9/17/94 | 35 | 0 | 0 | 0 | 0.5296 | 6.14E-02 |
| 37 | 9/18/94 | 35 | 1 | 0 | 0 | 0.5145 | 6.06E-02 |
| 38 | 9/19/94 | 34 | 0 | 0 | 0 | 0.5145 | 6.15E-02 |
| 45 | 9/26/94 | 34 | 1 | 0 | 0 | 0.4994 | 6.06E-02 |
| 46 | 9/27/94 | 33 | 1 | 0 | 0 | 0.4842 | 6.05E-02 |
| 47 | 9/28/94 | 32 | 0 | 0 | 0 | 0.4842 | 6.15E-02 |
| 53 | 10/4/94 | 32 | 1 | 0 | 0 | 0.4691 | 6.04E-02 |
| 54 | 10/5/94 | 31 | 0 | 0 | 0 | 0.4691 | 6.14E-02 |
| 55 | 10/6/94 | 31 | 1 | 0 | 0 | 0.4540 | 6.02E-02 |
| 56 | 10/7/94 | 30 | 0 | 0 | 0 | 0.4540 | 6.12E-02 |
| 59 | 10/10/94 | 30 | 2 | 0 | 0 | 0.4237 | 5.87E-02 |
| 60 | 10/11/94 | 28 | 0 | 0 | 0 | 0.4237 | 6.08E-02 |
| 97 | 11/17/94 | 28 | 1 | 0 | 0 | 0.4086 | 5.94E-02 |
| 98 | 11/18/94 | 27 | 0 | 0 | 0 | 0.4086 | 6.05E-02 |
| 118 | 12/8/94 | 27 | 1 | 0 | 0 | 0.3934 | 5.90E-02 |
| 119 | 12/9/94 | 26 | 0 | 0 | 0 | 0.3934 | 6.01E-02 |
| 123 | 12/13/94 | 26 | 0 | 1 | 0 | 0.3934 | 6.01E-02 |
| 124 | 12/14/94 | 25 | 0 | 0 | 0 | 0.3934 | 6.13E-02 |
| 150 | 1/9/95 | 25 | 0 | 1 | 0 | 0.3934 | 6.13E-02 |
| 151 | 1/10/95 | 24 | 0 | 0 | 0 | 0.3934 | 6.25E-02 |
| 179 | 2/7/95 | 24 | 0 | 1 | 0 | 0.3934 | 6.25E-02 |

Table F23. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 180 | 2/8/95 | 23 | 0 | 0 | 0 | 0.3934 | 6.39E-02 |
| 215 | 3/15/95 | 23 | 1 | 0 | 0 | 0.3763 | 6.20E-02 |
| 216 | 3/16/95 | 22 | 0 | 0 | 0 | 0.3763 | 6.34E-02 |
| 222 | 3/22/95 | 22 | 1 | 0 | 0 | 0.3592 | 6.13E-02 |
| 223 | 3/23/95 | 21 | 0 | 0 | 0 | 0.3592 | 6.27E-02 |
| 228 | 3/28/95 | 21 | 1 | 0 | 0 | 0.3421 | 6.06E-02 |
| 229 | 3/29/95 | 20 | 0 | 0 | 0 | 0.3421 | 6.20E-02 |
| 249 | 4/18/95 | 20 | 1 | 0 | 0 | 0.3250 | 5.97E-02 |
| 250 | 4/19/95 | 19 | 0 | 0 | 0 | 0.3250 | 6.13E-02 |
| 256 | 4/25/95 | 19 | 1 | 0 | 0 | 0.3079 | 5.88E-02 |
| 257 | 4/26/95 | 18 | 0 | 0 | 0 | 0.3079 | 6.04E-02 |
| 287 | 5/26/95 | 18 | 1 | 0 | 0 | 0.2908 | 5.77E-02 |
| 288 | 5/27/95 | 17 | 0 | 0 | 0 | 0.2908 | 5.94E-02 |
| 301 | 6/9/95 | 17 | 0 | 1 | 0 | 0.2908 | 5.94E-02 |
| 302 | 6/10/95 | 16 | 0 | 0 | 0 | 0.2908 | 6.12E-02 |
| 313 | 6/21/95 | 16 | 1 | 0 | 0 | 0.2726 | 5.81E-02 |
| 314 | 6/22/95 | 15 | 0 | 0 | 0 | 0.2726 | 6.00E-02 |
| 339 | 7/17/95 | 15 | 1 | 0 | 0 | 0.2544 | 5.67E-02 |
| 340 | 7/18/95 | 14 | 0 | 0 | 0 | 0.2544 | 5.87E-02 |
| 345 | 7/23/95 | 14 | 0 | 1 | 0 | 0.2544 | 5.87E-02 |
| 346 | 7/24/95 | 13 | 0 | 0 | 0 | 0.2544 | 6.09E-02 |
| 357 | 8/4/95 | 13 | 0 | 13 | 0 | 0.2544 | 6.09E-02 |

Table F24. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 3 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 7 | 8/19/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 8 | 8/20/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/23/94 | 8 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 9 | 1 | 0 | 1 | 0.8889 | 9.88E-02 |
| 14 | 8/26/94 | 9 | 0 | 0 | 1 | 0.8889 | 9.88E-02 |
| 15 | 8/27/94 | 11 | 0 | 0 | 2 | 0.8889 | 8.93E-02 |
| 18 | 8/30/94 | 12 | 0 | 0 | 1 | 0.8889 | 8.55E-02 |
| 20 | 9/1/94 | 13 | 0 | 0 | 1 | 0.8889 | 8.22E-02 |
| 22 | 9/3/94 | 18 | 0 | 0 | 5 | 0.8889 | 6.98E-02 |
| 23 | 9/4/94 | 20 | 0 | 0 | 2 | 0.8889 | 6.63E-02 |
| 24 | 9/5/94 | 22 | 0 | 0 | 2 | 0.8889 | 6.32E-02 |
| 25 | 9/6/94 | 27 | 0 | 0 | 5 | 0.8889 | 5.70E-02 |
| 26 | 9/7/94 | 29 | 0 | 0 | 2 | 0.8889 | 5.50E-02 |
| 27 | 9/8/94 | 30 | 0 | 0 | 1 | 0.8889 | 5.41E-02 |
| 28 | 9/9/94 | 31 | 0 | 0 | 1 | 0.8889 | 5.32E-02 |
| 34 | 9/15/94 | 31 | 1 | 0 | 0 | 0.8602 | 5.78E-02 |
| 35 | 9/16/94 | 30 | 2 | 0 | 0 | 0.8029 | 6.51E-02 |
| 36 | 9/17/94 | 28 | 0 | 0 | 0 | 0.8029 | 6.74E-02 |
| 45 | 9/26/94 | 28 | 1 | 0 | 0 | 0.7742 | 6.95E-02 |
| 46 | 9/27/94 | 27 | 0 | 0 | 0 | 0.7742 | 7.08E-02 |
| 50 | 10/1/94 | 27 | 1 | 0 | 0 | 0.7455 | 7.24E-02 |
| 51 | 10/2/94 | 26 | 0 | 0 | 0 | 0.7455 | 7.38E-02 |
| 59 | 10/10/94 | 26 | 2 | 0 | 0 | 0.6882 | 7.54E-02 |
| 60 | 10/11/94 | 24 | 0 | 0 | 0 | 0.6882 | 7.84E-02 |
| 76 | 10/27/94 | 24 | 1 | 0 | 0 | 0.6595 | 7.86E-02 |
| 77 | 10/28/94 | 23 | 0 | 1 | 0 | 0.6595 | 8.02E-02 |
| 78 | 10/29/94 | 22 | 0 | 0 | 0 | 0.6595 | 8.20E-02 |
| 92 | 11/12/94 | 22 | 1 | 0 | 0 | 0.6295 | 8.17E-02 |
| 93 | 11/13/94 | 21 | 0 | 0 | 0 | 0.6295 | 8.36E-02 |
| 118 | 12/8/94 | 21 | 1 | 0 | 0 | 0.5995 | 8.28E-02 |
| 119 | 12/9/94 | 20 | 0 | 0 | 0 | 0.5995 | 8.48E-02 |
| 150 | 1/9/95 | 20 | 0 | 1 | 0 | 0.5995 | 8.48E-02 |
| 151 | 1/10/95 | 19 | 0 | 0 | 0 | 0.5995 | 8.70E-02 |
| 179 | 2/7/95 | 19 | 0 | 1 | 0 | 0.5995 | 8.70E-02 |
| 180 | 2/8/95 | 18 | 0 | 0 | 0 | 0.5995 | 8.94E-02 |
| 222 | 3/22/95 | 18 | 1 | 0 | 0 | 0.5662 | 8.79E-02 |
| 223 | 3/23/95 | 17 | 0 | 0 | 0 | 0.5662 | 9.04E-02 |
| 249 | 4/18/95 | 17 | 1 | 0 | 0 | 0.5329 | 8.83E-02 |
| 250 | 4/19/95 | 16 | 0 | 0 | 0 | 0.5329 | 9.11E-02 |
| 256 | 4/25/95 | 16 | 1 | 0 | 0 | 0.4996 | 8.84E-02 |
| 257 | 4/26/95 | 15 | 0 | 0 | 0 | 0.4996 | 9.13E-02 |
| 339 | 7/17/95 | 15 | 1 | 0 | 0 | 0.4663 | 8.80E-02 |
| 340 | 7/18/95 | 14 | 0 | 0 | 0 | 0.4663 | 9.10E-02 |
| 345 | 7/23/95 | 14 | 0 | 1 | 0 | 0.4663 | 9.10E-02 |
| 346 | 7/24/95 | 13 | 0 | 0 | 0 | 0.4663 | 9.45E-02 |
| 357 | 8/4/95 | 13 | 0 | 13 | 0 | 0.4663 | 9.45E-02 |

Table F25. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Huron National Forest (HNF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 6 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 9 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 4 | 8/16/94 | 9 | 1 | 0 | 0 | 0.8889 | 9.88E-02 |
| 5 | 8/17/94 | 8 | 0 | 0 | 0 | 0.8889 | 1.05E-01 |
| 6 | 8/18/94 | 8 | 1 | 0 | 0 | 0.7778 | 1.30E-01 |
| 7 | 8/19/94 | 8 | 0 | 0 | 1 | 0.7778 | 1.30E-01 |
| 8 | 8/20/94 | 9 | 0 | 0 | 1 | 0.7778 | 1.22E-01 |
| 10 | 8/22/94 | 10 | 0 | 0 | 1 | 0.7778 | 1.16E-01 |
| 11 | 8/23/94 | 13 | 1 | 0 | 3 | 0.7179 | 1.06E-01 |
| 12 | 8/24/94 | 13 | 0 | 0 | 1 | 0.7179 | 1.06E-01 |
| 13 | 8/25/94 | 16 | 0 | 0 | 3 | 0.7179 | 9.53E-02 |
| 14 | 8/26/94 | 18 | 0 | 0 | 2 | 0.7179 | 8.99E-02 |
| 17 | 8/29/94 | 19 | 0 | 0 | 1 | 0.7179 | 8.75E-02 |
| 18 | 8/30/94 | 20 | 0 | 0 | 1 | 0.7179 | 8.53E-02 |
| 19 | 8/31/94 | 23 | 0 | 0 | 3 | 0.7179 | 7.95E-02 |
| 20 | 9/1/94 | 25 | 1 | 0 | 2 | 0.6892 | 7.68E-02 |
| 21 | 9/2/94 | 26 | 0 | 0 | 2 | 0.6892 | 7.54E-02 |
| 22 | 9/3/94 | 27 | 0 | 0 | 1 | 0.6892 | 7.39E-02 |
| 24 | 9/5/94 | 28 | 1 | 0 | 1 | 0.6646 | 7.27E-02 |
| 25 | 9/6/94 | 28 | 0 | 0 | 1 | 0.6646 | 7.27E-02 |
| 31 | 9/12/94 | 28 | 1 | 0 | 0 | 0.6409 | 7.26E-02 |
| 32 | 9/13/94 | 27 | 0 | 1 | 0 | 0.6409 | 7.39E-02 |
| 33 | 9/14/94 | 26 | 0 | 0 | 0 | 0.6409 | 7.53E-02 |
| 37 | 9/18/94 | 26 | 1 | 0 | 0 | 0.6162 | 7.49E-02 |
| 38 | 9/19/94 | 25 | 0 | 0 | 0 | 0.6162 | 7.63E-02 |
| 46 | 9/27/94 | 25 | 1 | 0 | 0 | 0.5916 | 7.56E-02 |
| 47 | 9/28/94 | 24 | 0 | 0 | 0 | 0.5916 | 7.72E-02 |
| 53 | 10/4/94 | 24 | 1 | 0 | 0 | 0.5669 | 7.62E-02 |
| 54 | 10/5/94 | 23 | 0 | 0 | 0 | 0.5669 | 7.78E-02 |
| 55 | 10/6/94 | 23 | 2 | 0 | 0 | 0.5176 | 7.50E-02 |
| 56 | 10/7/94 | 21 | 0 | 0 | 0 | 0.5176 | 7.85E-02 |
| 97 | 11/17/94 | 21 | 1 | 0 | 0 | 0.4930 | 7.66E-02 |
| 98 | 11/18/94 | 20 | 0 | 0 | 0 | 0.4930 | 7.85E-02 |
| 123 | 12/13/94 | 20 | 0 | 1 | 0 | 0.4930 | 7.85E-02 |
| 124 | 12/14/94 | 19 | 0 | 0 | 0 | 0.4930 | 8.05E-02 |
| 202 | 3/2/95 | 19 | 1 | 0 | 0 | 0.4670 | 7.82E-02 |
| 203 | 3/3/95 | 18 | 0 | 0 | 0 | 0.4670 | 8.04E-02 |
| 215 | 3/15/95 | 18 | 1 | 0 | 0 | 0.4411 | 7.77E-02 |
| 216 | 3/16/95 | 17 | 0 | 0 | 0 | 0.4411 | 8.00E-02 |
| 228 | 3/28/95 | 17 | 1 | 0 | 0 | 0.4151 | 7.70E-02 |
| 229 | 3/29/95 | 16 | 0 | 0 | 0 | 0.4151 | 7.94E-02 |
| 255 | 4/24/95 | 16 | 0 | 1 | 0 | 0.4151 | 7.94E-02 |
| 256 | 4/25/95 | 15 | 1 | 0 | 0 | 0.3875 | 7.83E-02 |
| 257 | 4/26/95 | 14 | 0 | 0 | 0 | 0.3875 | 8.10E-02 |
| 287 | 5/26/95 | 14 | 1 | 0 | 0 | 0.3598 | 7.69E-02 |
| 288 | 5/27/95 | 13 | 1 | 0 | 0 | 0.3321 | 7.53E-02 |
| 289 | 5/28/95 | 12 | 0 | 0 | 0 | 0.3321 | 7.84E-02 |
| 301 | 6/9/95 | 12 | 0 | 1 | 0 | 0.3321 | 7.84E-02 |
| 302 | 6/10/95 | 11 | 0 | 0 | 0 | 0.3321 | 8.18E-02 |
| 312 | 6/20/95 | 11 | 1 | 0 | 0 | 0.3019 | 7.61E-02 |

Table F25. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 313 | 6/21/95 | 10 | 1 | 0 | 0 | 0.2717 | 7.33E-02 |
| 314 | 6/22/95 | 9 | 0 | 0 | 0 | 0.2717 | 7.73E-02 |
| 316 | 6/24/95 | 9 | 0 | 1 | 0 | 0.2717 | 7.73E-02 |
| 317 | 6/25/95 | 8 | 0 | 0 | 0 | 0.2717 | 8.20E-02 |
| 357 | 8/4/95 | 8 | 0 | 8 | 0 | 0.2717 | 8.20E-02 |

Table F26. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 5 | 8/17/94 | 7 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 9 | 8/21/94 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 10 | 8/22/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/94 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 14 | 8/26/94 | 12 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 17 | 8/29/94 | 13 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/94 | 14 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/94 | 16 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 29 | 9/10/94 | 18 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 30 | 9/11/94 | 21 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 32 | 9/13/94 | 28 | 0 | 0 | 7 | 1.0000 | 0.00E+00 |
| 33 | 9/14/94 | 29 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 34 | 9/15/94 | 30 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 35 | 9/16/94 | 31 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 32 | 1 | 0 | 1 | 0.9688 | 3.03E-02 |
| 37 | 9/18/94 | 33 | 0 | 0 | 2 | 0.9688 | 2.98E-02 |
| 38 | 9/19/94 | 34 | 1 | 0 | 1 | 0.9403 | 3.94E-02 |
| 39 | 9/20/94 | 37 | 0 | 0 | 4 | 0.9403 | 3.78E-02 |
| 40 | 9/21/94 | 41 | 0 | 0 | 4 | 0.9403 | 3.59E-02 |
| 41 | 9/22/94 | 44 | 0 | 0 | 3 | 0.9403 | 3.46E-02 |
| 42 | 9/23/94 | 48 | 0 | 0 | 4 | 0.9403 | 3.32E-02 |
| 43 | 9/24/94 | 49 | 0 | 0 | 1 | 0.9403 | 3.28E-02 |
| 45 | 9/26/94 | 49 | 1 | 0 | 0 | 0.9211 | 3.70E-02 |
| 46 | 9/27/94 | 48 | 0 | 0 | 0 | 0.9211 | 3.74E-02 |
| 48 | 9/29/94 | 50 | 0 | 0 | 2 | 0.9211 | 3.66E-02 |
| 49 | 9/30/94 | 51 | 0 | 0 | 1 | 0.9211 | 3.62E-02 |
| 50 | 10/1/94 | 53 | 0 | 0 | 2 | 0.9211 | 3.55E-02 |
| 51 | 10/2/94 | 57 | 0 | 0 | 4 | 0.9211 | 3.43E-02 |
| 52 | 10/3/94 | 58 | 0 | 2 | 1 | 0.9211 | 3.40E-02 |
| 53 | 10/4/94 | 56 | 0 | 0 | 0 | 0.9211 | 3.46E-02 |
| 55 | 10/6/94 | 56 | 0 | 1 | 0 | 0.9211 | 3.46E-02 |
| 56 | 10/7/94 | 55 | 0 | 0 | 0 | 0.9211 | 3.49E-02 |
| 65 | 10/16/94 | 55 | 0 | 1 | 0 | 0.9211 | 3.49E-02 |
| 66 | 10/17/94 | 54 | 0 | 0 | 0 | 0.9211 | 3.52E-02 |
| 68 | 10/19/94 | 54 | 1 | 0 | 0 | 0.9040 | 3.81E-02 |
| 69 | 10/20/94 | 53 | 0 | 0 | 0 | 0.9040 | 3.85E-02 |
| 71 | 10/22/94 | 53 | 1 | 0 | 0 | 0.8870 | 4.10E-02 |
| 72 | 10/23/94 | 52 | 2 | 0 | 0 | 0.8528 | 4.54E-02 |
| 73 | 10/24/94 | 50 | 0 | 0 | 0 | 0.8528 | 4.63E-02 |
| 79 | 10/30/94 | 50 | 0 | 1 | 0 | 0.8528 | 4.63E-02 |
| 80 | 10/31/94 | 49 | 0 | 0 | 0 | 0.8528 | 4.67E-02 |
| 82 | 11/2/94 | 49 | 0 | 1 | 0 | 0.8528 | 4.67E-02 |
| 83 | 11/3/94 | 48 | 0 | 0 | 0 | 0.8528 | 4.72E-02 |
| 91 | 11/11/94 | 48 | 1 | 0 | 0 | 0.8351 | 4.89E-02 |
| 92 | 11/12/94 | 47 | 0 | 1 | 0 | 0.8351 | 4.95E-02 |
| 93 | 11/13/94 | 46 | 1 | 0 | 0 | 0.8169 | 5.15E-02 |
| 94 | 11/14/94 | 45 | 0 | 0 | 0 | 0.8169 | 5.21E-02 |

Table F26. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 104 | 11/24/94 | 45 | 1 | 0 | 0 | 0.7988 | 5.34E-02 |
| 105 | 11/25/94 | 44 | 0 | 0 | 0 | 0.7988 | 5.40E-02 |
| 108 | 11/28/94 | 44 | 1 | 0 | 0 | 0.7806 | 5.51E-02 |
| 109 | 11/29/94 | 43 | 0 | 0 | 0 | 0.7806 | 5.58E-02 |
| 111 | 12/1/94 | 43 | 1 | 0 | 0 | 0.7625 | 5.67E-02 |
| 112 | 12/2/94 | 42 | 0 | 0 | 0 | 0.7625 | 5.73E-02 |
| 114 | 12/4/94 | 42 | 1 | 0 | 0 | 0.7443 | 5.81E-02 |
| 115 | 12/5/94 | 41 | 0 | 0 | 0 | 0.7443 | 5.88E-02 |
| 119 | 12/9/94 | 41 | 1 | 0 | 0 | 0.7262 | 5.93E-02 |
| 120 | 12/10/94 | 40 | 0 | 1 | 0 | 0.7262 | 6.01E-02 |
| 121 | 12/11/94 | 39 | 0 | 0 | 0 | 0.7262 | 6.08E-02 |
| 135 | 12/25/94 | 39 | 2 | 0 | 0 | 0.6889 | 6.15E-02 |
| 136 | 12/26/94 | 37 | 0 | 0 | 0 | 0.6889 | 6.32E-02 |
| 141 | 12/31/94 | 37 | 4 | 0 | 0 | 0.6144 | 6.27E-02 |
| 142 | 1/1/95 | 33 | 1 | 0 | 0 | 0.5958 | 6.59E-02 |
| 143 | 1/2/95 | 32 | 0 | 0 | 0 | 0.5958 | 6.70E-02 |
| 149 | 1/8/95 | 32 | 0 | 1 | 0 | 0.5958 | 6.70E-02 |
| 150 | 1/9/95 | 31 | 0 | 0 | 0 | 0.5958 | 6.80E-02 |
| 158 | 1/17/95 | 31 | 2 | 0 | 0 | 0.5574 | 6.66E-02 |
| 159 | 1/18/95 | 29 | 0 | 0 | 0 | 0.5574 | 6.89E-02 |
| 165 | 1/24/95 | 29 | 2 | 0 | 0 | 0.5189 | 6.68E-02 |
| 166 | 1/25/95 | 27 | 0 | 0 | 0 | 0.5189 | 6.93E-02 |
| 186 | 2/14/95 | 27 | 2 | 0 | 0 | 0.4805 | 6.67E-02 |
| 187 | 2/15/95 | 25 | 0 | 0 | 0 | 0.4805 | 6.93E-02 |
| 201 | 3/1/95 | 25 | 3 | 0 | 0 | 0.4228 | 6.42E-02 |
| 202 | 3/2/95 | 22 | 0 | 0 | 0 | 0.4228 | 6.85E-02 |
| 211 | 3/11/95 | 22 | 0 | 1 | 0 | 0.4228 | 6.85E-02 |
| 212 | 3/12/95 | 21 | 0 | 0 | 0 | 0.4228 | 7.01E-02 |
| 225 | 3/25/95 | 21 | 0 | 2 | 0 | 0.4228 | 7.01E-02 |
| 226 | 3/26/95 | 19 | 0 | 0 | 0 | 0.4228 | 7.37E-02 |
| 252 | 4/21/95 | 19 | 0 | 1 | 0 | 0.4228 | 7.37E-02 |
| 253 | 4/22/95 | 18 | 0 | 0 | 0 | 0.4228 | 7.57E-02 |
| 264 | 5/3/95 | 18 | 2 | 0 | 0 | 0.3759 | 7.00E-02 |
| 265 | 5/4/95 | 16 | 0 | 0 | 0 | 0.3759 | 7.42E-02 |
| 271 | 5/10/95 | 16 | 1 | 0 | 0 | 0.3524 | 7.09E-02 |
| 272 | 5/11/95 | 15 | 0 | 0 | 0 | 0.3524 | 7.32E-02 |
| 277 | 5/16/95 | 15 | 1 | 0 | 0 | 0.3289 | 6.96E-02 |
| 278 | 5/17/95 | 14 | 0 | 0 | 0 | 0.3289 | 7.20E-02 |
| 283 | 5/22/95 | 14 | 1 | 0 | 0 | 0.3054 | 6.80E-02 |
| 284 | 5/23/95 | 13 | 0 | 0 | 0 | 0.3054 | 7.06E-02 |
| 310 | 6/18/95 | 13 | 0 | 1 | 0 | 0.3054 | 7.06E-02 |
| 311 | 6/19/95 | 12 | 0 | 0 | 0 | 0.3054 | 7.35E-02 |
| 313 | 6/21/95 | 12 | 1 | 0 | 0 | 0.2799 | 6.86E-02 |
| 314 | 6/22/95 | 11 | 0 | 0 | 0 | 0.2799 | 7.16E-02 |
| 357 | 8/4/95 | 11 | 0 | 11 | 0 | 0.2799 | 7.16E-02 |

Table F27. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 5 | 8/17/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 17 | 8/29/94 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/94 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 29 | 9/10/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 32 | 9/13/94 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 33 | 9/14/94 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 12 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 37 | 9/18/94 | 13 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 39 | 9/20/94 | 15 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 40 | 9/21/94 | 17 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 42 | 9/23/94 | 19 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 43 | 9/24/94 | 20 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 48 | 9/29/94 | 21 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 50 | 10/1/94 | 22 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 51 | 10/2/94 | 23 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 52 | 10/3/94 | 24 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 71 | 10/22/94 | 24 | 1 | 0 | 0 | 0.9583 | 3.99E-02 |
| 72 | 10/23/94 | 23 | 1 | 0 | 0 | 0.9167 | 5.52E-02 |
| 73 | 10/24/94 | 22 | 0 | 0 | 0 | 0.9167 | 5.64E-02 |
| 91 | 11/11/94 | 22 | 1 | 0 | 0 | 0.8750 | 6.60E-02 |
| 92 | 11/12/94 | 21 | 0 | 0 | 0 | 0.8750 | 6.75E-02 |
| 104 | 11/24/94 | 21 | 1 | 0 | 0 | 0.8333 | 7.42E-02 |
| 105 | 11/25/94 | 20 | 0 | 0 | 0 | 0.8333 | 7.61E-02 |
| 108 | 11/28/94 | 20 | 1 | 0 | 0 | 0.7917 | 8.08E-02 |
| 109 | 11/29/94 | 19 | 0 | 0 | 0 | 0.7917 | 8.29E-02 |
| 114 | 12/4/94 | 19 | 1 | 0 | 0 | 0.7500 | 8.60E-02 |
| 115 | 12/5/94 | 18 | 0 | 0 | 0 | 0.7500 | 8.84E-02 |
| 119 | 12/9/94 | 18 | 1 | 0 | 0 | 0.7083 | 9.02E-02 |
| 120 | 12/10/94 | 17 | 0 | 0 | 0 | 0.7083 | 9.28E-02 |
| 135 | 12/25/94 | 17 | 2 | 0 | 0 | 0.6250 | 9.28E-02 |
| 136 | 12/26/94 | 15 | 0 | 0 | 0 | 0.6250 | 9.88E-02 |
| 141 | 12/31/94 | 15 | 1 | 0 | 0 | 0.5833 | 9.72E-02 |
| 142 | 1/1/95 | 14 | 1 | 0 | 0 | 0.5417 | 9.80E-02 |
| 143 | 1/2/95 | 13 | 0 | 0 | 0 | 0.5417 | 1.02E-01 |
| 149 | 1/8/95 | 13 | 0 | 1 | 0 | 0.5417 | 1.02E-01 |
| 150 | 1/9/95 | 12 | 0 | 0 | 0 | 0.5417 | 1.06E-01 |
| 158 | 1/17/95 | 12 | 1 | 0 | 0 | 0.4965 | 1.02E-01 |
| 159 | 1/18/95 | 11 | 0 | 0 | 0 | 0.4965 | 1.06E-01 |
| 165 | 1/24/95 | 11 | 1 | 0 | 0 | 0.4514 | 1.01E-01 |
| 166 | 1/25/95 | 10 | 0 | 0 | 0 | 0.4514 | 1.06E-01 |
| 201 | 3/1/95 | 10 | 1 | 0 | 0 | 0.4063 | 9.90E-02 |
| 202 | 3/2/95 | 9 | 0 | 0 | 0 | 0.4063 | 1.04E-01 |
| 225 | 3/25/95 | 9 | 0 | 1 | 0 | 0.4063 | 1.04E-01 |
| 226 | 3/26/95 | 8 | 0 | 0 | 0 | 0.4063 | 1.11E-01 |
| 252 | 4/21/95 | 8 | 0 | 1 | 0 | 0.4063 | 1.11E-01 |
| 253 | 4/22/95 | 7 | 0 | 0 | 0 | 0.4063 | 1.18E-01 |

Table F27. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 264 | 5/3/95 | 7 | 1 | 0 | 0 | 0.3482 | 1.06E-01 |
| 265 | 5/4/95 | 6 | 0 | 0 | 0 | 0.3482 | 1.15E-01 |
| 313 | 6/21/95 | 6 | 1 | 0 | 0 | 0.2902 | 9.98E-02 |
| 314 | 6/22/95 | 5 | 0 | 0 | 0 | 0.2902 | 1.09E-01 |
| 357 | 8/4/95 | 5 | 0 | 5 | 0 | 0.2902 | 1.09E-01 |

Table F28. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 5 | 8/17/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 9 | 8/21/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 10 | 8/22/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 14 | 8/26/94 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/94 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 29 | 9/10/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 30 | 9/11/94 | 12 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 32 | 9/13/94 | 18 | 0 | 0 | 6 | 1.0000 | 0.00E+00 |
| 34 | 9/15/94 | 19 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 35 | 9/16/94 | 20 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 20 | 1 | 0 | 0 | 0.9500 | 4.75E-02 |
| 37 | 9/18/94 | 20 | 0 | 0 | 1 | 0.9500 | 4.75E-02 |
| 38 | 9/19/94 | 21 | 1 | 0 | 1 | 0.9048 | 6.09E-02 |
| 39 | 9/20/94 | 22 | 0 | 0 | 2 | 0.9048 | 5.95E-02 |
| 40 | 9/21/94 | 24 | 0 | 0 | 2 | 0.9048 | 5.70E-02 |
| 41 | 9/22/94 | 27 | 0 | 0 | 3 | 0.9048 | 5.37E-02 |
| 42 | 9/23/94 | 29 | 0 | 0 | 2 | 0.9048 | 5.18E-02 |
| 45 | 9/26/94 | 29 | 1 | 0 | 0 | 0.8736 | 5.77E-02 |
| 46 | 9/27/94 | 28 | 0 | 0 | 0 | 0.8736 | 5.87E-02 |
| 48 | 9/29/94 | 29 | 0 | 0 | 1 | 0.8736 | 5.77E-02 |
| 49 | 9/30/94 | 30 | 0 | 0 | 1 | 0.8736 | 5.67E-02 |
| 50 | 10/1/94 | 31 | 0 | 0 | 1 | 0.8736 | 5.58E-02 |
| 51 | 10/2/94 | 34 | 0 | 0 | 3 | 0.8736 | 5.33E-02 |
| 52 | 10/3/94 | 34 | 0 | 2 | 0 | 0.8736 | 5.33E-02 |
| 53 | 10/4/94 | 32 | 0 | 0 | 0 | 0.8736 | 5.49E-02 |
| 55 | 10/6/94 | 32 | 0 | 1 | 0 | 0.8736 | 5.49E-02 |
| 56 | 10/7/94 | 31 | 0 | 0 | 0 | 0.8736 | 5.58E-02 |
| 65 | 10/16/94 | 31 | 0 | 1 | 0 | 0.8736 | 5.58E-02 |
| 66 | 10/17/94 | 30 | 0 | 0 | 0 | 0.8736 | 5.67E-02 |
| 68 | 10/19/94 | 30 | 1 | 0 | 0 | 0.8444 | 6.08E-02 |
| 69 | 10/20/94 | 29 | 0 | 0 | 0 | 0.8444 | 6.18E-02 |
| 72 | 10/23/94 | 29 | 1 | 0 | 0 | 0.8153 | 6.51E-02 |
| 73 | 10/24/94 | 28 | 0 | 0 | 0 | 0.8153 | 6.62E-02 |
| 79 | 10/30/94 | 28 | 0 | 1 | 0 | 0.8153 | 6.62E-02 |
| 80 | 10/31/94 | 27 | 0 | 0 | 0 | 0.8153 | 6.74E-02 |
| 82 | 11/2/94 | 27 | 0 | 1 | 0 | 0.8153 | 6.74E-02 |
| 83 | 11/3/94 | 26 | 0 | 0 | 0 | 0.8153 | 6.87E-02 |
| 92 | 11/12/94 | 26 | 0 | 1 | 0 | 0.8153 | 6.87E-02 |
| 93 | 11/13/94 | 25 | 1 | 0 | 0 | 0.7827 | 7.30E-02 |
| 94 | 11/14/94 | 24 | 0 | 0 | 0 | 0.7827 | 7.45E-02 |
| 111 | 12/1/94 | 24 | 1 | 0 | 0 | 0.7501 | 7.65E-02 |
| 112 | 12/2/94 | 23 | 0 | 0 | 0 | 0.7501 | 7.82E-02 |
| 120 | 12/10/94 | 23 | 0 | 1 | 0 | 0.7501 | 7.82E-02 |
| 121 | 12/11/94 | 22 | 0 | 0 | 0 | 0.7501 | 7.99E-02 |
| 141 | 12/31/94 | 22 | 3 | 0 | 0 | 0.6478 | 8.20E-02 |
| 142 | 1/1/95 | 19 | 0 | 0 | 0 | 0.6478 | 8.82E-02 |
| 158 | 1/17/95 | 19 | 1 | 0 | 0 | 0.6137 | 8.75E-02 |
| 159 | 1/18/95 | 18 | 0 | 0 | 0 | 0.6137 | 8.99E-02 |
| 165 | 1/24/95 | 18 | 1 | 0 | 0 | 0.5796 | 8.86E-02 |

Table F28. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 166 | 1/25/95 | 17 | 0 | 0 | 0 | 0.5796 | 9.11E-02 |
| 186 | 2/14/95 | 17 | 2 | 0 | 0 | 0.5114 | 8.67E-02 |
| 187 | 2/15/95 | 15 | 0 | 0 | 0 | 0.5114 | 9.23E-02 |
| 201 | 3/1/95 | 15 | 2 | 0 | 0 | 0.4432 | 8.54E-02 |
| 202 | 3/2/95 | 13 | 0 | 0 | 0 | 0.4432 | 9.17E-02 |
| 211 | 3/11/95 | 13 | 0 | 1 | 0 | 0.4432 | 9.17E-02 |
| 212 | 3/12/95 | 12 | 0 | 0 | 0 | 0.4432 | 9.55E-02 |
| 225 | 3/25/95 | 12 | 0 | 1 | 0 | 0.4432 | 9.55E-02 |
| 226 | 3/26/95 | 11 | 0 | 0 | 0 | 0.4432 | 9.97E-02 |
| 264 | 5/3/95 | 11 | 1 | 0 | 0 | 0.4029 | 9.39E-02 |
| 265 | 5/4/95 | 10 | 0 | 0 | 0 | 0.4029 | 9.85E-02 |
| 271 | 5/10/95 | 10 | 1 | 0 | 0 | 0.3627 | 9.16E-02 |
| 272 | 5/11/95 | 9 | 0 | 0 | 0 | 0.3627 | 9.65E-02 |
| 277 | 5/16/95 | 9 | 1 | 0 | 0 | 0.3224 | 8.85E-02 |
| 278 | 5/17/95 | 8 | 0 | 0 | 0 | 0.3224 | 9.38E-02 |
| 283 | 5/22/95 | 8 | 1 | 0 | 0 | 0.2821 | 8.45E-02 |
| 284 | 5/23/95 | 7 | 0 | 0 | 0 | 0.2821 | 9.03E-02 |
| 310 | 6/18/95 | 7 | 0 | 1 | 0 | 0.2821 | 9.03E-02 |
| 311 | 6/19/95 | 6 | 0 | 0 | 0 | 0.2821 | 9.76E-02 |
| 357 | 8/4/95 | 6 | 0 | 6 | 0 | 0.2821 | 9.76E-02 |

Table F29. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 1 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 9 | 8/21/94 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 17 | 8/29/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 22 | 9/3/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/94 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 29 | 9/10/94 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 30 | 9/11/94 | 9 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 32 | 9/13/94 | 13 | 0 | 0 | 4 | 1.0000 | 0.00E+00 |
| 33 | 9/14/94 | 14 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 14 | 1 | 0 | 0 | 0.9286 | 6.63E-02 |
| 37 | 9/18/94 | 15 | 0 | 0 | 2 | 0.9286 | 6.41E-02 |
| 38 | 9/19/94 | 16 | 1 | 0 | 1 | 0.8705 | 7.83E-02 |
| 39 | 9/20/94 | 18 | 0 | 0 | 3 | 0.8705 | 7.38E-02 |
| 40 | 9/21/94 | 20 | 0 | 0 | 2 | 0.8705 | 7.00E-02 |
| 41 | 9/22/94 | 21 | 0 | 0 | 1 | 0.8705 | 6.84E-02 |
| 42 | 9/23/94 | 25 | 0 | 0 | 4 | 0.8705 | 6.26E-02 |
| 43 | 9/24/94 | 26 | 0 | 0 | 1 | 0.8705 | 6.14E-02 |
| 48 | 9/29/94 | 27 | 0 | 0 | 1 | 0.8705 | 6.03E-02 |
| 50 | 10/1/94 | 29 | 0 | 0 | 2 | 0.8705 | 5.82E-02 |
| 51 | 10/2/94 | 31 | 0 | 0 | 2 | 0.8705 | 5.63E-02 |
| 52 | 10/3/94 | 32 | 0 | 1 | 1 | 0.8705 | 5.54E-02 |
| 53 | 10/4/94 | 31 | 0 | 0 | 0 | 0.8705 | 5.63E-02 |
| 68 | 10/19/94 | 31 | 1 | 0 | 0 | 0.8425 | 6.01E-02 |
| 69 | 10/20/94 | 30 | 0 | 0 | 0 | 0.8425 | 6.11E-02 |
| 71 | 10/22/94 | 30 | 1 | 0 | 0 | 0.8144 | 6.41E-02 |
| 72 | 10/23/94 | 29 | 0 | 0 | 0 | 0.8144 | 6.52E-02 |
| 91 | 11/11/94 | 29 | 1 | 0 | 0 | 0.7863 | 6.75E-02 |
| 92 | 11/12/94 | 28 | 0 | 0 | 0 | 0.7863 | 6.87E-02 |
| 93 | 11/13/94 | 28 | 1 | 0 | 0 | 0.7582 | 7.05E-02 |
| 94 | 11/14/94 | 27 | 0 | 0 | 0 | 0.7582 | 7.18E-02 |
| 104 | 11/24/94 | 27 | 1 | 0 | 0 | 0.7301 | 7.30E-02 |
| 105 | 11/25/94 | 26 | 0 | 0 | 0 | 0.7301 | 7.44E-02 |
| 108 | 11/28/94 | 26 | 1 | 0 | 0 | 0.7020 | 7.52E-02 |
| 109 | 11/29/94 | 25 | 0 | 0 | 0 | 0.7020 | 7.66E-02 |
| 111 | 12/1/94 | 25 | 1 | 0 | 0 | 0.6740 | 7.70E-02 |
| 112 | 12/2/94 | 24 | 0 | 0 | 0 | 0.6740 | 7.86E-02 |
| 114 | 12/4/94 | 24 | 1 | 0 | 0 | 0.6459 | 7.85E-02 |
| 115 | 12/5/94 | 23 | 0 | 0 | 0 | 0.6459 | 8.01E-02 |
| 119 | 12/9/94 | 23 | 1 | 0 | 0 | 0.6178 | 7.96E-02 |
| 120 | 12/10/94 | 22 | 0 | 0 | 0 | 0.6178 | 8.14E-02 |
| 135 | 12/25/94 | 22 | 2 | 0 | 0 | 0.5616 | 7.93E-02 |
| 136 | 12/26/94 | 20 | 0 | 0 | 0 | 0.5616 | 8.31E-02 |
| 141 | 12/31/94 | 20 | 2 | 0 | 0 | 0.5055 | 7.95E-02 |
| 142 | 1/1/95 | 18 | 0 | 0 | 0 | 0.5055 | 8.38E-02 |
| 158 | 1/17/95 | 18 | 2 | 0 | 0 | 0.4493 | 7.86E-02 |
| 159 | 1/18/95 | 16 | 0 | 0 | 0 | 0.4493 | 8.34E-02 |
| 186 | 2/14/95 | 16 | 1 | 0 | 0 | 0.4212 | 8.01E-02 |
| 187 | 2/15/95 | 15 | 0 | 0 | 0 | 0.4212 | 8.27E-02 |
| 201 | 3/1/95 | 15 | 3 | 0 | 0 | 0.3370 | 7.08E-02 |

Table F29. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 202 | 3/2/95 | 12 | 0 | 0 | 0 | 0.3370 | 7.92E-02 |
| 211 | 3/11/95 | 12 | 0 | 1 | 0 | 0.3370 | 7.92E-02 |
| 212 | 3/12/95 | 11 | 0 | 0 | 0 | 0.3370 | 8.27E-02 |
| 225 | 3/25/95 | 11 | 0 | 1 | 0 | 0.3370 | 8.27E-02 |
| 226 | 3/26/95 | 10 | 0 | 0 | 0 | 0.3370 | 8.68E-02 |
| 264 | 5/3/95 | 10 | 1 | 0 | 0 | 0.3033 | 8.01E-02 |
| 265 | 5/4/95 | 9 | 0 | 0 | 0 | 0.3033 | 8.44E-02 |
| 271 | 5/10/95 | 9 | 1 | 0 | 0 | 0.2696 | 7.68E-02 |
| 272 | 5/11/95 | 8 | 0 | 0 | 0 | 0.2696 | 8.15E-02 |
| 357 | 8/4/95 | 8 | 0 | 8 | 0 | 0.2696 | 8.15E-02 |

Table F30. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Huron National Forest (HNF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 5 | 8/17/94 | 5 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 10 | 8/22/94 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/94 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 14 | 8/26/94 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 29 | 9/10/94 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 30 | 9/11/94 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 32 | 9/13/94 | 14 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 34 | 9/15/94 | 15 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 35 | 9/16/94 | 16 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 17 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 39 | 9/20/94 | 18 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 40 | 9/21/94 | 20 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 41 | 9/22/94 | 22 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 45 | 9/26/94 | 22 | 1 | 0 | 0 | 0.9545 | 4.34E-02 |
| 46 | 9/27/94 | 21 | 0 | 0 | 0 | 0.9545 | 4.44E-02 |
| 48 | 9/29/94 | 22 | 0 | 0 | 1 | 0.9545 | 4.34E-02 |
| 49 | 9/30/94 | 23 | 0 | 0 | 1 | 0.9545 | 4.24E-02 |
| 51 | 10/2/94 | 25 | 0 | 0 | 2 | 0.9545 | 4.07E-02 |
| 52 | 10/3/94 | 25 | 0 | 1 | 0 | 0.9545 | 4.07E-02 |
| 53 | 10/4/94 | 24 | 0 | 0 | 0 | 0.9545 | 4.15E-02 |
| 55 | 10/6/94 | 24 | 0 | 1 | 0 | 0.9545 | 4.15E-02 |
| 56 | 10/7/94 | 23 | 0 | 0 | 0 | 0.9545 | 4.24E-02 |
| 65 | 10/16/94 | 23 | 0 | 1 | 0 | 0.9545 | 4.24E-02 |
| 66 | 10/17/94 | 22 | 0 | 0 | 0 | 0.9545 | 4.34E-02 |
| 72 | 10/23/94 | 22 | 2 | 0 | 0 | 0.8678 | 6.73E-02 |
| 73 | 10/24/94 | 20 | 0 | 0 | 0 | 0.8678 | 7.06E-02 |
| 79 | 10/30/94 | 20 | 0 | 1 | 0 | 0.8678 | 7.06E-02 |
| 80 | 10/31/94 | 19 | 0 | 0 | 0 | 0.8678 | 7.24E-02 |
| 82 | 11/2/94 | 19 | 0 | 1 | 0 | 0.8678 | 7.24E-02 |
| 83 | 11/3/94 | 18 | 0 | 0 | 0 | 0.8678 | 7.44E-02 |
| 92 | 11/12/94 | 18 | 0 | 1 | 0 | 0.8678 | 7.44E-02 |
| 93 | 11/13/94 | 17 | 0 | 0 | 0 | 0.8678 | 7.65E-02 |
| 120 | 12/10/94 | 17 | 0 | 1 | 0 | 0.8678 | 7.65E-02 |
| 121 | 12/11/94 | 16 | 0 | 0 | 0 | 0.8678 | 7.89E-02 |
| 141 | 12/31/94 | 16 | 1 | 0 | 0 | 0.8135 | 8.78E-02 |
| 142 | 1/1/95 | 15 | 1 | 0 | 0 | 0.7593 | 9.62E-02 |
| 143 | 1/2/95 | 14 | 0 | 0 | 0 | 0.7593 | 9.96E-02 |
| 149 | 1/8/95 | 14 | 0 | 1 | 0 | 0.7593 | 9.96E-02 |
| 150 | 1/9/95 | 13 | 0 | 0 | 0 | 0.7593 | 1.03E-01 |
| 165 | 1/24/95 | 13 | 2 | 0 | 0 | 0.6425 | 1.07E-01 |
| 166 | 1/25/95 | 11 | 0 | 0 | 0 | 0.6425 | 1.16E-01 |
| 186 | 2/14/95 | 11 | 1 | 0 | 0 | 0.5841 | 1.14E-01 |
| 187 | 2/15/95 | 10 | 0 | 0 | 0 | 0.5841 | 1.19E-01 |
| 225 | 3/25/95 | 10 | 0 | 1 | 0 | 0.5841 | 1.19E-01 |
| 226 | 3/26/95 | 9 | 0 | 0 | 0 | 0.5841 | 1.26E-01 |
| 252 | 4/21/95 | 9 | 0 | 1 | 0 | 0.5841 | 1.26E-01 |
| 253 | 4/22/95 | 8 | 0 | 0 | 0 | 0.5841 | 1.33E-01 |

Table F30. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 264 | 5/3/95 | 8 | 1 | 0 | 0 | 0.5111 | 1.26E-01 |
| 265 | 5/4/95 | 7 | 0 | 0 | 0 | 0.5111 | 1.35E-01 |
| 277 | 5/16/95 | 7 | 1 | 0 | 0 | 0.4381 | 1.24E-01 |
| 278 | 5/17/95 | 6 | 0 | 0 | 0 | 0.4381 | 1.34E-01 |
| 283 | 5/22/95 | 6 | 1 | 0 | 0 | 0.3650 | 1.19E-01 |
| 284 | 5/23/95 | 5 | 0 | 0 | 0 | 0.3650 | 1.30E-01 |
| 310 | 6/18/95 | 5 | 0 | 1 | 0 | 0.3650 | 1.30E-01 |
| 311 | 6/19/95 | 4 | 0 | 0 | 0 | 0.3650 | 1.45E-01 |
| 313 | 6/21/95 | 4 | 1 | 0 | 0 | 0.2738 | 1.17E-01 |
| 314 | 6/22/95 | 3 | 0 | 0 | 0 | 0.2738 | 1.35E-01 |
| 357 | 8/4/95 | 3 | 0 | 3 | 0 | 0.2738 | 1.35E-01 |

Table F31. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 4 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 4 | 8/16/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/94 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 8 | 8/20/94 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 12 | 8/24/94 | 8 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 16 | 8/28/94 | 7 | 1 | 0 | 0 | 0.8571 | 1.22E-01 |
| 17 | 8/29/94 | 6 | 0 | 0 | 0 | 0.8571 | 1.32E-01 |
| 20 | 9/1/94 | 11 | 0 | 0 | 5 | 0.8571 | 9.77E-02 |
| 23 | 9/4/94 | 12 | 0 | 1 | 1 | 0.8571 | 9.35E-02 |
| 24 | 9/5/94 | 12 | 0 | 0 | 1 | 0.8571 | 9.35E-02 |
| 25 | 9/6/94 | 13 | 0 | 0 | 1 | 0.8571 | 8.99E-02 |
| 26 | 9/7/94 | 15 | 0 | 0 | 2 | 0.8571 | 8.36E-02 |
| 27 | 9/8/94 | 16 | 0 | 0 | 1 | 0.8571 | 8.10E-02 |
| 28 | 9/9/94 | 17 | 0 | 0 | 1 | 0.8571 | 7.86E-02 |
| 30 | 9/11/94 | 18 | 0 | 0 | 1 | 0.8571 | 7.64E-02 |
| 31 | 9/12/94 | 18 | 0 | 1 | 0 | 0.8571 | 7.64E-02 |
| 32 | 9/13/94 | 19 | 0 | 0 | 2 | 0.8571 | 7.43E-02 |
| 34 | 9/15/94 | 19 | 0 | 1 | 0 | 0.8571 | 7.43E-02 |
| 35 | 9/16/94 | 19 | 0 | 0 | 1 | 0.8571 | 7.43E-02 |
| 36 | 9/17/94 | 21 | 1 | 0 | 2 | 0.8163 | 7.63E-02 |
| 37 | 9/18/94 | 21 | 0 | 0 | 1 | 0.8163 | 7.63E-02 |
| 38 | 9/19/94 | 24 | 0 | 0 | 3 | 0.8163 | 7.14E-02 |
| 40 | 9/21/94 | 25 | 0 | 0 | 1 | 0.8163 | 7.00E-02 |
| 41 | 9/22/94 | 28 | 0 | 0 | 3 | 0.8163 | 6.61E-02 |
| 42 | 9/23/94 | 30 | 0 | 0 | 2 | 0.8163 | 6.39E-02 |
| 43 | 9/24/94 | 31 | 0 | 0 | 1 | 0.8163 | 6.28E-02 |
| 44 | 9/25/94 | 33 | 0 | 0 | 2 | 0.8163 | 6.09E-02 |
| 45 | 9/26/94 | 33 | 1 | 0 | 0 | 0.7916 | 6.29E-02 |
| 46 | 9/27/94 | 33 | 0 | 0 | 1 | 0.7916 | 6.29E-02 |
| 50 | 10/1/94 | 34 | 1 | 0 | 1 | 0.7683 | 6.34E-02 |
| 51 | 10/2/94 | 33 | 0 | 0 | 0 | 0.7683 | 6.44E-02 |
| 57 | 10/8/94 | 33 | 0 | 1 | 0 | 0.7683 | 6.44E-02 |
| 58 | 10/9/94 | 32 | 1 | 0 | 0 | 0.7443 | 6.65E-02 |
| 59 | 10/10/94 | 31 | 0 | 0 | 0 | 0.7443 | 6.76E-02 |
| 61 | 10/12/94 | 31 | 1 | 2 | 0 | 0.7203 | 6.84E-02 |
| 62 | 10/13/94 | 28 | 0 | 0 | 0 | 0.7203 | 7.20E-02 |
| 63 | 10/14/94 | 28 | 1 | 0 | 0 | 0.6946 | 7.25E-02 |
| 64 | 10/15/94 | 27 | 1 | 0 | 0 | 0.6688 | 7.41E-02 |
| 65 | 10/16/94 | 26 | 0 | 0 | 0 | 0.6688 | 7.55E-02 |
| 68 | 10/19/94 | 26 | 0 | 1 | 0 | 0.6688 | 7.55E-02 |
| 69 | 10/20/94 | 25 | 0 | 0 | 0 | 0.6688 | 7.70E-02 |
| 71 | 10/22/94 | 25 | 0 | 1 | 0 | 0.6688 | 7.70E-02 |
| 72 | 10/23/94 | 24 | 0 | 0 | 0 | 0.6688 | 7.86E-02 |
| 90 | 11/10/94 | 24 | 2 | 0 | 0 | 0.6131 | 7.78E-02 |
| 91 | 11/11/94 | 22 | 0 | 0 | 0 | 0.6131 | 8.13E-02 |
| 97 | 11/17/94 | 22 | 1 | 0 | 0 | 0.5852 | 8.04E-02 |
| 98 | 11/18/94 | 21 | 0 | 0 | 0 | 0.5852 | 8.22E-02 |
| 117 | 12/7/94 | 21 | 0 | 1 | 0 | 0.5852 | 8.22E-02 |
| 118 | 12/8/94 | 20 | 0 | 0 | 0 | 0.5852 | 8.43E-02 |
| 126 | 12/16/94 | 20 | 0 | 1 | 0 | 0.5852 | 8.43E-02 |

Table F31. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 127 | 12/17/94 | 19 | 0 | 0 | 0 | 0.5852 | 8.65E-02 |
| 129 | 12/19/94 | 19 | 1 | 0 | 0 | 0.5544 | 8.49E-02 |
| 130 | 12/20/94 | 18 | 0 | 0 | 0 | 0.5544 | 8.72E-02 |
| 145 | 1/4/95 | 18 | 0 | 1 | 0 | 0.5544 | 8.72E-02 |
| 146 | 1/5/95 | 17 | 0 | 0 | 0 | 0.5544 | 8.98E-02 |
| 158 | 1/17/95 | 17 | 0 | 1 | 0 | 0.5544 | 8.98E-02 |
| 159 | 1/18/95 | 16 | 0 | 0 | 0 | 0.5544 | 9.25E-02 |
| 166 | 1/25/95 | 16 | 1 | 1 | 0 | 0.5198 | 9.00E-02 |
| 167 | 1/26/95 | 14 | 0 | 0 | 0 | 0.5198 | 9.63E-02 |
| 173 | 2/1/95 | 14 | 1 | 0 | 0 | 0.4827 | 9.28E-02 |
| 174 | 2/2/95 | 13 | 0 | 0 | 0 | 0.4827 | 9.63E-02 |
| 194 | 2/22/95 | 13 | 2 | 0 | 0 | 0.4084 | 8.71E-02 |
| 195 | 2/23/95 | 11 | 0 | 0 | 0 | 0.4084 | 9.47E-02 |
| 214 | 3/14/95 | 11 | 0 | 1 | 0 | 0.4084 | 9.47E-02 |
| 215 | 3/15/95 | 10 | 0 | 0 | 0 | 0.4084 | 9.93E-02 |
| 249 | 4/18/95 | 10 | 0 | 1 | 0 | 0.4084 | 9.93E-02 |
| 250 | 4/19/95 | 9 | 0 | 0 | 0 | 0.4084 | 1.05E-01 |
| 252 | 4/21/95 | 9 | 0 | 1 | 0 | 0.4084 | 1.05E-01 |
| 253 | 4/22/95 | 8 | 0 | 0 | 0 | 0.4084 | 1.11E-01 |
| 256 | 4/25/95 | 8 | 1 | 0 | 0 | 0.3573 | 1.01E-01 |
| 257 | 4/26/95 | 7 | 0 | 0 | 0 | 0.3573 | 1.08E-01 |
| 280 | 5/19/95 | 7 | 1 | 0 | 0 | 0.3063 | 9.64E-02 |
| 281 | 5/20/95 | 6 | 0 | 0 | 0 | 0.3063 | 1.04E-01 |
| 315 | 6/23/95 | 6 | 0 | 1 | 0 | 0.3063 | 1.04E-01 |
| 316 | 6/24/95 | 5 | 0 | 0 | 0 | 0.3063 | 1.14E-01 |
| 330 | 7/8/95 | 5 | 0 | 1 | 0 | 0.3063 | 1.14E-01 |
| 331 | 7/9/95 | 4 | 0 | 0 | 0 | 0.3063 | 1.28E-01 |
| 357 | 8/4/95 | 4 | 0 | 4 | 0 | 0.3063 | 1.28E-01 |

Table F32. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 6 | 8/18/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 8 | 8/20/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/94 | 4 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 20 | 9/1/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 23 | 9/4/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 25 | 9/6/94 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 27 | 9/8/94 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 30 | 9/11/94 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 31 | 9/12/94 | 8 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 32 | 9/13/94 | 9 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 34 | 9/15/94 | 9 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 35 | 9/16/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 38 | 9/19/94 | 13 | 0 | 0 | 3 | 1.0000 | 0.00E+00 |
| 40 | 9/21/94 | 14 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 42 | 9/23/94 | 16 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 43 | 9/24/94 | 17 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 45 | 9/26/94 | 17 | 1 | 0 | 0 | 0.9412 | 5.54E-02 |
| 46 | 9/27/94 | 16 | 0 | 0 | 0 | 0.9412 | 5.71E-02 |
| 50 | 10/1/94 | 17 | 0 | 0 | 1 | 0.9412 | 5.54E-02 |
| 61 | 10/12/94 | 17 | 1 | 1 | 0 | 0.8858 | 7.26E-02 |
| 62 | 10/13/94 | 15 | 0 | 0 | 0 | 0.8858 | 7.73E-02 |
| 90 | 11/10/94 | 15 | 1 | 0 | 0 | 0.8268 | 8.89E-02 |
| 91 | 11/11/94 | 14 | 0 | 0 | 0 | 0.8268 | 9.20E-02 |
| 126 | 12/16/94 | 14 | 0 | 1 | 0 | 0.8268 | 9.20E-02 |
| 127 | 12/17/94 | 13 | 0 | 0 | 0 | 0.8268 | 9.54E-02 |
| 129 | 12/19/94 | 13 | 1 | 0 | 0 | 0.7632 | 1.03E-01 |
| 130 | 12/20/94 | 12 | 0 | 0 | 0 | 0.7632 | 1.07E-01 |
| 145 | 1/4/95 | 12 | 0 | 1 | 0 | 0.7632 | 1.07E-01 |
| 146 | 1/5/95 | 11 | 0 | 0 | 0 | 0.7632 | 1.12E-01 |
| 158 | 1/17/95 | 11 | 0 | 1 | 0 | 0.7632 | 1.12E-01 |
| 159 | 1/18/95 | 10 | 0 | 0 | 0 | 0.7632 | 1.17E-01 |
| 166 | 1/25/95 | 10 | 1 | 1 | 0 | 0.6868 | 1.22E-01 |
| 167 | 1/26/95 | 8 | 0 | 0 | 0 | 0.6868 | 1.36E-01 |
| 173 | 2/1/95 | 8 | 1 | 0 | 0 | 0.6010 | 1.34E-01 |
| 174 | 2/2/95 | 7 | 0 | 0 | 0 | 0.6010 | 1.43E-01 |
| 214 | 3/14/95 | 7 | 0 | 1 | 0 | 0.6010 | 1.43E-01 |
| 215 | 3/15/95 | 6 | 0 | 0 | 0 | 0.6010 | 1.55E-01 |
| 249 | 4/18/95 | 6 | 0 | 1 | 0 | 0.6010 | 1.55E-01 |
| 250 | 4/19/95 | 5 | 0 | 0 | 0 | 0.6010 | 1.70E-01 |
| 252 | 4/21/95 | 5 | 0 | 1 | 0 | 0.6010 | 1.70E-01 |
| 253 | 4/22/95 | 4 | 0 | 0 | 0 | 0.6010 | 1.90E-01 |
| 256 | 4/25/95 | 4 | 1 | 0 | 0 | 0.4507 | 1.67E-01 |
| 257 | 4/26/95 | 3 | 0 | 0 | 0 | 0.4507 | 1.93E-01 |
| 315 | 6/23/95 | 3 | 0 | 1 | 0 | 0.4507 | 1.93E-01 |
| 316 | 6/24/95 | 2 | 0 | 0 | 0 | 0.4507 | 2.36E-01 |
| 357 | 8/4/95 | 2 | 0 | 2 | 0 | 0.4507 | 2.36E-01 |

Table F33. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 4 | 8/16/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 8 | 8/20/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 16 | 8/28/94 | 4 | 1 | 0 | 0 | 0.7500 | 1.88E-01 |
| 17 | 8/29/94 | 3 | 0 | 0 | 0 | 0.7500 | 2.17E-01 |
| 20 | 9/1/94 | 7 | 0 | 0 | 4 | 0.7500 | 1.42E-01 |
| 23 | 9/4/94 | 7 | 0 | 1 | 0 | 0.7500 | 1.42E-01 |
| 24 | 9/5/94 | 6 | 0 | 0 | 0 | 0.7500 | 1.53E-01 |
| 26 | 9/7/94 | 8 | 0 | 0 | 2 | 0.7500 | 1.33E-01 |
| 28 | 9/9/94 | 9 | 0 | 0 | 1 | 0.7500 | 1.25E-01 |
| 36 | 9/17/94 | 10 | 1 | 0 | 1 | 0.6750 | 1.22E-01 |
| 37 | 9/18/94 | 10 | 0 | 0 | 1 | 0.6750 | 1.22E-01 |
| 41 | 9/22/94 | 12 | 0 | 0 | 2 | 0.6750 | 1.11E-01 |
| 44 | 9/25/94 | 14 | 0 | 0 | 2 | 0.6750 | 1.03E-01 |
| 46 | 9/27/94 | 15 | 0 | 0 | 1 | 0.6750 | 9.94E-02 |
| 50 | 10/1/94 | 15 | 1 | 0 | 0 | 0.6300 | 9.89E-02 |
| 51 | 10/2/94 | 14 | 0 | 0 | 0 | 0.6300 | 1.02E-01 |
| 57 | 10/8/94 | 14 | 0 | 1 | 0 | 0.6300 | 1.02E-01 |
| 58 | 10/9/94 | 13 | 1 | 0 | 0 | 0.5815 | 1.04E-01 |
| 59 | 10/10/94 | 12 | 0 | 0 | 0 | 0.5815 | 1.09E-01 |
| 61 | 10/12/94 | 12 | 0 | 1 | 0 | 0.5815 | 1.09E-01 |
| 62 | 10/13/94 | 11 | 0 | 0 | 0 | 0.5815 | 1.13E-01 |
| 63 | 10/14/94 | 11 | 1 | 0 | 0 | 0.5287 | 1.09E-01 |
| 64 | 10/15/94 | 10 | 0 | 0 | 0 | 0.5287 | 1.15E-01 |
| 68 | 10/19/94 | 10 | 0 | 1 | 0 | 0.5287 | 1.15E-01 |
| 69 | 10/20/94 | 9 | 0 | 0 | 0 | 0.5287 | 1.21E-01 |
| 71 | 10/22/94 | 9 | 0 | 1 | 0 | 0.5287 | 1.21E-01 |
| 72 | 10/23/94 | 8 | 0 | 0 | 0 | 0.5287 | 1.28E-01 |
| 90 | 11/10/94 | 8 | 1 | 0 | 0 | 0.4626 | 1.20E-01 |
| 91 | 11/11/94 | 7 | 0 | 0 | 0 | 0.4626 | 1.28E-01 |
| 97 | 11/17/94 | 7 | 1 | 0 | 0 | 0.3965 | 1.16E-01 |
| 98 | 11/18/94 | 6 | 0 | 0 | 0 | 0.3965 | 1.26E-01 |
| 117 | 12/7/94 | 6 | 0 | 1 | 0 | 0.3965 | 1.26E-01 |
| 118 | 12/8/94 | 5 | 0 | 0 | 0 | 0.3965 | 1.38E-01 |
| 194 | 2/22/95 | 5 | 1 | 0 | 0 | 0.3172 | 1.17E-01 |
| 195 | 2/23/95 | 4 | 0 | 0 | 0 | 0.3172 | 1.31E-01 |
| 280 | 5/19/95 | 4 | 1 | 0 | 0 | 0.2379 | 1.04E-01 |
| 281 | 5/20/95 | 3 | 0 | 0 | 0 | 0.2379 | 1.20E-01 |
| 330 | 7/8/95 | 3 | 0 | 1 | 0 | 0.2379 | 1.20E-01 |
| 331 | 7/9/95 | 2 | 0 | 0 | 0 | 0.2379 | 1.47E-01 |
| 357 | 8/4/95 | 2 | 0 | 2 | 0 | 0.2379 | 1.47E-01 |

Table F34. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 4 | 8/16/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 6 | 8/18/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 16 | 8/28/94 | 4 | 1 | 0 | 0 | 0.7500 | 1.88E-01 |
| 17 | 8/29/94 | 3 | 0 | 0 | 0 | 0.7500 | 2.17E-01 |
| 20 | 9/1/94 | 5 | 0 | 0 | 2 | 0.7500 | 1.68E-01 |
| 26 | 9/7/94 | 7 | 0 | 0 | 2 | 0.7500 | 1.42E-01 |
| 27 | 9/8/94 | 8 | 0 | 0 | 1 | 0.7500 | 1.33E-01 |
| 32 | 9/13/94 | 9 | 0 | 0 | 1 | 0.7500 | 1.25E-01 |
| 34 | 9/15/94 | 9 | 0 | 1 | 0 | 0.7500 | 1.25E-01 |
| 35 | 9/16/94 | 9 | 0 | 0 | 1 | 0.7500 | 1.25E-01 |
| 36 | 9/17/94 | 10 | 1 | 0 | 1 | 0.6750 | 1.22E-01 |
| 37 | 9/18/94 | 10 | 0 | 0 | 1 | 0.6750 | 1.22E-01 |
| 38 | 9/19/94 | 12 | 0 | 0 | 2 | 0.6750 | 1.11E-01 |
| 40 | 9/21/94 | 13 | 0 | 0 | 1 | 0.6750 | 1.07E-01 |
| 41 | 9/22/94 | 15 | 0 | 0 | 2 | 0.6750 | 9.94E-02 |
| 42 | 9/23/94 | 17 | 0 | 0 | 2 | 0.6750 | 9.33E-02 |
| 50 | 10/1/94 | 17 | 1 | 0 | 0 | 0.6353 | 9.31E-02 |
| 51 | 10/2/94 | 16 | 0 | 0 | 0 | 0.6353 | 9.59E-02 |
| 57 | 10/8/94 | 16 | 0 | 1 | 0 | 0.6353 | 9.59E-02 |
| 58 | 10/9/94 | 15 | 1 | 0 | 0 | 0.5929 | 9.77E-02 |
| 59 | 10/10/94 | 14 | 0 | 0 | 0 | 0.5929 | 1.01E-01 |
| 61 | 10/12/94 | 14 | 1 | 0 | 0 | 0.5506 | 9.86E-02 |
| 62 | 10/13/94 | 13 | 0 | 0 | 0 | 0.5506 | 1.02E-01 |
| 63 | 10/14/94 | 13 | 1 | 0 | 0 | 0.5082 | 9.88E-02 |
| 64 | 10/15/94 | 12 | 1 | 0 | 0 | 0.4659 | 9.83E-02 |
| 65 | 10/16/94 | 11 | 0 | 0 | 0 | 0.4659 | 1.03E-01 |
| 90 | 11/10/94 | 11 | 1 | 0 | 0 | 0.4235 | 9.70E-02 |
| 91 | 11/11/94 | 10 | 0 | 0 | 0 | 0.4235 | 1.02E-01 |
| 97 | 11/17/94 | 10 | 1 | 0 | 0 | 0.3812 | 9.48E-02 |
| 98 | 11/18/94 | 9 | 0 | 0 | 0 | 0.3812 | 1.00E-01 |
| 126 | 12/16/94 | 9 | 0 | 1 | 0 | 0.3812 | 1.00E-01 |
| 127 | 12/17/94 | 8 | 0 | 0 | 0 | 0.3812 | 1.06E-01 |
| 158 | 1/17/95 | 8 | 0 | 1 | 0 | 0.3812 | 1.06E-01 |
| 159 | 1/18/95 | 7 | 0 | 0 | 0 | 0.3812 | 1.13E-01 |
| 166 | 1/25/95 | 7 | 0 | 1 | 0 | 0.3812 | 1.13E-01 |
| 167 | 1/26/95 | 6 | 0 | 0 | 0 | 0.3812 | 1.22E-01 |
| 173 | 2/1/95 | 6 | 1 | 0 | 0 | 0.3176 | 1.07E-01 |
| 174 | 2/2/95 | 5 | 0 | 0 | 0 | 0.3176 | 1.17E-01 |
| 252 | 4/21/95 | 5 | 0 | 1 | 0 | 0.3176 | 1.17E-01 |
| 253 | 4/22/95 | 4 | 0 | 0 | 0 | 0.3176 | 1.31E-01 |
| 256 | 4/25/95 | 4 | 1 | 0 | 0 | 0.2382 | 1.04E-01 |
| 257 | 4/26/95 | 3 | 0 | 0 | 0 | 0.2382 | 1.20E-01 |
| 315 | 6/23/95 | 3 | 0 | 1 | 0 | 0.2382 | 1.20E-01 |
| 316 | 6/24/95 | 2 | 0 | 0 | 0 | 0.2382 | 1.47E-01 |
| 357 | 8/4/95 | 2 | 0 | 2 | 0 | 0.2382 | 1.47E-01 |

Table F35. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) open site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 8 | 8/20/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/24/94 | 3 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 20 | 9/1/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 23 | 9/4/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 24 | 9/5/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 25 | 9/6/94 | 6 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 28 | 9/9/94 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 31 | 9/12/94 | 7 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 32 | 9/13/94 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 38 | 9/19/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 41 | 9/22/94 | 10 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 43 | 9/24/94 | 11 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 44 | 9/25/94 | 13 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 45 | 9/26/94 | 13 | 1 | 0 | 0 | 0.9231 | 7.10E-02 |
| 46 | 9/27/94 | 13 | 0 | 0 | 1 | 0.9231 | 7.10E-02 |
| 50 | 10/1/94 | 14 | 0 | 0 | 1 | 0.9231 | 6.84E-02 |
| 61 | 10/12/94 | 14 | 0 | 1 | 0 | 0.9231 | 6.84E-02 |
| 62 | 10/13/94 | 13 | 0 | 0 | 0 | 0.9231 | 7.10E-02 |
| 68 | 10/19/94 | 13 | 0 | 1 | 0 | 0.9231 | 7.10E-02 |
| 69 | 10/20/94 | 12 | 0 | 0 | 0 | 0.9231 | 7.39E-02 |
| 71 | 10/22/94 | 12 | 0 | 1 | 0 | 0.9231 | 7.39E-02 |
| 72 | 10/23/94 | 11 | 0 | 0 | 0 | 0.9231 | 7.72E-02 |
| 90 | 11/10/94 | 11 | 1 | 0 | 0 | 0.8392 | 1.01E-01 |
| 91 | 11/11/94 | 10 | 0 | 0 | 0 | 0.8392 | 1.06E-01 |
| 117 | 12/7/94 | 10 | 0 | 1 | 0 | 0.8392 | 1.06E-01 |
| 118 | 12/8/94 | 9 | 0 | 0 | 0 | 0.8392 | 1.12E-01 |
| 129 | 12/19/94 | 9 | 1 | 0 | 0 | 0.7459 | 1.25E-01 |
| 130 | 12/20/94 | 8 | 0 | 0 | 0 | 0.7459 | 1.33E-01 |
| 145 | 1/4/95 | 8 | 0 | 1 | 0 | 0.7459 | 1.33E-01 |
| 146 | 1/5/95 | 7 | 0 | 0 | 0 | 0.7459 | 1.42E-01 |
| 166 | 1/25/95 | 7 | 1 | 0 | 0 | 0.6394 | 1.45E-01 |
| 167 | 1/26/95 | 6 | 0 | 0 | 0 | 0.6394 | 1.57E-01 |
| 194 | 2/22/95 | 6 | 2 | 0 | 0 | 0.4262 | 1.32E-01 |
| 195 | 2/23/95 | 4 | 0 | 0 | 0 | 0.4262 | 1.61E-01 |
| 214 | 3/14/95 | 4 | 0 | 1 | 0 | 0.4262 | 1.61E-01 |
| 215 | 3/15/95 | 3 | 0 | 0 | 0 | 0.4262 | 1.86E-01 |
| 280 | 5/19/95 | 3 | 1 | 0 | 0 | 0.2842 | 1.39E-01 |
| 281 | 5/20/95 | 2 | 0 | 0 | 0 | 0.2842 | 1.70E-01 |
| 357 | 8/4/95 | 2 | 0 | 2 | 0 | 0.2842 | 1.70E-01 |

Table F36. Kaplan-Meier survival estimates for ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 6 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/94 | 8 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 9 | 0 | 1 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/23/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 11 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 21 | 9/2/94 | 11 | 1 | 0 | 0 | 0.9091 | 8.26E-02 |
| 22 | 9/3/94 | 10 | 0 | 0 | 0 | 0.9091 | 8.67E-02 |
| 25 | 9/6/94 | 11 | 0 | 0 | 1 | 0.9091 | 8.26E-02 |
| 26 | 9/7/94 | 12 | 0 | 0 | 1 | 0.9091 | 7.91E-02 |
| 28 | 9/9/94 | 13 | 0 | 0 | 1 | 0.9091 | 7.60E-02 |
| 29 | 9/10/94 | 13 | 0 | 1 | 0 | 0.9091 | 7.60E-02 |
| 30 | 9/11/94 | 12 | 0 | 0 | 0 | 0.9091 | 7.91E-02 |
| 35 | 9/16/94 | 13 | 0 | 0 | 1 | 0.9091 | 7.60E-02 |
| 36 | 9/17/94 | 14 | 0 | 0 | 1 | 0.9091 | 7.33E-02 |
| 37 | 9/18/94 | 14 | 0 | 1 | 0 | 0.9091 | 7.33E-02 |
| 38 | 9/19/94 | 13 | 0 | 0 | 0 | 0.9091 | 7.60E-02 |
| 42 | 9/23/94 | 17 | 1 | 0 | 4 | 0.8556 | 7.89E-02 |
| 43 | 9/24/94 | 17 | 1 | 0 | 1 | 0.8053 | 8.62E-02 |
| 44 | 9/25/94 | 17 | 0 | 0 | 1 | 0.8053 | 8.62E-02 |
| 45 | 9/26/94 | 18 | 0 | 0 | 1 | 0.8053 | 8.38E-02 |
| 46 | 9/27/94 | 20 | 0 | 0 | 2 | 0.8053 | 7.95E-02 |
| 47 | 9/28/94 | 20 | 0 | 1 | 0 | 0.8053 | 7.95E-02 |
| 48 | 9/29/94 | 19 | 0 | 0 | 0 | 0.8053 | 8.15E-02 |
| 49 | 9/30/94 | 20 | 0 | 0 | 1 | 0.8053 | 7.95E-02 |
| 50 | 10/1/94 | 21 | 1 | 0 | 1 | 0.7669 | 8.08E-02 |
| 51 | 10/2/94 | 20 | 0 | 0 | 0 | 0.7669 | 8.28E-02 |
| 52 | 10/3/94 | 21 | 0 | 1 | 1 | 0.7669 | 8.08E-02 |
| 53 | 10/4/94 | 20 | 0 | 0 | 0 | 0.7669 | 8.28E-02 |
| 55 | 10/6/94 | 21 | 0 | 0 | 1 | 0.7669 | 8.08E-02 |
| 56 | 10/7/94 | 22 | 0 | 0 | 1 | 0.7669 | 7.89E-02 |
| 57 | 10/8/94 | 25 | 0 | 0 | 3 | 0.7669 | 7.41E-02 |
| 59 | 10/10/94 | 26 | 0 | 0 | 1 | 0.7669 | 7.26E-02 |
| 60 | 10/11/94 | 28 | 0 | 0 | 2 | 0.7669 | 7.00E-02 |
| 61 | 10/12/94 | 29 | 0 | 0 | 1 | 0.7669 | 6.88E-02 |
| 64 | 10/15/94 | 31 | 0 | 0 | 2 | 0.7669 | 6.65E-02 |
| 68 | 10/19/94 | 31 | 0 | 1 | 0 | 0.7669 | 6.65E-02 |
| 69 | 10/20/94 | 30 | 0 | 0 | 0 | 0.7669 | 6.76E-02 |
| 71 | 10/22/94 | 30 | 0 | 1 | 0 | 0.7669 | 6.76E-02 |
| 72 | 10/23/94 | 29 | 0 | 0 | 0 | 0.7669 | 6.88E-02 |
| 79 | 10/30/94 | 29 | 1 | 0 | 0 | 0.7405 | 7.00E-02 |
| 80 | 10/31/94 | 28 | 0 | 0 | 0 | 0.7405 | 7.13E-02 |
| 81 | 11/1/94 | 28 | 0 | 1 | 0 | 0.7405 | 7.13E-02 |
| 82 | 11/2/94 | 27 | 0 | 0 | 0 | 0.7405 | 7.26E-02 |
| 87 | 11/7/94 | 27 | 1 | 0 | 0 | 0.7131 | 7.35E-02 |
| 88 | 11/8/94 | 26 | 0 | 0 | 0 | 0.7131 | 7.49E-02 |
| 96 | 11/16/94 | 26 | 0 | 1 | 0 | 0.7131 | 7.49E-02 |
| 97 | 11/17/94 | 25 | 0 | 0 | 0 | 0.7131 | 7.64E-02 |
| 102 | 11/22/94 | 25 | 1 | 0 | 0 | 0.6845 | 7.69E-02 |
| 103 | 11/23/94 | 24 | 0 | 0 | 0 | 0.6845 | 7.85E-02 |
| 111 | 12/1/94 | 24 | 1 | 0 | 0 | 0.6560 | 7.85E-02 |

Table F36. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 112 | 12/2/94 | 23 | 0 | 0 | 0 | 0.6560 | 8.02E-02 |
| 118 | 12/8/94 | 23 | 0 | 1 | 0 | 0.6560 | 8.02E-02 |
| 119 | 12/9/94 | 22 | 0 | 0 | 0 | 0.6560 | 8.20E-02 |
| 125 | 12/15/94 | 22 | 1 | 0 | 0 | 0.6262 | 8.16E-02 |
| 126 | 12/16/94 | 21 | 0 | 0 | 0 | 0.6262 | 8.35E-02 |
| 130 | 12/20/94 | 21 | 0 | 1 | 0 | 0.6262 | 8.35E-02 |
| 131 | 12/21/94 | 20 | 0 | 0 | 0 | 0.6262 | 8.56E-02 |
| 149 | 1/8/95 | 20 | 1 | 0 | 0 | 0.5949 | 8.47E-02 |
| 150 | 1/9/95 | 19 | 0 | 0 | 0 | 0.5949 | 8.69E-02 |
| 166 | 1/25/95 | 19 | 1 | 0 | 0 | 0.5636 | 8.54E-02 |
| 167 | 1/26/95 | 18 | 0 | 0 | 0 | 0.5636 | 8.78E-02 |
| 173 | 2/1/95 | 18 | 2 | 1 | 0 | 0.5010 | 8.34E-02 |
| 174 | 2/2/95 | 15 | 0 | 0 | 0 | 0.5010 | 9.14E-02 |
| 189 | 2/17/95 | 15 | 1 | 0 | 0 | 0.4676 | 8.81E-02 |
| 190 | 2/18/95 | 14 | 0 | 0 | 0 | 0.4676 | 9.12E-02 |
| 194 | 2/22/95 | 14 | 0 | 1 | 0 | 0.4676 | 9.12E-02 |
| 195 | 2/23/95 | 13 | 0 | 0 | 0 | 0.4676 | 9.46E-02 |
| 200 | 2/28/95 | 13 | 1 | 0 | 0 | 0.4316 | 9.02E-02 |
| 201 | 3/1/95 | 12 | 0 | 0 | 0 | 0.4316 | 9.39E-02 |
| 215 | 3/15/95 | 12 | 1 | 0 | 0 | 0.3956 | 8.88E-02 |
| 216 | 3/16/95 | 11 | 0 | 0 | 0 | 0.3956 | 9.27E-02 |
| 255 | 4/24/95 | 11 | 1 | 0 | 0 | 0.3597 | 8.68E-02 |
| 256 | 4/25/95 | 10 | 0 | 0 | 0 | 0.3597 | 9.10E-02 |
| 281 | 5/20/95 | 10 | 1 | 0 | 0 | 0.3237 | 8.42E-02 |
| 282 | 5/21/95 | 9 | 0 | 0 | 0 | 0.3237 | 8.87E-02 |
| 324 | 7/2/95 | 9 | 0 | 1 | 0 | 0.3237 | 8.87E-02 |
| 325 | 7/3/95 | 8 | 0 | 0 | 0 | 0.3237 | 9.41E-02 |
| 357 | 8/4/95 | 8 | 0 | 8 | 0 | 0.3237 | 9.41E-02 |

Table F37. Kaplan-Meier survival estimates for adult (AHY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 6 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 7 | 0 | 1 | 1 | 1.0000 | 0.00E+00 |
| 11 | 8/23/94 | 7 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 21 | 9/2/94 | 8 | 1 | 0 | 0 | 0.8750 | 1.09E-01 |
| 22 | 9/3/94 | 7 | 0 | 0 | 0 | 0.8750 | 1.17E-01 |
| 25 | 9/6/94 | 8 | 0 | 0 | 1 | 0.8750 | 1.09E-01 |
| 26 | 9/7/94 | 9 | 0 | 0 | 1 | 0.8750 | 1.03E-01 |
| 28 | 9/9/94 | 10 | 0 | 0 | 1 | 0.8750 | 9.78E-02 |
| 29 | 9/10/94 | 10 | 0 | 1 | 0 | 0.8750 | 9.78E-02 |
| 30 | 9/11/94 | 9 | 0 | 0 | 0 | 0.8750 | 1.03E-01 |
| 35 | 9/16/94 | 10 | 0 | 0 | 1 | 0.8750 | 9.78E-02 |
| 37 | 9/18/94 | 10 | 0 | 1 | 0 | 0.8750 | 9.78E-02 |
| 38 | 9/19/94 | 9 | 0 | 0 | 0 | 0.8750 | 1.03E-01 |
| 42 | 9/23/94 | 11 | 0 | 0 | 2 | 0.8750 | 9.33E-02 |
| 43 | 9/24/94 | 11 | 1 | 0 | 0 | 0.7955 | 1.08E-01 |
| 44 | 9/25/94 | 11 | 0 | 0 | 1 | 0.7955 | 1.08E-01 |
| 46 | 9/27/94 | 13 | 0 | 0 | 2 | 0.7955 | 9.98E-02 |
| 47 | 9/28/94 | 13 | 0 | 1 | 0 | 0.7955 | 9.98E-02 |
| 48 | 9/29/94 | 12 | 0 | 0 | 0 | 0.7955 | 1.04E-01 |
| 49 | 9/30/94 | 13 | 0 | 0 | 1 | 0.7955 | 9.98E-02 |
| 50 | 10/1/94 | 13 | 1 | 0 | 0 | 0.7343 | 1.05E-01 |
| 51 | 10/2/94 | 12 | 0 | 0 | 0 | 0.7343 | 1.09E-01 |
| 55 | 10/6/94 | 13 | 0 | 0 | 1 | 0.7343 | 1.05E-01 |
| 56 | 10/7/94 | 14 | 0 | 0 | 1 | 0.7343 | 1.01E-01 |
| 59 | 10/10/94 | 15 | 0 | 0 | 1 | 0.7343 | 9.77E-02 |
| 60 | 10/11/94 | 16 | 0 | 0 | 1 | 0.7343 | 9.46E-02 |
| 61 | 10/12/94 | 17 | 0 | 0 | 1 | 0.7343 | 9.18E-02 |
| 68 | 10/19/94 | 17 | 0 | 1 | 0 | 0.7343 | 9.18E-02 |
| 69 | 10/20/94 | 16 | 0 | 0 | 0 | 0.7343 | 9.46E-02 |
| 87 | 11/7/94 | 16 | 1 | 0 | 0 | 0.6884 | 9.61E-02 |
| 88 | 11/8/94 | 15 | 0 | 0 | 0 | 0.6884 | 9.92E-02 |
| 111 | 12/1/94 | 15 | 1 | 0 | 0 | 0.6425 | 9.92E-02 |
| 112 | 12/2/94 | 14 | 0 | 0 | 0 | 0.6425 | 1.03E-01 |
| 118 | 12/8/94 | 14 | 0 | 1 | 0 | 0.6425 | 1.03E-01 |
| 119 | 12/9/94 | 13 | 0 | 0 | 0 | 0.6425 | 1.07E-01 |
| 125 | 12/15/94 | 13 | 1 | 0 | 0 | 0.5931 | 1.05E-01 |
| 126 | 12/16/94 | 12 | 0 | 0 | 0 | 0.5931 | 1.09E-01 |
| 130 | 12/20/94 | 12 | 0 | 1 | 0 | 0.5931 | 1.09E-01 |
| 131 | 12/21/94 | 11 | 0 | 0 | 0 | 0.5931 | 1.14E-01 |
| 173 | 2/1/95 | 11 | 2 | 1 | 0 | 0.4852 | 1.05E-01 |
| 174 | 2/2/95 | 8 | 0 | 0 | 0 | 0.4852 | 1.23E-01 |
| 200 | 2/28/95 | 8 | 1 | 0 | 0 | 0.4246 | 1.14E-01 |
| 201 | 3/1/95 | 7 | 0 | 0 | 0 | 0.4246 | 1.22E-01 |
| 255 | 4/24/95 | 7 | 1 | 0 | 0 | 0.3639 | 1.10E-01 |
| 256 | 4/25/95 | 6 | 0 | 0 | 0 | 0.3639 | 1.18E-01 |
| 281 | 5/20/95 | 6 | 1 | 0 | 0 | 0.3033 | 1.03E-01 |
| 282 | 5/21/95 | 5 | 0 | 0 | 0 | 0.3033 | 1.13E-01 |
| 324 | 7/2/95 | 5 | 0 | 1 | 0 | 0.3033 | 1.13E-01 |
| 325 | 7/3/95 | 4 | 0 | 0 | 0 | 0.3033 | 1.27E-01 |

Table F37. (cont'd)

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 357 | 8/4/95 | 4 | 0 | 4 | 0 | 0.3033 | 1.27E-01 |

Table F38. Kaplan-Meier survival estimates for juvenile (HY) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/14/94 | 1 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 12 | 8/25/94 | 2 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 35 | 9/17/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 41 | 9/23/94 | 5 | 1 | 0 | 2 | 0.8000 | 1.60E-01 |
| 42 | 9/24/94 | 5 | 0 | 0 | 1 | 0.8000 | 1.60E-01 |
| 44 | 9/26/94 | 6 | 0 | 0 | 1 | 0.8000 | 1.46E-01 |
| 51 | 10/3/94 | 7 | 0 | 1 | 1 | 0.8000 | 1.35E-01 |
| 52 | 10/4/94 | 6 | 0 | 0 | 0 | 0.8000 | 1.46E-01 |
| 56 | 10/8/94 | 8 | 0 | 0 | 2 | 0.8000 | 1.26E-01 |
| 59 | 10/11/94 | 9 | 0 | 0 | 1 | 0.8000 | 1.19E-01 |
| 63 | 10/15/94 | 11 | 0 | 0 | 2 | 0.8000 | 1.08E-01 |
| 70 | 10/22/94 | 11 | 0 | 1 | 0 | 0.8000 | 1.08E-01 |
| 71 | 10/23/94 | 10 | 0 | 0 | 0 | 0.8000 | 1.13E-01 |
| 78 | 10/30/94 | 10 | 1 | 0 | 0 | 0.7200 | 1.20E-01 |
| 79 | 10/31/94 | 9 | 0 | 0 | 0 | 0.7200 | 1.27E-01 |
| 80 | 11/1/94 | 9 | 0 | 1 | 0 | 0.7200 | 1.27E-01 |
| 81 | 11/2/94 | 8 | 0 | 0 | 0 | 0.7200 | 1.35E-01 |
| 95 | 11/16/94 | 8 | 0 | 1 | 0 | 0.7200 | 1.35E-01 |
| 96 | 11/17/94 | 7 | 0 | 0 | 0 | 0.7200 | 1.44E-01 |
| 101 | 11/22/94 | 7 | 1 | 0 | 0 | 0.6171 | 1.44E-01 |
| 102 | 11/23/94 | 6 | 0 | 0 | 0 | 0.6171 | 1.56E-01 |
| 148 | 1/8/95 | 6 | 1 | 0 | 0 | 0.5143 | 1.46E-01 |
| 149 | 1/9/95 | 5 | 0 | 0 | 0 | 0.5143 | 1.60E-01 |
| 165 | 1/25/95 | 5 | 1 | 0 | 0 | 0.4114 | 1.41E-01 |
| 166 | 1/26/95 | 4 | 0 | 0 | 0 | 0.4114 | 1.58E-01 |
| 193 | 2/22/95 | 4 | 0 | 1 | 0 | 0.4114 | 1.58E-01 |
| 194 | 2/23/95 | 3 | 0 | 0 | 0 | 0.4114 | 1.82E-01 |
| 356 | 8/4/95 | 3 | 0 | 3 | 0 | 0.4114 | 1.82E-01 |

Table F39. Kaplan-Meier survival estimates for male (M) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 2 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/94 | 3 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 4 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 21 | 9/2/94 | 4 | 1 | 0 | 0 | 0.7500 | 1.88E-01 |
| 22 | 9/3/94 | 3 | 0 | 0 | 0 | 0.7500 | 2.17E-01 |
| 26 | 9/7/94 | 4 | 0 | 0 | 1 | 0.7500 | 1.88E-01 |
| 28 | 9/9/94 | 5 | 0 | 0 | 1 | 0.7500 | 1.68E-01 |
| 29 | 9/10/94 | 5 | 0 | 1 | 0 | 0.7500 | 1.68E-01 |
| 30 | 9/11/94 | 4 | 0 | 0 | 0 | 0.7500 | 1.88E-01 |
| 35 | 9/16/94 | 5 | 0 | 0 | 1 | 0.7500 | 1.68E-01 |
| 37 | 9/18/94 | 5 | 0 | 1 | 0 | 0.7500 | 1.68E-01 |
| 38 | 9/19/94 | 4 | 0 | 0 | 0 | 0.7500 | 1.88E-01 |
| 42 | 9/23/94 | 6 | 0 | 0 | 2 | 0.7500 | 1.53E-01 |
| 44 | 9/25/94 | 7 | 0 | 0 | 1 | 0.7500 | 1.42E-01 |
| 46 | 9/27/94 | 9 | 0 | 0 | 2 | 0.7500 | 1.25E-01 |
| 47 | 9/28/94 | 9 | 0 | 1 | 0 | 0.7500 | 1.25E-01 |
| 48 | 9/29/94 | 8 | 0 | 0 | 0 | 0.7500 | 1.33E-01 |
| 49 | 9/30/94 | 9 | 0 | 0 | 1 | 0.7500 | 1.25E-01 |
| 50 | 10/1/94 | 10 | 0 | 0 | 1 | 0.7500 | 1.19E-01 |
| 56 | 10/7/94 | 11 | 0 | 0 | 1 | 0.7500 | 1.13E-01 |
| 60 | 10/11/94 | 12 | 0 | 0 | 1 | 0.7500 | 1.08E-01 |
| 79 | 10/30/94 | 12 | 1 | 0 | 0 | 0.6875 | 1.11E-01 |
| 80 | 10/31/94 | 11 | 0 | 0 | 0 | 0.6875 | 1.16E-01 |
| 81 | 11/1/94 | 11 | 0 | 1 | 0 | 0.6875 | 1.16E-01 |
| 82 | 11/2/94 | 10 | 0 | 0 | 0 | 0.6875 | 1.22E-01 |
| 87 | 11/7/94 | 10 | 1 | 0 | 0 | 0.6188 | 1.21E-01 |
| 88 | 11/8/94 | 9 | 0 | 0 | 0 | 0.6188 | 1.27E-01 |
| 102 | 11/22/94 | 9 | 1 | 0 | 0 | 0.5500 | 1.23E-01 |
| 103 | 11/23/94 | 8 | 0 | 0 | 0 | 0.5500 | 1.30E-01 |
| 111 | 12/1/94 | 8 | 1 | 0 | 0 | 0.4813 | 1.23E-01 |
| 112 | 12/2/94 | 7 | 0 | 0 | 0 | 0.4813 | 1.31E-01 |
| 130 | 12/20/94 | 7 | 0 | 1 | 0 | 0.4813 | 1.31E-01 |
| 131 | 12/21/94 | 6 | 0 | 0 | 0 | 0.4813 | 1.42E-01 |
| 173 | 2/1/95 | 6 | 2 | 0 | 0 | 0.3208 | 1.08E-01 |
| 174 | 2/2/95 | 4 | 0 | 0 | 0 | 0.3208 | 1.32E-01 |
| 215 | 3/15/95 | 4 | 1 | 0 | 0 | 0.2406 | 1.05E-01 |
| 216 | 3/16/95 | 3 | 0 | 0 | 0 | 0.2406 | 1.21E-01 |
| 255 | 4/24/95 | 3 | 1 | 0 | 0 | 0.1604 | 8.49E-02 |
| 256 | 4/25/95 | 2 | 0 | 0 | 0 | 0.1604 | 1.04E-01 |
| 357 | 8/4/95 | 2 | 0 | 2 | 0 | 0.1604 | 1.04E-01 |

Table F40. Kaplan-Meier survival estimates for female (F) ruffed grouse radio-tagged on Pigeon River Country State Forest (PRCSF) closed site, 1994.

| Day | Date | No. at risk | No. deaths | No. censored | No. added | Survival ($\hat{S}$ [t]) | S.E. |
|---|---|---|---|---|---|---|---|
| 1 | 8/13/94 | 4 | 0 | 0 | 0 | 1.0000 | 0.00E+00 |
| 2 | 8/14/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 3 | 8/15/94 | 5 | 0 | 1 | 0 | 1.0000 | 0.00E+00 |
| 11 | 8/23/94 | 5 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 13 | 8/25/94 | 7 | 0 | 0 | 2 | 1.0000 | 0.00E+00 |
| 25 | 9/6/94 | 8 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 36 | 9/17/94 | 9 | 0 | 0 | 1 | 1.0000 | 0.00E+00 |
| 42 | 9/23/94 | 10 | 1 | 0 | 1 | 0.9000 | 9.00E-02 |
| 43 | 9/24/94 | 10 | 1 | 0 | 1 | 0.8100 | 1.12E-01 |
| 44 | 9/25/94 | 9 | 0 | 0 | 0 | 0.8100 | 1.18E-01 |
| 45 | 9/26/94 | 10 | 0 | 0 | 1 | 0.8100 | 1.12E-01 |
| 52 | 10/3/94 | 11 | 0 | 1 | 1 | 0.8100 | 1.06E-01 |
| 53 | 10/4/94 | 10 | 0 | 0 | 0 | 0.8100 | 1.12E-01 |
| 55 | 10/6/94 | 11 | 0 | 0 | 1 | 0.8100 | 1.06E-01 |
| 57 | 10/8/94 | 14 | 0 | 0 | 3 | 0.8100 | 9.44E-02 |
| 60 | 10/11/94 | 15 | 0 | 0 | 1 | 0.8100 | 9.12E-02 |
| 61 | 10/12/94 | 16 | 0 | 0 | 1 | 0.8100 | 8.83E-02 |
| 64 | 10/15/94 | 17 | 0 | 0 | 1 | 0.8100 | 8.56E-02 |
| 68 | 10/19/94 | 17 | 0 | 1 | 0 | 0.8100 | 8.56E-02 |
| 69 | 10/20/94 | 16 | 0 | 0 | 0 | 0.8100 | 8.83E-02 |
| 71 | 10/22/94 | 16 | 0 | 1 | 0 | 0.8100 | 8.83E-02 |
| 72 | 10/23/94 | 15 | 0 | 0 | 0 | 0.8100 | 9.12E-02 |
| 118 | 12/8/94 | 15 | 0 | 1 | 0 | 0.8100 | 9.12E-02 |
| 119 | 12/9/94 | 14 | 0 | 0 | 0 | 0.8100 | 9.44E-02 |
| 149 | 1/8/95 | 14 | 1 | 0 | 0 | 0.7521 | 1.00E-01 |
| 150 | 1/9/95 | 13 | 0 | 0 | 0 | 0.7521 | 1.04E-01 |
| 166 | 1/25/95 | 13 | 1 | 0 | 0 | 0.6943 | 1.06E-01 |
| 167 | 1/26/95 | 12 | 0 | 0 | 0 | 0.6943 | 1.11E-01 |
| 173 | 2/1/95 | 12 | 0 | 1 | 0 | 0.6943 | 1.11E-01 |
| 174 | 2/2/95 | 11 | 0 | 0 | 0 | 0.6943 | 1.16E-01 |
| 189 | 2/17/95 | 11 | 1 | 0 | 0 | 0.6312 | 1.16E-01 |
| 190 | 2/18/95 | 10 | 0 | 0 | 0 | 0.6312 | 1.21E-01 |
| 194 | 2/22/95 | 10 | 0 | 1 | 0 | 0.6312 | 1.21E-01 |
| 195 | 2/23/95 | 9 | 0 | 0 | 0 | 0.6312 | 1.28E-01 |
| 200 | 2/28/95 | 9 | 1 | 0 | 0 | 0.5610 | 1.24E-01 |
| 201 | 3/1/95 | 8 | 0 | 0 | 0 | 0.5610 | 1.31E-01 |
| 281 | 5/20/95 | 8 | 1 | 0 | 0 | 0.4909 | 1.24E-01 |
| 282 | 5/21/95 | 7 | 0 | 0 | 0 | 0.4909 | 1.32E-01 |
| 324 | 7/2/95 | 7 | 0 | 1 | 0 | 0.4909 | 1.32E-01 |
| 325 | 7/3/95 | 6 | 0 | 0 | 0 | 0.4909 | 1.43E-01 |
| 357 | 8/4/95 | 6 | 0 | 6 | 0 | 0.4909 | 1.43E-01 |

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