Can Hunting of Translocated Nuisance Canada Geese Reduce Local Conflicts?

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Abstract

*Resident Canada geese (*Branta canadensis*) nest or reside in the temperate latitudes of North America. In past years, translocation—the capture and subsequent release of geese at distant locations—has been used to establish resident goose populations and to reduce nuisance problems. However, with new special hunting seasons designed to target resident Canada geese, we can now evaluate translocation as a management tool when hunting is allowed at release sites. We selected 2 study sites, representative of urban and suburban locations with nuisance resident geese, in central and western New York, USA. In June 2003, we translocated 80 neck-banded adult geese, 14 radiomarked adult females, and 83 juveniles 150 km east and southwest from urban and suburban problem sites in western New York to state-owned Wildlife Management Areas. At these same capture sites, we used 151 neck-banded adult geese, 12 radiomarked females, and 100 juveniles as controls to compare dispersal movements and harvest vulnerability to translocated geese. All observations (*n = 45*) of translocated radiomarked geese were <20 km from release sites, in areas where hunting was permitted. Only 25 of 538 observations (4.6%) of radiomarked geese at control sites were in areas open to hunting. The remainder of observations occurred at nonhunting locations within 10 km of control sites. More translocated adult geese (23.8%) were harvested than control geese (6.6%; $\chi^2 = 12.98$, P = 0.0009). More translocated juvenile geese were harvested (22.9%) than juvenile controls (5.0%; $\chi^2 = 12.30$, P = 0.0005). Only 7 (8.8%) translocated adult geese returned to the original capture sites during Canada goose hunting seasons. Translocation of adult and juvenile geese in family groups may alleviate nuisance problems at conflict sites through increased harvest, reducing the number of birds returning in subsequent years.* (WILDLIFE SOCIETY BULLETIN 34(3):845–849; 2006)

Key words

Branta canadensis*, Canada geese, harvest, hunting, nuisance, translocation.*

During 1953–1965, 20,734 migrant Canada geese were captured at wintering locations in the Mississippi and Atlantic Flyways and transplanted to 9 national wildlife refuges in 4 southeastern states (Hankla 1968). The primary intent was to 1) restore wintering flocks in the south to their historic high levels, and 2) establish additional wintering flocks in new areas with suitable habitat. Transplants consisted of 1) fully-winged birds, 2) birds with primary feathers removed prior to release, and 3) immature birds held for 2 years at the release sites. This attempt to redistribute wintering geese was unsuccessful, but the practice of trapping and moving geese was initiated.

In the 1960s and 1970s, new emphasis was placed on transplanting geese to both restore and introduce the giant Canada goose (*Branta canadensis maxima*; Hanson 1965) and its western counterpart, *B. c. moffitti* (Palmer 1976). Transplanting consisted of moving flightless molting adults and goslings to new areas. This method proved highly successful in establishing locally breeding flocks throughout much of the United States and southern Canada (Lee et al. 1984). These flocks increased dramatically and in succeeding decades caused nuisance problems, especially in urban and suburban areas (Conover and Chasko 1985). Trapping and relocation of geese continued but primarily to help control local population growth (Hindman and Ferrigno 1990). Presently, there is little interest in transplanting geese.

Temperate-nesting geese in the Atlantic Flyway, referred to as "resident" geese, now total ~1 million birds, while "giant" geese in the Mississippi Flyway number ~1.5 million (U.S. Fish and Wildlife Service 2004). Harvest of these geese has increased sharply as populations have grown and hunting regulations were modified to target local flocks (Lawrence et al. 1998, Atlantic Flyway Council 1999). In the late 1980s, the U.S. Fish and Wildlife Service endorsed the implementation of special hunting seasons, outside the regular Canada goose hunting season framework, to help control temperate-nesting geese (Heussmann et al. 1998). These seasons involved hunting in September and late winter when subarctic nesting populations would not be affected. While effective in many rural areas, geese in many cities and suburbs receive little exposure to hunter harvest because hunting is prohibited (Smith et al. 1999).

We transplanted nuisance geese from urban and suburban sites where hunting was prohibited to rural areas where hunting was allowed. Our objective was to determine the conditions under which the hunting of transplanted geese would lessen their negative impact on the local community. We know that translocation of adult geese, by themselves, often is ineffective, because of their eventual return to the original capture site (Cooper 1978, 1987; Cooper and Keefe 1997). However, translocated goslings often remain at release sites (Surrendi 1970, Martz et al. 1983, Cooper 1987, Smith 1996). By releasing molting adults with flightless young into rural areas with similarly flightless adults and young, we hypothesized that formation of creches would delay the return of transplanted birds to the capture site and increase their exposure to the early September and autumn harvest seasons.

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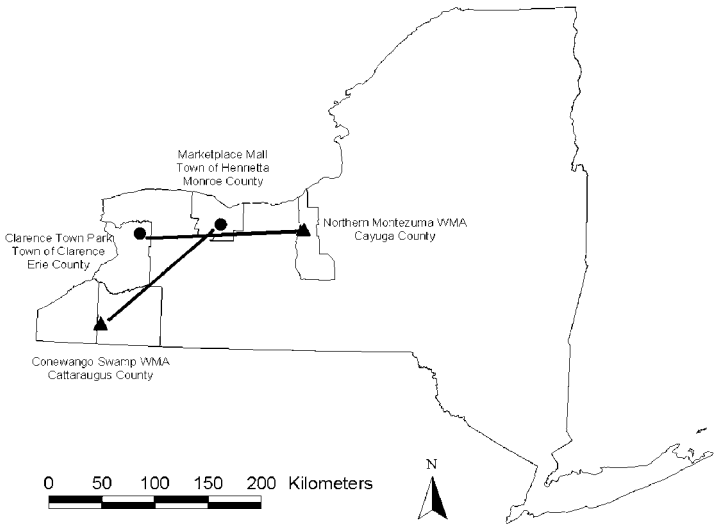

Figure 1. Capture sites (circles) and release sites (triangles) for Canada geese translocated in Jun 2003 from the towns of Henrietta and Clarence, in western New York, USA, to Wildlife Management Areas owned by the New York State Department of Environmental Conservation.

Study Area

We selected 2 towns with a history of nuisance goose problems as control sites in western New York state. The town of Henrietta, located 4 km south of Rochester in Monroe County, is a highly developed urban location with shopping malls, corporate complexes, and residential areas (Fig. 1). The town of Clarence, approximately 32 km northeast of downtown Buffalo in Erie County, is a suburban site with residential subdivisions, drainage ponds, and town parks surrounded by agricultural lands. In both towns, hunting was prohibited due to ordinances and safety concerns, and nonlethal hazing techniques were used to frighten nuisance geese at problem sites.

We released translocated geese at Wildlife Management Areas (WMA) owned by the New York State Department of Environmental Conservation (NYSDEC). We translocated geese captured in Henrietta 150 km southwest to Conewango Swamp WMA, located in the town of Conewango, Cattaraugus County (Fig. 1). This 364-ha wetland was approximately 1.5 km north of the village of Randolph and surrounded by agricultural lands. We translocated geese captured in Clarence 157 km east to Northern Montezuma WMA in the town of Savannah, Cayuga County (Fig. 1). This 2,550-ha parcel of upland and wetland habitat was part of the 14,569-ha Montezuma Wetlands Complex, which included Montezuma National Wildlife Refuge and lands owned by conservation groups and individuals. Hunting was allowed at both release areas.

Methods

In June 2003, we captured flightless adult and young Canada geese by herding them into portable funnel traps at several locations within control sites. We aged, sexed, and marked geese with standard aluminum United States Fish and Wildlife Service leg bands (Table 1). We also marked adult geese with plastic neckbands inscribed with unique alpha-numeric codes. We fitted a subsample of adult female geese, exhibiting brood patches, with either a neck-band radiotransmitter manufactured by Advanced Telemetry Systems (ATS) in Isanti, Minnesota (Model A3880, 57 g) or backpack-style transmitter (ATS, Model A1560, 48 g) attached with an elastic harness (mention of trade names or commercial products does not constitute endorsement or recommendation for use by the U.S. government). For comparison, we either released groups of adult and young geese on site to serve as the control or translocated them to WMAs (Table 1).

Table 1. Number of Canada geese leg-banded (neck-banded, radiomarked in parentheses) at control sites and released on site or translocated 150 km to state Wildlife Management Areas (WMA) in western New York, USA, Jun 2003.

	Age and sex classes[a]					
Location	AHY-M	AHY-F	AHY total	HY-M	HY-F	HY total
Control sites						
Henrietta	55 (55)	70 (63, 7)	125 (118, 7)	7	5	12
Clarence	19 (19)	19 (14, 5)	38 (33, 5)	51	37	88
Total	74 (74)	89 (77, 12)	163 (151, 12)	58	42	100
Translocation sites (WMA)						
Conewango Swamp	25 (25)	29 (22, 7)	54 (47, 7)	21	24	45
Northern Montezuma	21 (21)	19 (12, 7)	40 (33, 7)	20	18	38
Total	46 (46)	48 (34, 14)	94 (80, 14)	41	42	83

[a] AHY = After Hatch Year, HY = Hatch Year, M = Male, F = Female.

We tracked radiomarked and neck-banded geese at control and release sites weekly from the date of release through 1 September 2003, and bimonthly thereafter through December 2003 to determine dispersal. When visual sightings were possible, we recorded date, time, location, number of geese, and neck-band codes. When birds were not seen but located using triangulation of the radio signal, we recorded the date, time, location, and radio frequency. If geese were not located near the release location, we monitored the original capture sites weekly to determine if and when geese returned.

We calculated dispersal distances of radiomarked and neck-banded geese from locations plotted in ArcView GIS v. 3.3 (Environmental Systems Research Institute, Redlands, California). We calculated percentages of neck-banded geese observed returning to original capture sites and documented dates of return. We also compared proportions of radiomarked and neck-banded geese observed in areas open to hunting at control and release sites.

We obtained band recoveries of birds shot or found dead from September 2003 to March 2004 from the U.S. Geological Survey's Bird Banding Laboratory (Laurel, Maryland). We used only direct band recoveries, defined as recoveries during the first hunting season after banding, to evaluate the vulnerability of geese to harvest. We used chi-squared tests and program CONTRAST (Hines and Sauer 1989; Sauer and Williams 1989) to compare mortality rates between translocated and control groups for adult and juvenile age classes.

Results

Translocated Geese

Between 1 September and 5 December, we saw 41 (51.3%) of 80 translocated neck-banded geese <20 km from their release sites.

Table 2. Direct recovery rates (f) and corresponding standard errors of translocated and control Canada geese during Sep and regular Canada goose hunting seasons in New York, USA, 2003–2004.

Hunting season	Age[a]	Classification	n[b]	Recovered (%)	f	SE
September	AHY	Translocated	80	19 (23.8)	0.238	0.048
1 Sep–15 Sep		Control	151	10 (6.6)	0.066	0.020
	HY	Translocated	83	19 (22.9)	0.229	0.046
		Control	100	5 (5.0)	0.050	0.022
Regular	AHY	Translocated	80	4 (5.0)	0.050	0.024
26 Oct–17 Jan		Control	151	5 (3.3)	0.033	0.015
	HY	Translocated	83	1 (1.2)	0.012	0.012
		Control	100	1 (1.1)	0.010	0.010

[a] AHY = After Hatch Year, HY = Hatch Year.
[b] Number of adult geese neck-banded and juvenile geese leg-banded.

Flock sizes ranged from 10 to >2,000 birds, indicating some neck-banded geese separated from the translocated groups and others merged with local flocks and migrating geese. We observed geese in wetlands, agricultural fields, horse pastures, and rural lawns near ponds. No complaints of nuisance problems caused by translocated geese were reported near the release locations. Thirty-nine neck-banded geese were never observed after translocation.

We tracked 11 of 14 translocated radiomarked geese between 1 September and 5 December 2003. We excluded 3 geese from analyses; 1 died of an unknown cause, 1 experienced widespread interference with the radio frequency, and 1 transmitter failed. All observations ($n = 45$) of radiomarked geese were <20 km from release sites. One radiomarked female, with 5 neck-banded geese, flew 75 km west of the Northern Montezuma release area by 1 September 2003, but returned to the release site by 10 October 2003. We observed this female 2 km north of the release site in April 2004; it was the only radiomarked goose located near a release site >10 months after translocation.

Control Geese

Between 1 September and 30 December, we observed 122 of 151 (80.8%) neck-banded geese at control areas <10 km from the capture sites. The remaining 29 neck-banded geese were never observed. We observed only 21 neck-banded geese (13.9%) at least once on properties open to hunting. Almost all of the 1,600 observations (96.0%) of neck-banded geese were in areas where hunting was not allowed.

We did not track 3 of 12 geese radiomarked at control sites; 1 lost its transmitter, 1 was hit by a car, and 1 died of a wing injury. We consistently observed 8 of the remaining 9 birds near control sites between 1 September and 30 December. We did not observe one bird near the control site after 6 September, but it returned by 12 December. Some geese may have been exposed to hazing programs at conflict areas within control sites, but remained close to those sites despite disturbance. Only 25 of 538 (4.6%) observations of our radiomarked geese were in areas open to hunting. We made the remaining 95.4% of observations at nonhunting locations within 10 km of the control sites.

Mortality

Five of 11 (45.5%) translocated radiomarked geese were shot <20 km from release sites during the September hunting season. Another bird was harvested in December, during the regular season, 35.2 km from the release site. No radiomarked control geese ($n = 9$) were harvested during hunting seasons in New York, USA. However, one was harvested in Virginia, USA, during February 2004.

During the September hunting season, the direct recovery rate of translocated adult geese (23.8%) was higher than the direct recovery rate of adult geese at control sites (6.6%; $\chi^2 = 12.98$, $P \leq 0.001$). Translocated juvenile geese also were harvested at a higher rate (22.9%) than juvenile controls (5.0%; $\chi^2 = 12.30$, $P \leq 0.001$; Table 2). All harvest reports of translocated ($n = 38$) and control ($n = 15$) geese during September were <35 km from the translocated and control sites.

During the regular hunting season, 5.0% of translocated adults were harvested versus 3.3% of control adults. Only 1.2% of translocated juveniles and 1.0% of control juveniles were harvested during this period (Table 2). Six geese were recovered <50 km from the release and control sites, and 5 were recovered out-of-state. The small number of direct recoveries reported during the regular hunting season prohibited further comparisons.

Return to Original Capture Sites

Seven of 80 (8.8%) translocated adult geese returned to the original capture sites during the regular Canada goose hunting season. They were first observed in October ($n = 3$), November ($n = 3$), and December ($n = 1$), <5 months after release. Upon return, these geese were located in areas where hunting was not permitted. We observed no radiomarked geese at the original capture sites during open hunting seasons.

After hunting seasons, 13 additional neck-banded geese (16.3%) were detected at capture sites between March and April 2004. Six of these were seen in Virginia, USA, in January, before they returned to western New York, USA. Three returning adult females were observed on nests. Two of 11 translocated radiomarked geese also returned to the capture sites. One returned in April 2004 and was observed nesting approximately 0.25 km from the original capture site. The other was detected at the original capture site in June 2004.

Discussion

Translocation studies of resident Canada geese have focused mainly on establishment of flocks at new locations or measuring control of nuisance flocks based on failure of translocated birds to return to their original capture sites in subsequent years. Our study investigated translocation as a seasonal mechanism to reduce return rates by exposing local geese to hunter harvest. We detected over half (51.3%, $n = 80$) of our translocated radiomarked geese within 20 km of the release site during open hunting seasons. They also were in areas open to hunting every time we observed them. Direct recoveries of bands indicated that translocated geese were harvested <35 km from the release site during the September Canada goose season and <50 km during the regular goose season. In contrast, 80.8% ($n = 151$) of neck-banded adults from our control areas remained <10 km from the site of capture and in areas closed to hunting.

Smith et al. (1999) noted that relocating geese to public hunting areas can result in some harvest of geese near the release site. In this study, translocated adults were harvested at significantly

higher rates (23.8%) during the September Canada goose season than adults from control areas (6.6%). Six of 11 translocated radiomarked geese were also reported harvested during the autumn hunting season versus no radiomarked control birds ($n = 9$).

Our translocated juveniles were also harvested at a higher rate (22.9%) than control juveniles (5.0%) during the September season. Smith (1996) found that juveniles translocated from urban areas to WMAs within Michigan and Ohio from 1988 to 1993 had less than half the probability of survival than juveniles that remained in urban locations. Because juveniles are known to stay with adults through the first year (Hanson 1962), translocating juveniles and adults in family groups may increase the likelihood that adult birds will remain in areas open to hunting, rather than return immediately to original capture sites where hunting is not allowed. Also, because translocated geese dispersed up to 50 km from release sites, hunting pressure in and around release sites is an important consideration for this method to be successful.

Return rates of adult translocated geese to the original capture sites were similar to a previous study in New York in 1997 and 1998 in which 19% ($n = 41$) of adult geese translocated 100 km east or 300 km northwest returned to the capture site more than 8 months after release (B. L. Swift, New York State Department of Environmental Conservation, unpublished report). In our study, 25% ($n = 80$) of translocated geese returned to capture sites <10 months after release. Only 8.8% of these adult geese returned during the hunting season.

We could not account for approximately 50% of translocated adults at the end of this 1-year study. Possible explanations are nonreporting of bands and nonrecovery of geese by hunters. In addition, translocated geese may have dispersed long distances with resident or migrant geese, and auxiliary markers were not detected. If geese were not harvested, they could return to the original capture site over time or be exposed to hunting mortality in subsequent years near release sites. Future long-term translocation studies are needed to assess the impacts of translocation in reducing survival of Canada geese at nuisance sites, especially during years with special Canada goose hunting seasons and liberal bag limits.

Management Implications

Translocation of adult and juvenile geese in family groups may alleviate nuisance problems at conflict sites. Harvest of geese near the release sites limits the number of geese that return to the original capture site in subsequent years. Translocation may be most beneficial and cost effective when geese are translocated >150 km from the capture site to areas with high hunting pressure. Translocation may be more effective if conducted in consecutive years, and the long-term effectiveness of this technique requires further evaluation.

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