Efficacy of border collies to control nuisance Canada geese

Paul M. Castelli and Sheila E. Sleggs

Abstract We performed a retrospective analysis of the efficacy of a border collie program implemented in 1990 to control nuisance Canada geese (*Branta canadensis*) at the Dow Jones & Company (DJC) corporate complex in New Jersey. Personnel at DJC were interviewed to obtain the origin, details, costs, and perceived effects of the program. Aerial waterfowl survey and ground count data (1982 to 1997) were examined to document yearly changes in Canada goose numbers at DJC and for the surrounding area. At DJC, the border collie program successfully eliminated Canada geese and the problems associated with their presence, despite the fact that the number of geese in the surrounding area increased during the same time period. The estimated cost of implementing the program in 1990 was $9,400, with an approximate annual maintenance cost of $2,000. Logistic, social, and legal aspects of the program are discussed and recommendations for implementing a border collie goose control program are provided. The border collie program was effective in addressing overabundance of Canada geese at DJC; however, it did not contribute to a solution for the larger problem of overabundance of both resident and wintering goose populations in the region.

Key words border collies, *Branta canadensis,* Canada goose, dogs, lawn damage, nuisance wildlife control

Canada goose (*Branta canadensis*) populations in New Jersey and other northeastern states have increased dramatically over the last 40 years (Serie and Cruz 1997). Most of the increase is thought to be due to large growth in the resident Canada goose population (Conover and Chasko 1985, Kelley 1998). The traditional migrant Canada goose population has declined significantly during the last decade (Atlantic Flyway Council 1996). However, a northward shift in distribution has resulted in large and increasing numbers of migrant Canada geese present in New Jersey during fall and winter.

Nuisance and damage complaints have resulted from large concentrations of Canada geese in urban and suburban areas. Accumulations of goose droppings on parks, playgrounds, golf courses, corporate complexes, residential lawns, and beaches are the major source of nuisance complaints (Conover and Chasko 1985, Castelli 1988). Goose droppings also have been implicated in fecal contamination of bathing beaches and drinking water reservoirs (Conover and Chasko 1985), as well as eutrophication of water bodies (Manny et al. 1975). Major damage complaints in urban and suburban areas involved damage to lawn grasses (Conover 1991). Geese also have been identified as a threat to aviation safety at several airports (Cooper 1991, Allan et al. 1995).

Most techniques used in rural areas to control goose damage to agriculture are unsuitable for use in more developed areas (Conover and Chasko 1985, Cummings et al. 1991). Many urban and suburban communities have noise ordinances that preclude the use of sonic deterrents such as propane cannons, cracker shells, screamers, air horns, and sirens. Laws prohibiting the discharge of firearms

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also are common in developed areas. Fencing, flagging, scarecrows, and strobe lights are often aesthetically unacceptable. Large-scale modification of habitat or chemical repellents, though more acceptable, often involve a considerable expense (Conover and Chasko 1985, Conover and Kania 1991). Conover and Chasko (1985) indicate that nuisance goose problems are increasing without an apparent solution.

Dogs have been used effectively for a variety of wildlife management purposes, such as reducing mortality of sheep by predators (Andelt 1992) and preventing damage to white pine (*Pinus strobus*) plantations by white-tailed deer (*Odocoileus virginianus*, Beringer et al. 1994). Border collies (herding dogs) have been used to help capture and relocate an endangered subspecies of Canada goose in the Alaska Maritime National Wildlife Refuge (Shute 1990). Since the mid-1980s, some golf course managers in New Jersey have used dogs to chase geese from their property. These dogs received little or no specific training and were usually house pets of various breeds. Typically the owner escorted the dog through the golf course to chase any geese present at the beginning of the day and whenever golfers reported geese throughout the day. Golf course managers report dogs to be the most effective technique they have found and usually are satisfied with the results. Several companies now provide a service wherein a handler visits a property regularly and uses border collies to chase geese from the area. We are unaware of any published evaluation of the use of border collies to address nuisance Canada goose problems. In this paper, we conduct an *a posteriori* examination of the efficacy of one corporate landowner's use of resident border collies to eliminate Canada geese from its property in central New Jersey.

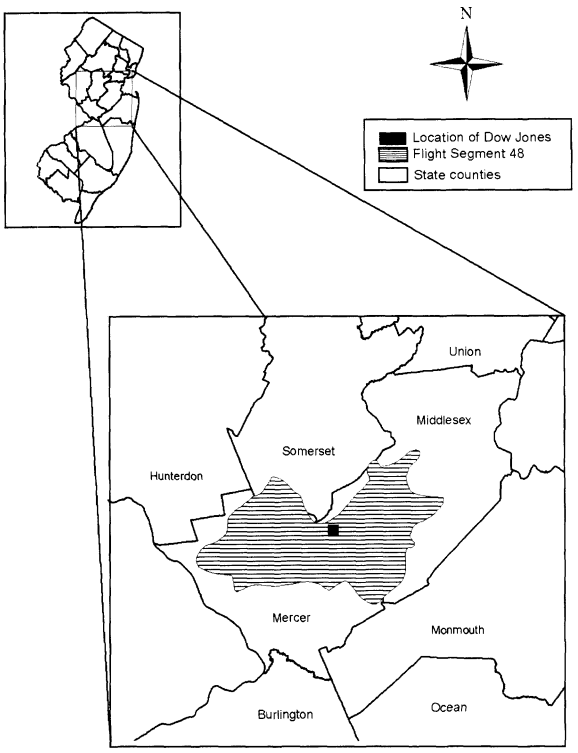

Figure 1. Dow Jones & Company location and the boundary of New Jersey Division of Fish and Wildlife waterfowl survey flight segment 48 in central New Jersey.

Study area

The study area is encompassed by flight segment 48 of the New Jersey Division of Fish, Game, and Wildlife aerial waterfowl survey (Castelli et al. 1998, Figure 1). The study area is in Middlesex and Mercer counties, New Jersey, within the inner coastal plain and piedmont physiographic regions. Soils in the area are generally fertile sandy loams and rainfall averages 111 cm per year (Robichard and Buell 1973). During the last 20 years the landscape has changed from being primarily agricultural and forested habitat to one dominated by corporate facilities, shopping centers, and suburban housing, with many lakes and ponds. Grains are the most common crops on the remaining farmland in the area. Canada geese roost in large numbers on many of the corporate ponds and feed on the surrounding lawns and grain fields.

The specific study site where border collies were used to control Canada goose numbers is the Dow Jones and Company (DJC) headquarters located on Route 1, approximately 6 km northeast of Princeton (Figure 1). The DJC complex is approximately 44 ha and includes buildings, parking lots, walkways, a helicopter landing pad, and an extensive lawn area surrounding a 1.7-ha pond (Figure 2).

Methods

We interviewed facilities managers at DJC to understand their perceptions of the problems and costs associated with presence of Canada geese before the border collie program was implemented. We also inquired as to the origin, details, costs, and benefits associated with implementing and maintaining the border collie program.

Figure 2. Dow Jones & Company lawn area, helicopter landing pad, and 1.7-ha pond. All photos by Paul Castelli.

To measure the effect of the program on Canada goose numbers at DJC relative to the surrounding area, we examined aerial survey and ground count data from before and after using border collies. We used flight segment 48 data from mid-November and midwinter (January) aerial waterfowl surveys to obtain Canada goose counts on the study area. We reviewed all flight segment 48 field notes to obtain aerial Canada goose counts at the DJC study site. All aerial surveys were conducted by the senior author from Cessna 172 or Cessna 185 aircraft flying at altitudes of 100 to 300 meters above ground level.

We also examined the numbers of Canada geese on the study site by using ground counts obtained during neckband observations (Hestbeck and Malecki 1989*a*, Hestbeck 1994). We used the mean counts from November and January to correspond to our mid-November and midwinter aerial survey data, respectively.

We graphed the raw data for flight segment 48 and the DJC aerial and ground count data. To adjust for high variances, we performed a natural log transformation on the total number of geese in the aerial data for flight segment 48. We converted observation dates to continuous numeric data measured in days with the first observation day set equal to zero (Steel and Torrie 1980). We used simple linear regression on the transformed data to examine the change in goose numbers over time.

Results

DJC interview results

On 25 November 1997, we interviewed 3 facilities managers at DJC. They reported goose droppings, potential safety hazards to daily helicopter traffic, and general annoyance as the major problems associated with the presence of Canada geese prior to implementation of the border collie program. Although DJC personnel were unable to quantify the actual costs associated with addressing goose problems, they reported that at least several hours a week were required to clean goose droppings from walkways, parking lots, recreation areas, and the helicopter landing pad. Cleanup activities resulted in only a short-term benefit (often less than 24 hours), did not resolve the helicopter safety issue, and did not address the source of the problem. During June and July 1988, application of a chemical repellent (water-soluble methyl anthranilate) was unsuccessful in reducing number of Canada geese using the treated area. During the late 1980s, a United States Department of Agriculture Animal Damage Control representative conducted a site visit and recommended flagging, streamers, shell crackers, and propane cannons as control techniques. These techniques were rejected by DJC officials. They felt that many were unsuitable for the location and, if used, would be largely ineffective. They also estimated that a full-time position would be required to implement the techniques as recommended.

The idea of using dogs as a scare tactic was first suggested by a DJC facilities manager. A local dog trainer was consulted and he recommended border collies as the most appropriate breed for the program. Border collies are very intelligent, medium-sized dogs with a strong instinct for herding. The border collie program was implemented at DJC in October 1990.

The DJC property is not fenced and for aesthetic reasons the owner did not want fencing. To enclose the dogs, Invisible Fencing©, an electronic containment system, was installed (use of brand names does not imply endorsement by the State of New Jersey). This system includes an underground wire that transmits a radio signal to a dog collar when the collar is in the vicinity of the wire. The radio signal activates a warning sound as the collar approaches the wire. If the collar comes close to the wire, an electric shock results. The underground wire is initially marked above ground with flagging to assist the dogs in learning boundary limits.

DJC installed Invisible Fencing that enclosed the 1.7-ha pond and 3.7 ha of the surrounding lawn. The surrounding lawn included the picnic area,

baseball fields, and area adjacent to the helicopter landing pad. No roadways, parking lots, or major walkways bisected this area.

A kennel was constructed to provide shelter for the dogs. The DJC kennel included a fenced cement runway; partial overhead and side cover; and heated, insulated doghouses. The kennel door was generally left open, allowing the dogs to chase geese 24 hours a day. The dogs were confined to the kennels only during special events and when lawn treatments occurred within their boundary area. DJC personnel checked on the dogs at least once daily to provide food, water, and care. DJC purchased border collies in pairs because they believe that encouraging competition and providing companionship increased the effectiveness of the herding dogs. The first pair of border collies DJC purchased were not from working stock. These dogs did not exhibit a strong herding instinct and were not effective. Subsequently, a pair was purchased from a breeder with proven working stock. Although these dogs received no training in obedience or shepherding, their strong instinct to chase and herd made them effective in harassing geese from the area. When geese were on the area or attempted to land there, the dogs herded them into the pond, where they eventually took flight either because the dogs swam after them or prevented them from coming out on the lawn to feed.

DJC personnel were able to provide only approximate estimates for the costs of implementing and maintaining their border collie program. The initial cost, including 2 dogs ($1,200 each), Invisible Fencing installation ($5,000), and kennel construction ($2,000), was approximately $9,400. The estimated cost per year to maintain the border collie program between 1990 and 1997 was approximately $2,000, primarily for food and veterinary care. We asked DJC personnel to estimate annual personnel costs associated with the border collie program. They indicated that daily dog care was integrated with other maintenance activities to the point where they were unable to make a cost estimate. They did feel that the amount of time spent on the border collie program was similar to what they had spent previously on nuisance goose issues.

DJC personnel perceived an immediate reduction in number of Canada geese using the property. They observed an initial decrease from thousands of birds to a flock of approximately 100, which they noted was about the same size as the resident,

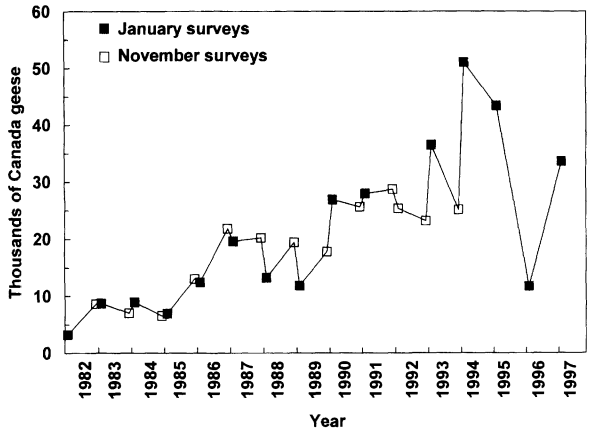

Figure 3. Total numbers of Canada geese observed on aerial waterfowl survey flight segment 48 between 1982 and 1997.

breeding flock of the previous summer. This flock visited most days but was restricted to the pond by the dogs. Over the next several years, decreasing numbers of goose pairs attempted to establish nests each spring, but were thwarted by the presence of the border collies. After 3 years, geese were seldom observed on the DJC property at any time of the year.

DJC personnel reported that they were very satisfied with the efficacy of the border collie program in reducing numbers of nuisance Canada geese and related problems. By harassing Canada geese from DJC property, helicopter safety hazards, goose droppings, and other annoyances were eliminated. DJC personnel stated that these benefits justified the costs of the border collie program.

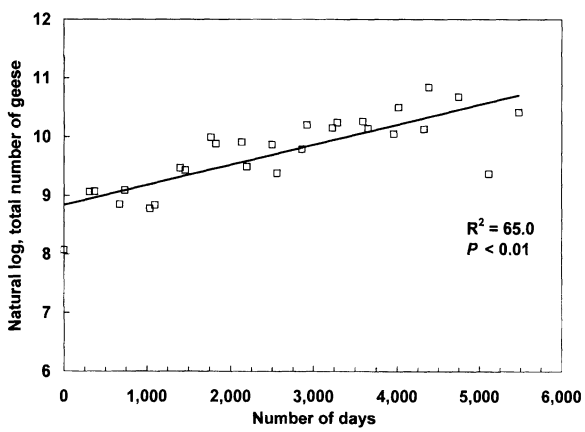

Figure 4. Relationship between the natural log of total number of Canada geese and number of days for aerial waterfowl survey observations in flight segment 48, 1982 to 1997. Regression line is $y = 8.84 + 0.0003x$.

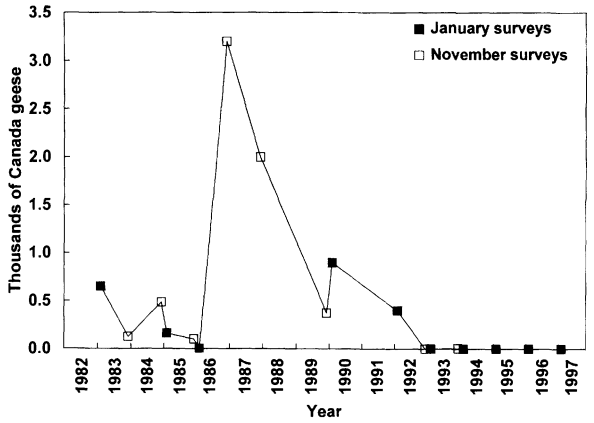

Figure 5. Total numbers of Canada geese observed on Dow Jones & Company aerial waterfowl surveys between 1982 and 1997.

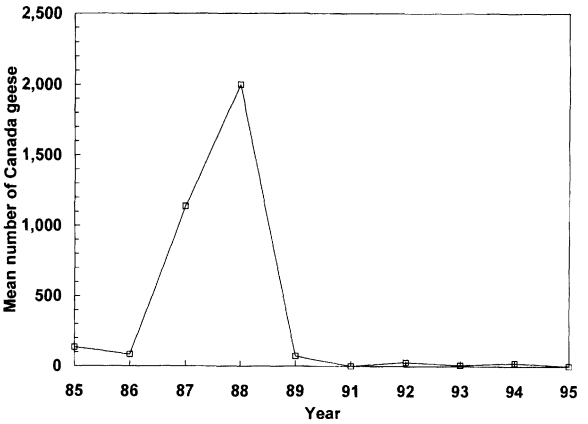

Figure 6. Total numbers of Canada geese observed on Dow Jones & Company ground count surveys between 1985 and 1995.

Data analysis

Twelve years (1982-93) of mid-November aerial Canada goose counts and 16 years (1982-97) of January aerial Canada goose counts were available for flight segment 48 (Figure 3). An increasing trend in Canada goose numbers observed in flight segment 48 indicated an increasing fall and winter population in the area surrounding DJC. Linear regression revealed a 12% increase in Canada geese per year (365 days) in flight segment 48 between 1982 and 1997 (R^2 = 65.0%, P = 0.001, Figure 4).

Examination of flight segment 48 field notes yielded 8 years of mid-November aerial Canada goose counts and 10 years of January aerial Canada goose counts at the DJC study site (Figure 5). Aerial Canada goose counts at DJC showed a marked decrease in Canada goose numbers after border collies were introduced in October 1990. In fact, no geese were seen on the site from November 1992 through January 1997.

Ten years (1985-89, 1991-95) of ground count data were available for DJC (Figure 6). Ground counts at DJC showed a decrease similar to that observed during aerial surveys. After October 1990, Canada geese were rarely observed during ground counts at DJC and then only in very low numbers. The aerial survey data and the ground count data both mirror the observations of the DJC managers that there was a great decrease in number and frequency of geese using their property.

Discussion

The border collie program successfully reduced Canada goose numbers at DJC. The problems associated with the presence of large numbers of geese at DJC were eliminated. This control was achieved during a time period when number of geese increased in the surrounding area. Despite the clarity of the results, it is important to keep in mind that this was an *a posteriori* analysis of a single site.

We believe the year-round, 24-hour-a-day harassment of the geese by the collies was the key factor in achieving almost 100% control. In southern New York, a border collie and handler visiting a park an average of 4.7 times/day during fall achieved a 68% reduction in number of geese using the site after 6 weeks (B. L. Swift, New York Department of Environmental Conservation, unpublished data). However, one week after the visits ended, number of geese using the site was similar to number observed prior to the harassment.

At DJC, most of the geese stopped using the area immediately following implementation of the border collie program. A small flock of geese, likely resident birds, continued to try to use the area for several years. Resident Canada geese with established nesting territories and young raised on a site exhibit a great level of philopatry (Lessells 1985). Resident geese are more likely to be persistent in their attempts to use a site and may take longer to ultimately abandon an area than would over-wintering migrant geese.

Costs related to implementing and maintaining the border collie program were significant. However, these costs were offset by the effectiveness of the program and in some cases were less than the costs of repairing damage (Castelli 1988) or traditional control techniques. For example, the traditional nuisance control methods recommended at DJC would have required a full-time position plus the cost of supplies. Control techniques such

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as screamer shells (Aguilera et al. 1991), chemical repellents (Cummings et al. 1991, Belant et al. 1996), taped alarm-distress calls (Mott and Timbrook 1988), and propane cannons (Heinrich and Craven 1990) are costly and in some locations unsuitable or ineffective. A border collie program, though costly, appears to be effective and suitable for many urban-suburban areas. However, in certain situations, such as residential areas, parks with continuous public use, areas bisected by roadways, and large water bodies, border collie use may not be appropriate.

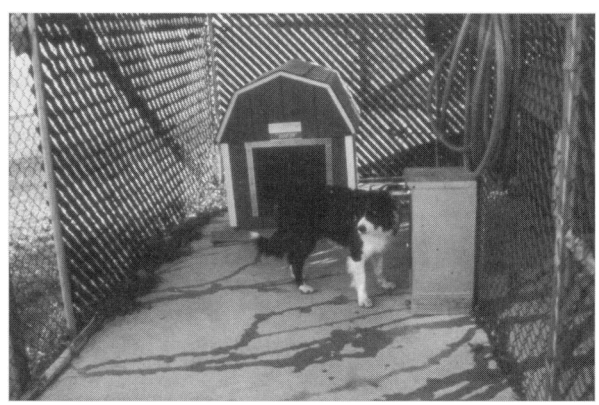
Border collie owners must follow New Jersey dog owner regulations that include licensing individual dogs and annual vaccinations. No special permits are required to use the border collie program as described. Harassment without the intent to catch or kill geese is not prohibited under the Migratory Bird Act of 1918. However, the owner may be held liable if the dogs actually harm or kill the geese (J. Meehan, United States Fish and Wildlife Service, Law Enforcement, personal communication).

Based on their experience, DJC personnel recommend limiting contact among dogs, employees, and the public. DJC reported incidents of harassment to dogs by employees and visitors. These incidents generally involved actions that were unintentional rather than malicious. Similarly, there were incidents of dogs jumping on and scratching people. DJC personnel now routinely kennel their border collies during softball games, picnics, and other outdoor recreational activities at their facility.

Using dogs to control goose numbers raised concerns from several groups, including employees at DJC, neighbors, and animal rights groups. These concerns ranged from the treatment of geese by the dogs to the care and treatment of the dogs. At DJC, most people accepted that there were legitimate problems caused by great concentrations of geese and recognized a need for the border collie program. The explanation that the dogs were herding geese, not catching and killing them, and that the dogs were properly cared for alleviated most concerns. Articles regarding the border collie program in company newsletters and local newspapers were useful in communicating factual information, thereby reducing public concerns.

The border collie program appears to be useful in addressing overabundance of Canada geese on a site-specific basis. However, harassing geese from one site may exacerbate problems at neighboring sites. B. L. Swift (New York Department of Environmental Conservation, unpublished data) found that border collie patrols in early spring reduced the number of nesting Canada geese from 11-12 in the preceding 2 years to one nest during the treatment year. However, number of nests in the surrounding area increased and several neck-banded geese that had nested formerly in the treatment area contributed to this increase.

Despite the ability of border collies to achieve goose control on specific sites, the larger problem of overabundance of resident and wintering Canada goose populations in the region remains. Resident Canada geese in New Jersey exhibit great rates of nest success (P. M. Castelli, New Jersey Division of Fish, Game, and Wildlife, unpublished data) and survival (83%, Castelli and Trost 1996).



The Dow Jones & Company kennel included a fenced cement runway, partial overhead and side cover, and heated, insulated doghouses. The kennel door was generally left open, allowing the dogs to chase geese 24 hours a day.

Estimates of the breeding Canada goose population in New Jersey have risen from 41,075 in 1989 to 85,970 in 1998 (Castelli et al. 1998). Similarly, the resident population of Canada geese in the Atlantic Flyway has increased from 395,985 in 1989 to 970,055 in 1998 (Kelley et al. 1998).

Numbers of Migrant Atlantic Population Canada geese have declined to the point that the regular goose hunting season was closed from 1995–98 in most Atlantic Flyway states to allow the population to increase. Although reduced in number, migrant Canada geese also contribute to damage and nuisance problems when they winter in urban and suburban areas. In New Jersey, number of wintering geese has increased from 38,500 in 1982 to 280,245 in 1999 (P. M. Castelli, New Jersey Division of Fish, Game, and Wildlife, unpublished data). The wintering Canada goose flock contains migrant (Hestbeck and Malecki 1989*b*) and resident geese (Johnson and Castelli 1998).

Management suggestions

Based on 7 years of experience, DJC personnel made the following suggestions for implementing a border collie program: 1) purchase a minimum of 2 adult dogs from proven working stock, preferably with prior experience with or exposure to live animals, particularly birds; 2) dogs with intensive shepherding training are not necessary, but basic obedience training is recommended; 3) for properties that are not fenced, use an electronic containment system to restrict dogs to the areas of concern; 4) provide appropriate kennel facilities and ensure that food and water are available daily; and 5) schedule one to 3 daily sessions, 15 to 30 minutes each, where dogs can be inspected, fed, socialized, and exercised even if geese are not present.

We recommend that border collie programs not be initiated during spring and early summer because this timing would coincide with the nesting, brood rearing, and molting periods, when the dogs would be likely to actually catch goslings, defending adults, or molting geese. This would violate the Migratory Bird Treaty Act of 1918 and likely lead to negative public reaction. The continuous presence of the dogs prior to the nesting season would prevent geese from establishing nests or choosing the area as a molting site. We suggest that anyone implementing a border collie program contact the United States Special Agent-in-Charge for a given state and discuss potential liabilities of the program.

Finally, we recommend that a proactive information effort be conducted prior to initiating a border collie program. This would serve to minimize management, employee, and public concerns that might arise from an incomplete understanding of the activities of the border collies and their effects on the geese.

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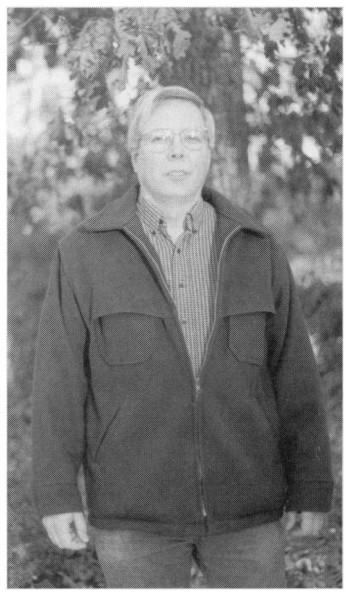

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