# Wild Turkey, *Meleagris gallopavo silvestris*, Behavior in Central Ontario During Winter

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Nguyen, Linh P., Josef Hamr, and Glenn H. Parker. 2004. Wild Turkey, *Meleagris gallopavo silvestris*, Behavior in Central Ontario During Winter. Canadian Field-Naturalist 118(2): 251-255.

Home range size, food habits, and roost site selection are described for the Eastern Wild Turkey (*Meleagris gallopavo silvestris*) introduced on the Precambrian Shield in central Ontario during the winters 1999 and 2000. Monthly home range size was correlated primarily to snow depth, although it was also likely associated to other factors, including food availability and/or roost site availability. Ferns and allies were used more than available, whereas monocots were used less than expected. Roost site-selection was primarily influenced by tree height. If the Eastern Wild Turkey is to expand its northern range in Ontario, winter food and roost site availability may be the primary determinants for successful introductions.

Key Words: Eastern Wild Turkey, *Meleagris gallopavo silvestris*, home range size, roost site, food availability, Ontario.

The Eastern Wild Turkey (*Meleagris gallopavo silvestris*) is a large, highly adaptable gallinaceous bird that is common throughout southern Ontario as a result of introductions in the last 20 years (Bellamy 2001). For northern turkey populations, winter is the most stressful season for satisfying energy demands (Oberlag et al. 1990). Variations in home range size and resource selection appear to be governed by snow depth (Porter et al. 1980; Vander Haegen et al. 1989) and, to a lesser extent, ambient temperature (Oberlag et al. 1990). Numerous accounts of turkey winter biology (e.g., Glover and Bailey 1949; Wunz and Hayden 1975; Porter et al. 1980; Kilpatrick et al. 1988; Vander Haegen et al. 1989), refer primarily to studies conducted in the United States. The winter biology of turkeys in these southern habitats may be different from that of birds living in Ontario due to inherent differences in climate and habitat. Hence, we report on home range size, food habits, and roost site use by Eastern Wild Turkeys introduced to the Precambrian Shield in central Ontario during the winters 1999 and 2000. It was hypothesized that turkey movement and forage availability were inversely related to snow depth. It was also hypothesized that the tallest trees provided optimum wild turkey roost sites due to their sturdiness.

## Study Area

This study was conducted from November to March 1999/2000 and 2000/2001 near Noëlville, approximately 60 km southeast of Sudbury, Ontario (46º10'N, 80º25'W). The 169-km$^2$ study area was located within the Great Lakes–St. Lawrence Ecotonal Forest Region (Rowe 1972), characterized by flat to rolling topography, interrupted by rock outcrops and narrow valleys. The habitat consisted of 20% softwood forests, 37% hardwood forests, 28% abandoned pasture and hayfields, and 15% residential areas and rock outcrops. Beef farming was the dominant land use, with many fields cultivated for corn silage or pasture grasses. The forested areas were dominated by White Birch (*Betula papyrifera*) and Trembling Aspen (*Populus tremuloides*), interspersed with Balsam Fir (*Abies balsamea*), Eastern White and Red Pine (*Pinus strobus, P. resinosa*), Red Oak (*Quercus rubra*), White Spruce (*Picea glauca*), Red and Sugar Maple (*Acer rubrum, A. saccharum*), and Eastern Hemlock (*Tsuga canadensis*). Shrubs included raspberries (*Rubus* spp.), Bracken Fern (*Pteridium aquilinum*), blueberries (*Vaccinium* spp.), Beaked Hazel (*Corylus cornuta*), and asters (*Aster* spp.).

January, the coldest month of the year, had a mean temperature of –13.9°C and –10.5°C in 2000 and 2001, respectively. Total snowfall was 216.0 cm in 1999-2000 (10.0% below the 30-year norm) and 328.3 cm in 2000-2001 (22.2% above the 30-year norm). Snow depths exceeded 25 cm for 38 days in 1999-2000 and 111 days in 2000-2001.

## Methods

### *Capture and Radio-Tracking*

Wild Turkeys were captured with rocket nets (Hawkins et al. 1968) in southern Ontario and upper New York for introduction to the study area in February and March 1999 (10 males and 26 females) and March 2000 (13 females). Female turkeys were fitted with backpack-style, 32.5 g (1% of mean body mass), mortality-mode VHF radio-transmitters (Holohil Systems Ltd., Carp, Ontario). We tracked radio-fitted birds two to four days per week, or until battery failure, from 1999 to 2001. Locations of birds were determined by

triangulation using ≥3 locations (Heezen and Tester 1967) taken less than 15 minutes apart with a 2-element H antenna and portable receiver-scanner (Model STR-1000, Lotek Engineering Inc., Newmarket, Ontario). Average telemetry error was 156.9 m ± 21.1 SE (n = 40).

*Home Range*

Monthly home range sizes were calculated using the 100% minimum convex polygon method (White and Garrott 1990). All spatial analyses were conducted using an ArcView GIS software (Environmental Systems Research Institute, Redlands, California), with the Animal Movement Analysis (Hooge and Eichenlaub 1997) and Spatial Analyst Extensions.

*Forage Selection*

Active turkey feeding areas were identified by tracks, and forage plants were identified and collected. Crop contents from dead specimens provided a supplemental source of information. Forage species eaten were recorded regardless of the number of bites using a modified point-quarter method (Jost et al. 1999) during 2000-2001. Point samples of available plants adjacent to turkey tracks in the herb (less than 0.5 m) and shrub (0.5 to 2.0 m) layers were selected randomly and identified. Plants were grouped into five classes: (1) mosses, (2) ferns and allies, (3) conifers and allies, (4) monocots, and (5) dicots.

*Roost Site*

Roost sites were found by (1) observing commonly used trees, (2) finding turkey droppings under trees (Hoffman 1968), (3) examining areas where Wild Turkeys were common after snowfalls, or (4) locating radio-fitted birds on trees before sunset. Locations of roost sites were determined using a Global Positioning System (GARMIN International Inc., Olathe, Kansas). Equal numbers of random trees that may have provided potential roost sites within our study area were generated in ArcView GIS. Random trees were located using a Global Positioning System, and trees that had diameter at breast height (dbh) less than 10.2 cm were discarded (Kilpatrick et al. 1988).

Elevation, tree dbh, percent canopy cover, canopy density, distance to habitat edge, distance to open water, and tree height for actual and selected trees were measured. Elevation was measured with an altimeter, tree dbh with a diameter tape, percent canopy cover by averaging readings at each compass directions (N, S, W, E) using a convex spherical densiometer, canopy density by counting tree trunks of dbh ≥10.2 cm within 5 m of actual roost sites, and tree height from estimates on a subjectively selected "average" tree. Distances to habitat edge and open water were also determined by plotting roost sites on Ontario Base Maps (OBM) and Forest Resource Inventory (FRI) maps. The used habitat variables either had been previously described in the literature (Tzilkowski 1971; Kilpatrick et al. 1988; Chamberlain et al. 2000), or were hypothesized correlates based on the winter biology of the species.

*Statistical Analyses*

Data were pooled to maintain sufficient sample size, unless otherwise noted (Alldredge and Ratti 1986; Thomas and Taylor 1990). Home range sizes were compared between years using the Mann-Whitney *U*-test. Monthly home ranges were compared using the Kruskal Wallis test (Zar 1999). Two measurements used to examine the effects of winter on monthly home range size were (1) number of days with snow depths over 25 cm (Porter et al. 1980), and (2) number of days with minimum temperature less than –16.2°C (Oberlag et al. 1990). Spearman rank-order correlation analyses were used to compare mean monthly home range size with these two variables. The number of days with snow depth over 25 cm and the number of days with minimum temperature less than –16.2°C were also compared between years using the Mann-Whitney *U*-test.

Chi-square analysis was used to compare the frequencies of plants browsed by turkeys to availability (Neu et al. 1974). When forage selection differed, a Bonferroni *Z*-test was used to identify plants that were browsed more or less than availability (Byers et al. 1984). A series of one-way analyses of variance (ANOVA) was used to compare each habitat variable associated with roosting and random sites. Pearson correlation analyses were performed for the significant habitat variables. In order to minimize artifacts from environmental variations in habitat characteristics, an analysis of covariance (ANCOVA) was used to determine significant habitat variables. All analyses were conducted using Statistical Package for the Social Sciences (SPSS Inc., Chicago, Illinois) with significance level set at a = 0.10.

## Results

*Home Range*

We obtained 441 locations from 12 radio-fitted turkeys from November 1999 to March 2000 and from November 2000 to January 2001. Mean winter home range size differed between years ($U$ = 142.0, $P$ = 0.002), as did monthly home range size (November: $U$ = 9.0, $P$ = 0.083; December: $U$ = 8.0, $P$ = 0.060; January: $U$ = 3.0, $P$ = 0.020). In addition, home range size differed among months in the two years ($c^2$ = 7.79, df = 4, $P$ = 0.100; Table 1). Monthly home range size was correlated with the number of days with snow depth more than 25 cm ($r_s$ = –0.71, n = 59, $P$ = 0.050) and the number of days with minimum temperature less than –16.2°C ($r_s$ = 0.75, n = 59, $P$ = 0.031).

The number of days with snow depth over 25 cm differed ($U$ = 4.0, $P$ = 0.095) between 1999-2000 (9.60 ± 5.91 days, n = 5) and 2000-2001 (22.6 ± 4.88 days, n = 5), while the number of days with minimum temperature less than –16.2°C did not differ ($U$ = 10.5, $P$ = 0.690) between 1999-2000 (10.00 ±

TABLE 1. Winter home range size (ha) of Eastern Wild Turkey hens in Noëlville, near Sudbury, Ontario, 1999-2001 (SE = standard error of the mean).

| | 1999-2000 | | | 2000-2001 | | | 1999-2001 (Pooled Data) | | |
|---|---|---|---|---|---|---|---|---|---|
| | n | Mean | SE | n | Mean | SE | n | Mean | SE |
| Winter | 9 | 249 | 60 | 4 | 58 | 19 | 13 | 204 | 47 |
| Monthly | | | | | | | | | |
| November | 9 | 399 | 198 | 5 | 90 | 54 | 14 | 288 | 132 |
| December | 9 | 145 | 60 | 5 | 41 | 8 | 14 | 108 | 40 |
| January | 9 | 302 | 130 | 4 | 38 | 10 | 13 | 221 | 95 |
| February | 9 | 75 | 27 | – | _ | – | 9 | 75 | 27 |
| March | 9 | 323 | 170 | – | – | – | 9 | 323 | 170 |

4.15 days, n = 5) and 2000-2001 (11.40 ± 3.63 days, n = 5). In 1999-2000, snow was generally packed or crusted with seeps and small streams remaining unfrozen. In 2000-2001, deep, powdery snow was common, and most seeps were frozen by mid-winter.

*Forage Selection*

Wild Turkeys foraged primarily on clovers (*Trifolium* spp.), asters (*Aster* spp.), goldenrods (*Solidago* spp.), and fertile fronds of the Sensitive Fern (*Onoclea sensibilis*) in the winter 1999-2000. Turkeys avoided species such as Cattail (*Typha latifolia*) and Meadow Sweet (*Spiraea latifolia*). Crops (n = 2) contained grass seeds and Sensitive Fern spore heads in late winter, confirming observations of turkeys feeding in the field. Ostrich Fern (*Matteuccia struthiopteris*), Trembling Aspen (*P. tremuloides*) buds, Corn (*Zea mays*), Smooth Wild Rose (*Rosa blanda*), and ragged moss (*Brachythecium* spp.) were other winter foods. Burdocks (*Arctium* spp.), Sensitive Fern, and Soybeans (*Glycine max*) comprised 21.4%, 23.0%, and 37.4% of the turkeys' diet, respectively, in 2000-2001.

Forages used by turkeys differed from availability ($c^2 = 40.38$, df = 4, $P < 0.0001$; Table 2). Mosses were used in proportion to availability while ferns and allies, including Bracken (*Pteridium aquilinum*) and Sensitive Ferns, were selected more than available. Conifer and allies, including Balsam Fir, Eastern White Pine, and White Spruce, were used in proportion to availability. Monocots, including Quackgrass (*Elymus repens*) and Timothy (*Phleum pratense*), were used less than available, while dicots, including ash (*Fraxinus* spp.), aster, Beaked Hazel, burdock, Choke Cherry (*Prunus virginiana*), Dogwood (*Cornus stolonifera*), Evening Primrose (*Oenothera biennis*), Fireweed (*Epilobium angustifolium*), goldenrod, Northern Wild Raisin (*Viburnum cassinoides*), raspberry (*Rubus* spp.), Soybean, Speckled Alder (*Alnus incana*), Swamp Thistle (*Cirsium muticum*), and willow (*Salix* spp.) were used in proportion to availability.

*Roost Site Characteristics*

Trembling Aspen, American Basswood (*Tilia americana*), Jack Pine (*Pinus banksiana*), Eastern White Pine, White Spruce, and Eastern White Cedar (*Thuja occidentalis*) were used as roost sites. Tree heights at roosting sites averaged 13.9 ± 0.8 m, and were higher than the tree heights (8.8 ± 0.7 m) measured at random sites ($F_{1, 22} = 20.98$, $P = 0.0001$; Table 3). Mean dbh of trees associated with roost sites, 37.7 ± 3.0 cm, was significantly larger ($F_{1, 22} = 15.69$, $P = 0.0007$) than tree dbhs on random sites (24.1 ± 1.7 cm). Roost site topographical elevations averaged 217.1 ± 7.1 m and were significantly higher ($F_{1, 22} = 4.49$, $P = 0.0455$) than the 188.8 ± 11.3 m measured at random sites. Canopy cover (73.3 ± 8.8%), tree density (849.3 ± 127.7

TABLE 2. Chi-square analysis and Bonferroni Confidence Intervals for winter ground forage used by Eastern Wild Turkeys during winter in Noëlville, near Sudbury, Ontario ($\chi^2 = 40.38$, df = 4, $P < 0.0001$).

| Forage Class | Forage Selected | Forage Available | Proportion Selected | Proportion Available | 90% Confidence Interval on Proportion |
|---|---|---|---|---|---|
| Mosses | 0.1 | 1.0 | 0.001 | 0.004 | 0.000-0.006[b] |
| Ferns and allies | 43.0 | 32.0 | 0.230 | 0.124 | 0.158-0.302[c] |
| Conifers and allies | 5.0 | 4.0 | 0.027 | 0.016 | 0.000-0.055[b] |
| Monocots | 0.1 | 13.0 | 0.001 | 0.050 | 0.000-0.006[a] |
| Dicots | 139.0 | 208.0 | 0.743 | 0.806 | 0.669-0.817[b] |
| Total | 187.2 | 258.0 | | | |

[a]Proportions greater than the upper confidence limit indicates use less than available.
[b]Proportions within the confidence limit indicates use equal to availability.
[c]Proportions less than the lower confidence limit indicates selection greater than available.

TABLE 3. Comparison of physiographic characteristics of Eastern Wild Turkey roost (n = 12) and random (n = 12) sites in Noëlville, near Sudbury, Ontario.

| | Roost sites | | Random sites | | | |
|---|---|---|---|---|---|---|
| Habitat characteristic | Mean | SE | Mean | SE | *F* | *P* |
| Height (m) | 13.9 | 0.8 | 8.8 | 0.7 | 20.98 | 0.0001 |
| Tree dbh (cm) | 37.7 | 3.0 | 24.1 | 1.7 | 15.69 | 0.0007 |
| Canopy coverage (%) | 73.3 | 8.8 | 70.4 | 9.7 | 0.05 | 0.8303 |
| Density (trees/ha) | 849.3 | 127.7 | 764.3 | 110.9 | 0.25 | 0.6206 |
| Elevation (m) | 217.1 | 7.1 | 188.8 | 11.3 | 4.49 | 0.0455 |
| Distance to habitat edge (m) | 97.5 | 21.1 | 64.8 | 17.7 | 1.42 | 0.2468 |
| Distance to open water (m) | 73.5 | 18.6 | 122.1 | 34.7 | 1.52 | 0.2303 |

trees/ha), distance to clearing (97.5 ± 21.1 m), and distance to open water (73.5 ± 18.6 m) of roost trees did not differ (all $P > 0.10$) from those at random sites.

Height of roost site was correlated with tree dbh ($r = 0.78$, n = 24, $P = 0.003$). There was no correlation between elevation and tree dbh ($r = –0.36$, n = 24, $P = 0.245$) nor elevation and tree height ($r = 0.04$, n = 24, $P = 0.900$). Tree height was primarily responsible for the differences between roosting and random sites, regardless of the covariate tree dbh ($F_{1, 21} = 3.45$, $P = 0.077$). Tree dbh did not differ between roosting and random sites once the covariate height was statistically controlled ($F_{1, 21} = 15.87$, $P = 0.513$).

## Discussion

Winter mean home range sizes for turkeys released in northern Ontario (204 ± 47 ha) were similar to those of turkeys introduced to Indiana (Miller et al. 1985), and Iowa (Little and Varland 1981), but exceeded those reported in Ohio (Clark 1985) and in southern Ontario (Weaver 1989). Although previous studies reported a decline in monthly home range size between November to March (Porter 1977; Miller et al. 1985), this pattern was not observed in 1999-2000. This suggested that movement in late winter (1999-2000) was not limited by snow depth. On several occasions when snow covered local food resources, birds increased flight distance to otherwise unused parts of the home range. Snow depth was inversely related to winter and monthly home range size, confirming data from previous studies in Minnesota (Porter 1977), Indiana (Miller et al. 1985), Pennsylvania (Wunz and Hayden 1975), and southern Ontario (Weaver 1989).

Glover and Bailey (1949) described the Wild Turkey as a nomadic feeder with a tendency to sample a wide variety of forages, primarily dictated by their availability. The heavy use of ferns and allies was almost exclusively due to the selection of fertile fronds of the Sensitive Fern found in lowland hardwood sites and along seeps. Decker et al. (1991) reported that Sensitive Ferns were foraged in large quantities by Wild Turkeys because of their high nutritional content (crude protein 18.6%) and/or the high availability of this food in concentrated, relatively snow-free patches. Vander Haegen et al. (1989) reported that fields spread with manure were also important sources of winter food in Massachusetts, but the value of manure to wintering turkeys in central Ontario was questionable, as emaciated birds were observed to ignore manure piles. Glover and Bailey (1949) reported wariness by turkeys of supplemental feeding sites with corn and oats in West Virginia when natural forage (e.g., wild grape, *Vitis* spp.) was absent.

Standing crops, such as Soybean or clover, provided nutritious food in moderate snow conditions during early winter. Soybeans contain protein, but also produce trypsin inhibitors, which lower digestibility and fat absorption (McNaughton and Reece 1980, *in* Loesch and Kaminski 1989). Post-mortems in winter 2000-2001 (n = 5) verified that emaciated turkeys were under severe nutritional stress, and had catabolized significant amounts of muscle tissue.

Forages that were present in the study area, but may have been underestimated in use, included conifer and hardwood trees. Although primarily ground feeders, Eastern Wild Turkeys are capable of flight, but forage obtained in the tree-canopy layer is difficult to systematically record. Turkeys were observed feeding on Trembling Aspen buds on several occasions; however, the results indicate that prolonged periods of deep snow severely limited food availability for Wild Turkeys in northern Ontario.

Roosting sites of turkeys were the tallest and largest trees, usually conifers, which were found at higher elevations. Conifers may reduce wind speed and heat loss (Kilpatrick et al. 1988). Tzilkowski (1971) found that turkey winter roosts were dominated by large deciduous trees in Pennsylvania, suggesting that tree height and sturdiness were important factors. However, Chamberlain et al. (2000) suggested that turkeys roost in the nearest suitable habitat at the end of the day. Although roost sites were closer to open water than random sites, this proximity appeared to be due to forage availability. Turkeys used snow to meet winter water requirements in this study. Exum et al. (1985) argued against Wild Turkey dependence on open water in southern Ala-

bama during spring and summer; however, Kilpatrick et al. (1988) suggested that winter foods in Rhode Island were too low in water content to meet the species' needs. Roosting sites may have been closer to water because of the accelerated growth of trees associated with moist environments (Kilpatrick et al. 1988).

The results of this study suggest that (1) winter food and roost site availability are the primary factors determining successful turkey introductions in northern Ontario, (2) stands of Soybean or Corn are not sufficient to support Wild Turkey populations unless natural foods are available, and (3) snow depth is an important parameter influencing successful reintroduction of this species on the Precambrian Shield.

## Acknowledgments

Financial and logistic support was provided by the West Arm/French River Wild Turkey Chapter, Ontario Federation of Anglers and Hunters, Cambrian College of Applied Arts and Technology, Laurentian University, Ontario Ministry of Natural Resources, Sudbury District, and the Ontario Living Legacy Fund. We thank J. Craig and other landowners in Noëlville for allowing fieldwork on their property, M. N. Hall for the Ontario Base Maps and Forest Resource Inventory data, and G. M. Courtin for meteorological data.

## Literature Cited

**Alldredge, J. R.,** and **J. T. Ratti.** 1986. Comparison of some statistical techniques for analysis of resource selection. Journal of Wildlife Management 50: 157-165.

**Bellamy, K.** 2001. Annual Ontario Wild Turkey status reports (1992-2001). Ontario Ministry of Natural Resources, Wildlife Branch, Peterborough, Ontario.

**Byers, C. R., R. K. Steinhorst,** and **P. R. Krausman.** 1984. Clarification of a technique for analysis of utilization-availability data. Journal of Wildlife Management 48: 1050-1053.

**Chamberlain, M. J., B. D. Leopold,** and **L. W. Burger.** 2000. Characteristics of roost sites of adult Wild Turkey females. Journal of Wildlife Management 64: 1025-1032.

**Clark, L. G.** 1985. Adjustment by transplanted Wild Turkeys to an Ohio farmland area. Proceedings of the National Wild Turkey Symposium 5: 33-47.

**Decker, S. R., P. J. Pekins,** and **W. W. Mautz.** 1991. Nutritional evaluation of winter foods of Wild Turkeys. Canadian Journal of Zoology 69: 2128-2132.

**Exum, J. H., J. A. McGlincy, D. W. Speake, J. L. Buckner,** and **F. M. Stanley.** 1985. Evidence against dependence upon surface water by turkey hens and poults in southern Alabama. Proceedings of the National Wild Turkey Symposium 5: 83-89.

**Glover, F. A.,** and **R. W. Bailey.** 1949. Wild Turkey foods in West Virginia. Journal of Wildlife Management 13: 255-265.

**Hawkins, R. E., L. D. Martoglio,** and **G. G. Montgomery.** 1968. Cannon-netting deer. Journal of Wildlife Management 32: 191-195.

**Heezen, K. L.,** and **J. R. Tester.** 1967. Evaluation of radio-tracking by triangulation with special reference to deer movements. Journal of Wildlife Management 31: 124-141.

**Hoffman, D. M.** 1968. Roosting sites and habits of Merriam's Turkeys in Colorado. Journal of Wildlife Management 32: 859-866.

**Hooge, P. N.,** and **B. Eichenlaub.** 1997. Animal movement extension to ARCVIEW. Version 1.1. Alaska Biological Science Center, United States Geological Survey, Anchorage.

**Jost, M. A., J. Hamr, I. Filion,** and **F. F. Mallory.** 1999. Forage selection by Elk in habitats common to the French River-Burwash region of Ontario. Canadian Journal of Zoology 77: 1429-1438.

**Kilpatrick, H. J., T. P. Husband,** and **C. A. Pringle.** 1988. Winter roost site characteristics of Eastern Wild Turkeys. Journal of Wildlife Management 52: 461-463.

**Little, T. W.,** and **K. L. Varland.** 1981. Reproduction and dispersal of transplanted Wild Turkeys in Iowa. Journal of Wildlife Management 45: 419-427.

**Loesch, C. R.,** and **R. M. Kaminski.** 1989. Winter body-weight patterns of female Mallards fed agricultural seeds. Journal of Wildlife Management 53: 1081-1087.

**Miller, B. K., P. D. Major,** and **S. E. Backs.** 1985. Movements and productivity of transplanted Eastern Wild Turkeys in west-central Indiana farmland. Proceedings of the National Wild Turkey Symposium 5: 233-244.

**Neu, C. W., C. R. Byers,** and **J. M. Peek.** 1974. A technique for analysis of utilization-availability data. Journal of Wildlife Management 38: 541-545.

**Oberlag, D. F., P. J. Pekins,** and **W. W. Mautz.** 1990. Influence of seasonal temperatures on Wild Turkey metabolism. Journal of Wildlife Management 54: 663-667.

**Porter, W. F.** 1977. Home range dynamics of Wild Turkeys in southeastern Minnesota. Journal of Wildlife Management 41: 434-437.

**Porter, W. F., R. D. Tangen, G. C. Nelson,** and **G. C. Hamilton**. 1980. Effects of corn food plots on Wild Turkeys in the upper Mississippi Valley. Journal of Wildlife Management 44: 456-462.

**Rowe, J. S.** 1972. Forest regions of Canada. Publication 1300. Canadian Forestry Service, Department of the Environment, Ottawa.

**Thomas, D. L.,** and **E. J. Taylor.** 1990. Study designs and tests for comparing resource use and availability. Journal of Wildlife Management 54: 322-330.

**Tzilkowski, W. M.** 1971. Winter roost sites of Wild Turkeys in southwest Pennsylvania. Transactions of the Northeast Fish and Wildlife Conference 28: 167-178.

**Vander Haegen, W. M., M. W. Sayre,** and **W. E. Dodge.** 1989. Winter use of agricultural habitats by Wild Turkeys in Massachusetts. Journal of Wildlife Management 53: 30-33.

**Weaver, J. E.** 1989. On the ecology of Wild Turkeys reintroduced in southern Ontario. M. Sc. thesis, University of Western Ontario, London.

**White, G. C.,** and **R. A. Garrott.** 1990. Analysis of wildlife radio-tracking data. Academic Press Inc., New York.

**Wunz, G. A.,** and **A. H. Hayden.** 1975. Winter mortality and supplemental feeding of turkeys in Pennsylvania. Proceedings of the National Wild Turkey Symposium 3: 61-69.

**Zar, J. H.** 1999. Biostatistical analysis. Fourth edition. Prentice-Hall Inc., Upper Saddle River.

Received 24 March 2003
Accepted 15 November 2004