

Effect of Goose Removals on a Suburban Canada Goose Population

BRYAN L. SWIFT, *New York State Department of Environmental Conservation, Albany, NY, USA*

RICHARD B. CHIPMAN, *USDA, APHIS, Wildlife Services, Castleton, NY, USA*

KENNETH J. PREUSSER, *USDA, APHIS, Wildlife Services, Castleton, NY, USA*

ABSTRACT Local-nesting or “resident” Canada geese (*Branta canadensis*) are coming into conflict with people and human activities in urban-suburban areas throughout North America. Capture and removal of molting geese, followed by translocation or euthanasia, is a simple way to reduce the number of geese in an area, but some critics of lethal goose control methods claim that other geese will quickly fill the void left when geese are removed from a problem area. To better understand the effectiveness of urban-suburban goose removal programs, we captured 591 resident geese (mostly adult birds) in suburban Rockland County, New York, during the summer molt, 2004 and 2005. The birds were transported, marked with neck and leg bands and released in a rural area approximately 320 km to the northwest. Band returns indicated that at least 46% of translocated geese were eventually harvested by hunters, most of those (52%) during the first September hunting season after release, and most (72%) were taken within 50 km of the release site. Neckband observations indicated that <10% of translocated birds returned to Rockland County, and few (<1%) moved to suburban areas near the release site. Annual molting period goose surveys throughout Rockland County from 2004–2008 indicated that removal of geese from selected sites in Clarkstown resulted in nearly 60% fewer geese town wide for three subsequent years, and other geese did not quickly move in to replace birds that we removed. This study demonstrated that goose removal can be an effective way to reduce local goose populations in some areas for at least three years.

KEY WORDS *Branta canadensis*, Canada goose, New York, populations, removal, suburban, translocation

Local-nesting or “resident” Canada geese cause damage to property throughout temperate North America and in some situations pose a threat to human health and safety (U.S. Fish and Wildlife Service 2005). A variety of management alternatives are available to help reduce goose numbers at problem locations, but many techniques simply displace geese to nearby locations where they may also be unwanted and cause damage (Smith et al. 1999, Curtis and Shultz 2007). Capture and removal of geese, followed by translocation or euthanasia, is potentially the simplest, most cost-effective way to reduce the number of geese in an area without the risk of creating new conflicts in other locations. However, critics of lethal goose control methods sometimes claim that other geese will quickly fill the void left when geese are removed from a problem area. Trap and transfer of geese has

been widely used to help alleviate nuisance problems, but few studies have documented the effect on goose numbers at and around the removal site (Cooper 1991, Cooper and Keefe 1997). Most studies have focused on the fate of translocated birds and reported that relocating adult birds was less effective than moving goslings (Smith et al. 1999).

To better understand the effectiveness of typical urban-suburban goose removal programs, New York State Department of Environmental Conservation (DEC) and U.S. Department of Agriculture (USDA) Wildlife Services (WS) staff captured geese at several suburban problem areas in the town of Clarkstown, Rockland County, and moved them to a rural release site approximately 320 km away. Our objectives were to: 1) document the fate of translocated geese, especially to determine whether they returned to the capture area; and 2)

determine whether removal of geese reduced the numbers observed in Clarkstown in subsequent years.

STUDY AREA

Our study was largely conducted in two areas: the town of Clarkstown, Rockland County, where geese were captured, and the Howland's Island Unit of the Northern Montezuma Wildlife Management Area (WMA), in Cayuga County, where the birds were released (Fig. 1).

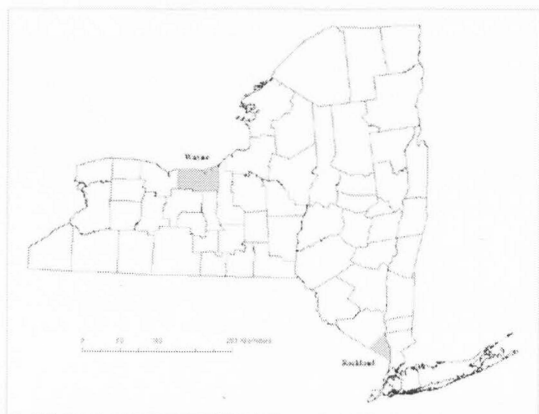


Figure 1. General location of Canada goose relocation study areas; geese were captured in Clarkstown, Rockland County, and released at the Montezuma Wetlands Complex near the southeast corner of Wayne County, New York.

Clarkstown is the central most of five townships in Rockland County, located approximately 20 km north of New York City, on the west side of the Hudson River. The town had a total land area of approximately 100 km² and, as of the 2000 census, a total human population of 82,082 (~820 people/km²). Clarkstown is predominantly a suburban residential and commercial area, with densely populated urban centers, large tracts of undeveloped forest and park land, and numerous lakes and ponds. No goose hunting occurs in Clarkstown because of a town wide ordinance prohibiting the discharge of firearms.

Northern Montezuma WMA is a 2,500 hectare portion of the nearly 14,500 hectare Montezuma Wetlands Complex, a large state, federal and private land management complex located about 50 km west of Syracuse, New York, in southeastern Wayne County and northwestern Cayuga County. The complex includes the federally-owned Montezuma National Wildlife Refuge, in addition to state and privately-owned conservation lands and active farmland, managed primarily for waterfowl and other migratory birds. The Howland's Island Unit is located in the north central area of the Montezuma complex, in the town of Conquest, Cayuga County. The town had a total land area of approximately 91 km² and, as of the 2000 census, a total human population of 1,925 (~21/km²). Emergent marshes and impoundments, forested wetlands, old fields, meadows, farm fields and woodlands provide a diversity of habitats throughout the area. Waterfowl hunting is a very popular and important activity throughout the Montezuma area.

METHODS

We captured molting (flightless) Canada geese at 10–12 selected locations in Clarkstown, during late June 2004 and 2005, by herding birds into temporary pens using fencing and portable panels (Costanzo et al. 1995). In 2004 we captured and removed 206 geese (198 adults, 8 goslings) and in 2005 we captured and removed 385 geese (367 adults, 18 goslings). Capture locations differed somewhat between years; the most notable difference was that Rockland Lake State Park was not included in 2004, whereas it was the primary capture location (318 geese) in 2005. Adult birds comprised 95% of captures. This was likely a direct result of a town wide egg treatment program in Clarkstown that had effectively limited nest success since 1993.

Upon capture, geese were immediately transported to an indoor holding facility where they were held overnight. The following morning, all geese were placed in open poultry crates, loaded on an open-bed trailer, and driven to the release site by early afternoon. Upon arrival at Howland's Island, banding crews processed all the birds as quickly as possible, recording age, sex, and recaptures, and placing new U.S. Fish and Wildlife Service (USFWS) leg bands and 3" yellow plastic neck collars with unique identification numbers on all adult birds that were not previously banded. Upon release, geese dispersed to various ponds, wetlands and mowed fields nearby.

Efforts to document locations and fate of all relocated geese began about a week after release each year. For several weeks, DEC staff made periodic visits to Howland's Island and other suitable habitats in the vicinity to record collar observations. During late summer and fall, goose flocks throughout the Montezuma Wetlands Complex and beyond were scanned in search of neck-banded birds, mostly as flocks were noted in the course of other field activities.

In Rockland County, we continued a county wide molting period count of Canada geese that began in 1993. This survey has been used to document numbers of adult geese and goslings, as well as neck collar observations, at all known and accessible molting locations (generally where ≥ 10 geese have been found) in the county (Swift 2000). More than 60 locations were checked annually, including many suburban parks, water supply reservoirs, residential areas and commercial properties. In addition, we made periodic visits to Rockland County, focusing on Clarkstown, at other times of the year in search of neck-banded birds. We also received reports of collared birds from local observers in Rockland County and from

other locations in New York and other states.

Finally, we obtained band recovery data (as of December 2008) for our relocated birds from the U.S. Geologic Survey Bird Banding Laboratory (BBL). Most of these data were reports of hunter-killed birds, but observations and recaptures by others were also included in the data set. Band recovery data included date, type of recovery, and location information to the nearest 10-minute latitude-longitude block.

RESULTS

Approximately 40% (N=203) of the geese that we relocated and neck-banded were reported shot during the first hunting season after release (Table 1). Most (n=174, or 86%) of those returns came from central New York, including 135 (67%) from within about 50 km of the release location. Other hunter returns came from Pennsylvania (15), New Jersey (7), Maryland (4), and western Long Island, New York (3). Most first year recoveries (n=121; 60%) occurred during the September hunting season in New York or an adjoining state.

An additional 6% of relocated geese were reported shot after the first hunting season following release (Table 1). Most (17 of 28) came from central New York, and the remainder from out-of-state. The total of 231 birds reported shot represents a known hunter harvest rate of 46% for relocated geese, with 83% coming from central New York.

Only 8% of geese that we relocated and neck-banded were seen back in Rockland County (Table 1). Most (74%) of those returned within one year of being moved, including 9 that were recaptured and taken back to Howland's Island in 2005. Only one of the 9 birds that we moved twice was seen back in Rockland County. Most other geese that returned were seen back in Clarkstown within two years of being moved. None of

Table 1. Numbers of geese relocated and neck-banded in this study, and fate of birds observed >60 days after release.¹

Year	No. moved	No. neck-banded	No. shot first year	No. shot other years	No. seen back in Rockland	No. last seen alive elsewhere	No. seen >60 days after release
2004	206	191	82 (43%)	12 (6%)	18 (9%)	8 (4%)	120 (59%)
2005	385	314	121 (39%)	16 (5%)	20 (6%)	11 (4%)	168 (54%)
Total	591	505	203 (40%)	28 (6%)	38 (8%)	19 (4%)	288 (57%)

¹ Numbers of geese moved included goslings and recaptures that we did not neckband as part of this study; all other columns include only birds neck-banded for this study.

the birds that returned to Rockland County were ever reported shot by hunters.

In addition to birds reported shot, 19 (4%) of relocated birds were last seen alive somewhere other than Rockland County during a subsequent breeding season (Table 1). Five were still near Howland's Island and 6 were last seen in suburbs of Syracuse (about 50 km east of Howland's Island); others were last seen alive in western New York (n=1), New York City (1), Connecticut (1), New Jersey (2), Delaware (1), and Maryland (2). Several of these birds were still alive in these other areas in 2008, at least three years after being relocated. Over the entire study, we determined the fate (shot, returned to Rockland, or alive elsewhere) for 57% of all relocated and neck-banded geese. The fate and location of other relocated birds remains unknown.

The total number of geese molting in Clarkstown was 70% lower in 2006 than in 2004. The change in total counts following removals (-145 in 2005 and -330 in 2006) was close to the actual numbers of geese removed (-206 and -374, respectively), especially if goslings are not included in the counts (48 and 28, respectively) (Fig. 2). Annual counts averaged 650 birds per year during 2002–2004, and were gradually increasing, before geese were removed (Table 2). Molting period counts averaged 250 birds (-62%) over the three years following removals (2006–2008).

Numbers of geese at Rockland Lake, the primary capture location in 2005, were 72% lower one year after we removed 91% (318 of 348) of geese from that site (Fig. 3). Mean annual counts in 2006–2008 (98 geese) were 69% lower than during 2002–2005 (318 geese) (Table 2). Numbers of geese counted at other locations where geese were removed tended to be lower in most cases, but results were likely confounded by the proximity (<3 km apart) of many molting sites in Clarkstown.

While numbers of geese molting in Clarkstown were 62% lower during the three years after removals, total goose counts in the rest of Rockland County declined by about 15%, from a mean of 1,906 birds in 2002–2004 to a mean of 1,623 in 2006–2008 (Table 2). More than half (60%) of the decline in other towns was due to fewer

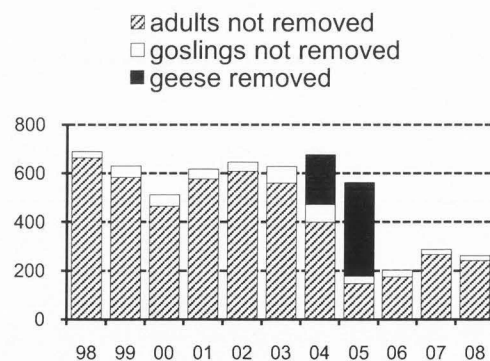


Figure 2. Numbers of goslings and adult geese not removed, and total geese removed, from the Town of Clarkstown, Rockland County, New York, 1998–2008.

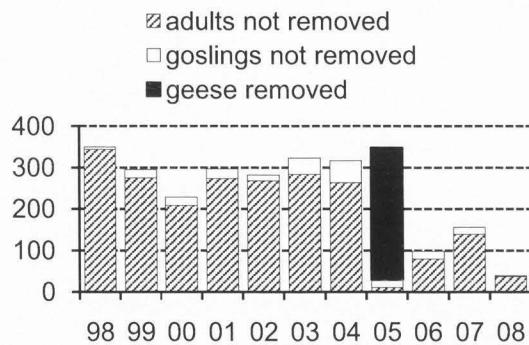


Figure 3. Numbers of goslings and adult geese not removed, and total geese removed, from Rockland Lake State Park, Rockland County, New York, 1998–2008.

goslings ($x = 354/\text{yr}$ before 2005, $x = 185/\text{yr}$ after), as egg treatment programs became more common during the latter period. Goslings accounted for only 10% of the decline in total geese in Clarkstown ($x = 62$ goslings/yr before 2005, $x = 23/\text{yr}$ after) because their egg treatment program had been ongoing since 1993. Estimated numbers of resident Canada geese in New York State and in the northeastern U.S. did not decline during the period of this study (New York: $x = 202,000/\text{yr}$ before 2005, $x = 256,000/\text{yr}$ after; NE US: $x = 1,047,000/\text{yr}$ before 2005, $x = 1,099,000/\text{yr}$ after) (Table 2).

DISCUSSION

We believe that the removal of 591 Canada geese during 2004–2005 was the principal reason for lower goose counts in Clarkstown in 2006–2008. The population reduction in Clarkstown was much larger than the decline observed in the rest of Rockland County, and population estimates at the state and flyway level remained stable or increased. Similar effects were noted following goose removals in Clarkstown in 1996–1997 (Swift 2000). Trap and transfer of adult geese from Minnesota to Oklahoma had similar effects, reducing the local breeding population by 70–90% after two years (Smith et al. 1999).

We found little evidence that new geese moved into Clarkstown to replace birds that we relocated. There was a near one-to-one ratio of birds removed to lower numbers of adult geese counted the following year in the same locations. We also had marked (with neck collars and colored tarsal bands) several hundred other geese throughout Rockland County before and during our study, and found few of those birds at sites in Clarkstown where they had not been seen previously (B. Swift, New York State Department of Environmental Conservation, unpublished data).

Effectiveness of goose removal was likely enhanced by egg treatment programs in Clarkstown and surrounding areas. Limiting local reproduction should slow the rate of population recovery, assuming immigration is low. Some geese banded as goslings in adjacent towns have been seen in Clarkstown, but most (>75%) of re-sightings within 18 months after banding were within 1 km of the banding site (Usai 2003). On the other hand, nest and egg treatment programs could reduce effectiveness of goose removal programs if unsuccessful nesting geese migrate out of an area, avoid capture, and return later in the year (Allan et al. 1995, Sheaffer et al. 2007).

The low return rate in our study (<10% observed back in Rockland County) suggested that translocation of adult Canada geese was nearly as effective as capture and euthanasia in reducing local populations of geese in subsequent years. Past studies have suggested that translocating adult geese was ineffective because geese have a strong homing instinct and strong site fidelity, and tend to return to their former nesting area (Smith et al. 1999, Preusser et al. 2008). In Ohio, neck-collar sightings of translocated adult geese the summer following release indicated that a high percentage of survivors returned to nuisance (capture) locations (Shieldcastle et al. 1998). Return rates of

Table 2. Total numbers of geese counted during the molting period in various areas of Rockland County, New York, 2000–2008, and corresponding breeding population estimates for resident Canada geese in New York State and the northeastern U.S.

Area	2000	2001	2002	2003	2004	2005	2006	2007	2008
Rockland Lake	229	297	282	323	317	348	98	156	40
Other	283	320	364	305	360	184	104	131	222
Clarkstown Total	512	617	646	628	677	532	202	287	262
Clarkstown Goslings - Clarkstown	47	41	38	68	80	48	28	20	20
Other	1,977	1,883	1,760	1,952	2,007	1,818	1,640	1,603	1,626
Rockland County Total	2,489	2,500	2,406	2,580	2,684	2,350	1,842	1,890	1,888
Rockland County Goslings - Rockland ¹	383	279	314	516	418	297	190	185	249
New York State ²	153,593	161,379	170,015	241,865	194,374	209,223	254,825	274,856	238,291
Northeastern U.S. ²	1,015,920	1,011,264	965,982	1,126,731	1,048,678	1,167,075	1,143,951	1,127,987	1,024,914

¹ Gosling counts included in total counts above.

² Source: U.S. Fish and Wildlife Service, unpublished data.

22–42% were reported for adult geese moved from Minnesota to Oklahoma (Cooper and Keefe 1997).

We believe that the distance and topography between our capture and release locations, and high hunter harvest rate, were factors in the low return rate we observed. The two study areas were more than 300 km apart and separated by a broad expanse of the Allegheny Plateau, including the Catskill Mountains with many peaks above 1,000 m elevation. More importantly, at least 40% of relocated geese were killed by hunters during the first hunting season after release. The September goose season was especially important, resulting in the immediate removal of at least 24% of relocated geese. The first year reported harvest rate was nearly four times greater than the estimated 11% harvest rate for adult resident Canada geese in the Atlantic Flyway during 2002–2004 (Sheaffer 2005). Recovery rates for resident geese banded in Clarkstown are

typically much lower (e.g., 2–4%; B. Swift, New York State Department of Environmental Conservation, unpublished data) because these birds spend most of the fall and winter in areas where hunting does not occur. We suspect that relocated suburban geese were naive to hunting and unfamiliar with local areas to seek refuge, and they were exposed to harvest before migratory populations from northern Canada normally enter the state.

We were pleased that few relocated geese moved into urban-suburban areas near the release site. Resident Canada geese have historically caused property damage and nuisance problems in the Rochester and Syracuse areas (Holevinsky et al. 2007), and we had concerns that birds from Clarkstown might seek out suburban environments. However, only about 1% of relocated birds were reported seen in Syracuse, and none were seen in Rochester. Those that were reported tended to be few in number, often

intermingled with flocks of unmarked local geese. We had no indication that birds we moved created or exacerbated goose problems in any area.

Although relocation seemed to work well in our study, this is not likely a solution for goose conflicts on a widespread scale. The state wildlife agency (DEC) does not routinely allow relocation of geese as a damage management option, in part because there are not enough acceptable release sites to accommodate the growing demand by property owners and communities with Canada goose conflicts. New York's resident Canada goose population is estimated at close to 250,000 birds, and WS receives more than 200 complaints annually about goose damage in New York (Preusser et al. 2008). Demand for goose removals would likely be in excess of 10,000 birds if relocation was allowed, and there are very few areas in New York similar to the release site in this study that could absorb that many geese with the same results we observed.

Proposals to relocate geese typically generate little public debate, whereas capture and killing of geese, and processing the birds to provide food for needy people, often generates intense controversy and legal challenges. Ironically, public acceptance of relocation to alleviate goose conflicts seems to be based in part on the belief that it is a nonlethal technique. However, nearly half of the geese that we relocated were killed by hunters, compared to <5% of resident geese in Rockland County that are normally taken by hunters. Without the high hunter harvest, many more relocated geese may have returned to Clarkstown, or found their way to other urban-suburban areas, and effectiveness would have been reduced.

MANAGEMENT IMPLICATIONS

The most effective strategy for alleviating Canada goose conflicts is an integrated

program of techniques to reduce overall numbers of geese, limit their reproductive success, and discourage or displace remaining birds from sensitive areas. Well-designed hazing programs using dogs, radio-controlled boats and other methods can disperse geese from high conflict areas to low-impact areas and may have application in some locations. However, these programs are costly, have only temporary effects, and move geese only short distances from hazing locations (Holevinski et al. 2007, Preusser et al. 2008). Capture and relocation of Canada geese can be an effective and more lasting technique to reduce local goose populations on a site-specific scale. However, without suitable release sites for relocating large numbers of geese, capture and euthanasia remains the principal alternative available to communities seeking to reduce, rather than disperse, local goose populations.

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