



# Rapid Dispersal and Long Term Effect on Resident Canada Geese by On-Demand Alarm and Alert Call Playback Reinforced with Cracker/Banger Shells

Philip C. Whitford, Capital University, Biology Dept. Columbus, OH

## Abstract

**Increasing resident Canada geese populations create major crop loss problems, and greatly increased air strike potential. There is a need for effective, non-lethal means to disperse resident Canada geese. Success in removing geese rapidly from above situations should yield results applicable to all.**

From 16 May – 28 August, 2007, alarm/alert call playback from GOOSEBUSTER™ call units, Bird-X Inc, Chicago Il., was used with a one minute delayed reinforcement by firing cracker shells to assess efficacy at reducing goose numbers at a sewage treatment plant and several farms with past records of heavy summer crop loss near Horicon Marsh, Wisconsin. Success was based upon reduction in goose/hours/month or week/site use before and after treatment. **A new technique “On demand use of call units, coupled with firing screamer and banger shells,” was found to produce the most rapid and effective method for inducing long term site avoidance by geese of any method tested to date.**

Goose presence on the sewage facility dropped from >14445 goose hours/week to < 53.6/week, a 99.7 % drop, within 4 days and remained there for the remaining months of the study. Crop damage reduction was 94.7%, to 100%, “no significant goose damage” by USDA crop evaluation personnel. Goose hours/month on the largest crop test site decreased from >36000 to < 200 goose/hr/month, a 99.45% reduction, in only 4 days and three uses of calls and shells.

No sign of habituation to reinforced “on demand” alarm call use was found over the course of the 100 days of the study. **Application of this method should provide rapid and effective long-term removal of geese from areas near or on airport properties with less than 2 total hours of human involvement to accomplish the results, as based on this study.**



Examples of bird strike damage

## Introduction

**Expanding resident Canada goose, Branta canadensis, populations have led to increased human/goose conflicts, increased crop damage, and increased airstrikes to civil aircraft.**

**Airstrike data reported for U.S. 1990-2007 indicated Canada goose as the # 2 large bird involved in aircraft strikes that cause significant damage, just behind all gull species, collectively, and ahead of all medium to large hawk species when grouped together, with recent increases in resident Canada goose populations leading to this species being represented in an increasing proportion of aircraft strikes since 2000 (Dolbeer and Wright, 2008).**

Resident geese are attracted to, and difficult to displace from, fertilized grass and ponds near parks and airports (Whitford 2002), and young corn or soybeans near gosling brooding areas. Most non-lethal Canada goose dispersal techniques tested to date have provided limited long-term success, particularly in settings evidencing high levels of annual site fidelity for molting and brood rearing by large concentrations of resident Canada geese.

Sonographic studies of all Canada goose calls, including alarm and alert calls and associated behaviors of giant Canada geese were published (Whitford 1987, 1998). Preliminary research using “alarm” calls (*see Discussion*) for Canada goose dispersal evidenced mixed results (Whitford 1987, Mott and Timbrook 1988, Aguilera et al. 1991). Only one prior study using alarm call playback using GooseBuster call units documented long-term success at resident goose dispersal from a large business park, and limited re-colonization (Whitford 2003). No prior studies investigated alarm call use for preventing crop damage by resident Canada geese or for removing geese from water/wastewater treatment facilities at long-term brood rearing and molt sites.

This work, done near Horicon Marsh, Wisconsin, on sites with preliminary counts indicating > 200 geese/goslings within .5 Km of each study site before project inception, directly addressed those issues. Goals were: 1) to test efficacy of GOOSEBUSTER unit alarm/alert call playback when reinforced with screamer/banger shells; 2) to determine if habituation occurred.

**Results should be directly applicable to long term removal of resident geese from airports and attractive sites near airports.**

## Methods

**GOOSEBUSTER call playback units used in this study played digitized forms of alarm and alert calls recorded from captive giant Canada geese** (Whitford 1987) and were provided by Bird-X Inc, Chicago IL 60607. Digitally created temporal and frequency modifications of calls gives an impression that different individuals are giving alarm or alert calls (Whitford 1987) and call units play up to 4 different mixed series of calls, in random sequence, via each of four dispersed speakers, each time playback is initiated.

These modifications enhance goose response and help reduce possible habituation to the calls (Whitford 2003). Units were powered by 14 volt, deep cycle marine batteries, recharged by 5 watt “SOLPAN” 33 X 33 cm solar panels (ICP Global Technologies Model 1009). Call playback volume was set to be consistent with natural goose alarm/alert call volumes.

Dates of initiation varied at the two study sites. Methods of determining pre-study and study goose populations, crop damage by geese, and goose hours/day/site were consistent between sites. Pre-study counts of geese used glassing, walking and counting all geese/goslings visible within .5 km in all directions from the center of the study site. Being flightless due to molt of wing feathers, all present were assumed to remain on site 24 hr/day, 7days/week, unless forced to leave by dispersal actions. Total geese/goslings observed was multiplied by 168 (hours in a week) to estimate pre-study goose hours/week/site. Later estimates used daily or alternate day counts of all geese within .5 km site center during 6 hour observation blocks, plus weekly interviews of resident farmers and treatment plant personnel about number of geese observed on the study sites, where and for how long.

Weekly dropping counts in corn, soybean, grass, and alfalfa feeding areas, and along water edges, were also used to calculate goose/hours/week site use, using an estimate of one goose use/hour/every four droppings > 3 cm found. This is less than 1/4<sup>th</sup> the average feces a feeding goose produces (Whitford 2002) and was intentionally used to be sure post-treatment goose/hours/week was not underestimated. Each large pile of water side “night droppings” was estimated to represent nine goose hours on site.

Crop damage estimates used USDA reports of damage on same fields between prior year and study year where possible. For other fields I relied on USDA field personnel knowledge of approximate prior losses (gained assisting these farmers with propane cannons, supplying screamer and banger shells and/or kill permits). Current crop damage estimates used weekly field transects, recording all crop damage with any associated goose droppings (deer damage was common, but tracks, feeding damage appearance and lack of goose droppings easily identified it).

## Study Sites

### Study Site 1 -

This was the Hustisford Sewage Treatment plant, a 3.4 ha, fenced complex with three treatment ponds, 2.27 ha total surface area, and 1.13 ha of grass, mowed weekly.

Plant personnel had used propane exploders, banger and screamer shells with only temporary success in past years. On pre-study counts 162 geese and goslings were present within the plant. Piles of night droppings and scattered feeding droppings covered all the grass within the fence. Personnel testing water from all ponds 4 times daily complained of the droppings, contamination of clothing, and smell, which explains why this site was suggested by USDA/APHIS.

Wisconsin DNR personnel had drive trapped and banded 292 and 228 geese in Hustisford (most at the treatment plant) in July 2006 and 2005, respectively (pers. com. B. Hill). In addition, fields to the east between the plant and Rock River, had heavy crop damage reported in prior years from > 200 geese brood rearing and molting on the sewage plant property. Another 30-40 geese used the river bank/lawn grasses of this farm for daily resting/feeding/brooding areas. They and 30-40 more used the river and fields within .5 km of the plant and used the nearby corn and alfalfa fields along the river before treatment began.

Goose removal efforts began 16 May, with continual call playback and walking at geese and waving arms to drive them off the property. After 45 minutes removal efforts were terminated when three nesting geese were discovered (past work indicated nesting geese habituated to alarm calls if continually exposed to them (Whitford 2003)).

Call playback restarted 5 June using only “On Demand” call playback, meaning - I used call units on “Test” mode for only as long as needed to remove geese rather than using timer controlled daily play settings. Call playback was always reinforced after 2 minutes of call (if needed) by firing banger/screamer shells launched toward any geese still present, using a Model RJ 1 Scare-Away launcher (Reed-Joseph International Company, Greenville, Mississippi).

Beginning 5 June, I did all goose removal until the study ended. I began with daily 6 hour alternating am and pm observations. I extended that to alternate days after no geese were seen on site for 5 consecutive days. Weekly interviews with treatment plant manager and employees provided accurate counts of geese seen on the property when I was not present. Dropping counts were continued, in case some geese were not observed or reported.



### Study Site 2 -

This study site consisted of two adjoining farms > 90 ha total area, 1 km NW of the town of Hustisford, WI. They were surrounded on three sides by water and marshes of Lake Sinissippi. During a 16 May, 2008, tour of this site I counted roughly 200 geese/goslings on lawns/boat landing, feeding in alfalfa, soybean stubble or on nearby waters of the lake and marsh.

The farms had 22.25 ha alfalfa: 14.2 ha of soybean field and 4.85 ha corn, all heavily damaged by molting/brood rearing resident geese in prior years despite use of propane cannons, screamer and banger shells, and kill permits used for > 4 years by the farmer. In prior years, the farmer patrolled the property by golf cart 3-4 times daily to drive geese off fields.

On 30 May, five call units were set up near fields on these farms. A sixth call unit was placed on the lawn below the central farmhouse for the owner expressed a desire to be rid of geese and droppings on his lawn and boat landing. No units were activated, and only the last was connected to its battery. The farmer was instructed to only turn on the call play back for 1-2 minutes if he saw geese on the lawn/boat landing, and to always follow the calls with screamer or banger shells if the geese didn't leave. This 83 year old farmer and I both participated in goose dispersal efforts on both properties for the remaining 90 days of the study. We both used “on demand” alarm call playback, with banger shell reinforcement, when needed.

The second farm abutted the south line of the first. Only two fields, both with shoreline contact, one corn, one soybeans, and a .5 ha grassy boat landing area with large shade trees were considered for protection based on prior years losses. Corn and soybeans on these fields were 8-12 cm high and showed minor goose damage at unit installation 30 May. The property owner was instructed to only turn units on briefly when geese were present, and to chase geese away when they were used.

## Results

### Study Site 1

Initial estimate figures used an arbitrarily low estimate of 86 geese counted/day, range 68 – 162, for the week prior to the study. Numbers went up daily, as more broods or molting adults arrived. The 16 May use of the call playback and human harassment was stopped when nesting geese were found.

On 5 June, I began the “On Demand call use, with banger/screamer shell reinforcement” protocol. When alarm call playback was followed by these shells, geese gave alarm calls of their own and ran off the property with goslings in tow. Small goslings and adults with them ran to the ponds. Flighted birds present flew off instantly. All geese, except 5 young goslings that refused to leave the ponds, were removed from the property in <25 minutes.

I remained until dark. The 5 goslings left 20 minutes after calls were shut off. Grass was closely mowed 1700-1830 hrs that evening, destroying all prior goose droppings.

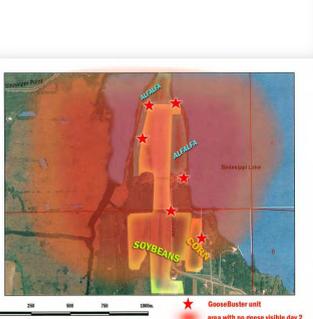
**Estimated Goose hrs/wk** at the sewage plant dropped from 14,445 to 10,800 from 17 May - 6 June while units were off and dispersal efforts stopped. From 6 June to 28 August the plant averaged 53.6 goose/hr/week once “on demand” reinforced call use began (Figure 1). Crop loss on the adjacent field was reduced by 94.7 %. What little loss did occur, occurred on < 2 ha corn nearest the treatment plant fence 17 May - 5 June, when the call units were shut off. For an area of > 190 ha around the plant a total of only 93 geese/goslings were observed/removed between 6 June and 18 July.

**Goose dispersal area** (hence crop protected) was vastly larger than the 3-8 ha per 1 and 2 call units, respectively, reported for urban settings (Whitford 2003). Between 18 July and 28 August, only two sets of flighted geese were seen on treatment ponds and left readily. Dropping counts 6 June – 28 August yielded a total estimate of 590 goose hours on the property, a 99.6 % decrease vs pre-study figures.

**Results were accomplished with only 11 activations of the alarm call units, and 16 screamer and banger shells used.**

**Total time spent removing geese after initial clearing of property was less than 1.3 hours over 80 days.** It would have been less than 20 minutes if a few goslings had not refused to leave the ponds while alarm calls played. One very clear and important conclusion of the study was that goose removal can easily be done using this equipment and method by any water and sewage treatment plant personnel as they do daily checking of water chemistry, and with minimal expense.

Goose dispersal area, study site 1



Goose dispersal area, study site 2

### Study Site 2

Beginning May 31 with first use of the lawn based call unit and shells, goose presence on the two farms dropped from the pre-study estimate of >36,000 to < 200 goose/hours/month in less than 3 days. It remained <200goose/hr/month until study completion (Figure 2).

As at site 1, no sign of habituation was observed when using “on demand call play back and reinforcement.” For the two farms < .3 ha of corn was damaged by geese, < 60 soybean plants showed goose nibbling evidence, and alfalfa loss was limited to 1-2 hours feeding by < 20 geese total over the duration of the study as indicated by droppings, interview and observation. There were no prior year loss records, but both farmers had complained of significant past losses of all crops, and especially of loss of most of the first and second cuttings of alfalfa to geese.

**Alarm call use with shells produced a 99.45 % reduction in goose hours/month on the property and reduced high 2007 losses to near zero levels.**

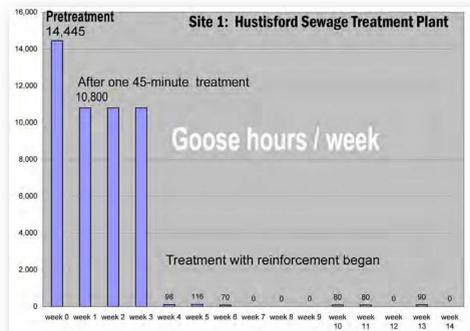
Interviewed 6 June, the primary farmer on the property stated he had used the call unit on his lawn 3 times (with shells) 31 May and 1 June and did not see or hear any geese anywhere for the next 4 days. I neither heard or saw geese within visible parts of >190 ha around the call unit on 6 June. Only 79 geese (total) were seen on this property and only 7 intrusions by geese were reported/observed 6 June – 28 August.

Two of the six call units put up were never activated; one near alfalfa was used four times; and the lawn unit 13 times, including five times it was used to scare geese from the corn field >250 m south on the second farm in the study. Units on the second farm were only activated twice by the owner and twice by me.

**In all, 19 banger and screamer shells were fired, and less than 1.8 hours were expended over 90 days by the three people involved in goose dispersal for the property.** Fewer than 500 droppings were found on the property. Short incursions by 20-30 geese/goslings occurred 0500 – 05:45hr 14 and 18 June, both stopped by use of the lawn call unit on the main farm. Geese only damaged a 35m X 10 m area of stunted corn before being discovered on those mornings.

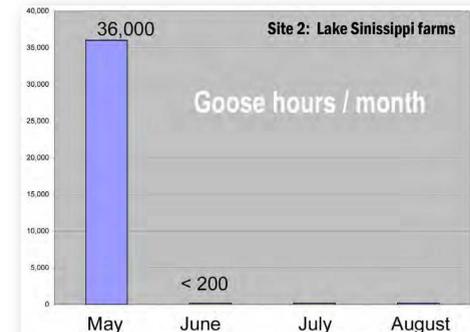
## Charts:

Figure 1



Reduction in goose hours per week with use of alarm calls and human harassment for 45 minutes, duration and degree of reduction, and further reduction with alarm calls reinforced with screamer and banger shells.

Figure 2



Reduction in goose hours per month by brood-rearing and molting resident Canada geese on two farms on a point in Lake Sinissippi following “on-demand alarm call playback” reinforced with screamer and banger shell use, initiated 5 June 2008.



GooseBuster unit as used in study



## Addendum of note:

As a final thing learned in this study, use of the alarm call playback to move goslings under two weeks of age will backfire if water is nearby. Goslings innately run to water when they hear alarm calls, and those under 2 weeks old appear to have the strongest instincts to stay in the water. Use of banger and screamer shells with alarm calls at the sewage plant only made the youngest goslings refuse to follow parents' attempts to lead them away. In mixed age gosling broods subjected to these calls, older goslings followed the parents, the younger remained in the water. I learned to turn off the calls after 2-3 minutes playback, not use screamers, and let the goslings calm down and follow the parents off the ponds and away from the dispersal site. I wasted several periods > 20 minutes ineffectually trying to move goslings that walked out soon after call units were turned off.

## Discussion

The primary difference between this research and previous alarm call play back research on geese dispersal (Mott and Timbrook 1988, Aguilera et al 1991) is that the alarm calls used in this study were unquestionably **alarm and alert calls based on 7 years of sonographic call and behavioral research on B. c. maxima** (Whitford 1987). Calls of the other authors were, at best, distress, flight and alert calls, based on descriptions of goose reactions and call sources.

Further, I used **on demand call playback coupled with screamer/banger shells** rather than comparing effectiveness of the two techniques separately, as in Aguilera et al (1991). There's was a very short duration study, only 3 tests each per 5 sites with “alarm call” and 2 “alert call” playbacks per site compared to their report of “continuing to fire shells until all geese left, reporting a maximum of 12 shots in succession.” With a car mounted speaker (Mott and Timbrook 1988) played “alarm calls” while driving towards geese. They reported 78% success for the calls/car. However they defined that geese “left” if they moved >100 m. When used in the manner of the current study, permitting call playback to make birds visibly nervous before firing shells, both alarm/alert calls and the shells appear to have much greater effectiveness than either alone. Geese often gave voice to alarm calls themselves as they ran/flew away, an extremely rare call for the species (Whitford 1987). Voicing the call seemed to dramatically increase long term avoidance of the area where they made the calls so that geese rarely returned, as evidenced by immediate long term decreases in goose numbers at the study sites.

**Results seen in this study developed faster and lasted longer for creating area avoidance than any goose dispersal method previously reported.** Geese in this study were effectively gone within 24-28 hours of first use of the combination and stayed gone for weeks or months. My best guess is it results from synergistic effects resulting from “on demand” use of the calls coupled with the screamer/banger shells to reinforce the experience. The few birds that were seen at site 1 June 5- late July were thought to be newly arrived birds, late nesters and molters coming to traditional molt and brood rearing sites as reported in White and Combs (2004), or birds displaced by holiday boating activities. After mid-July, new birds arriving were flighted and did not stay when greeted with alarm calls and shells. No killing of birds was needed to make the process effective and it should work in any area where use of pyrotechnics would be permitted. “On Demand” use of the call eliminates habituation concerns and also means that playback of calls would be far more acceptable to most neighbors than frequent call repetition, and would rarely need to be repeated.

**This technique should successfully clear airports of geese in 1-3 days and keep them from returning.**

**It can also be used at wetlands, parks, and golf courses adjacent to airports to reduce or eliminate resident geese and vastly decrease dangers of goose strikes to planes in critical air speed approach/departure flight patterns.**

## Conclusions

**On demand use of alarm/alert call playback with screamer shell reinforcement induced long term avoidance of emerging crops, and sewage treatment facilities by brood-rearing and molting resident geese in < 4 days.**

**No habituation was evidenced in the 90 days of the study.**

**Study site 2 results proved the method could be successfully applied by an 83 year old farmer investing less than 2 hours of his time over the study, and still produce a 99.45 % prevention of crop loss over areas of 30-40 ha or more with only two call units regularly used.**

## Acknowledgements

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## Literature Cited

Aguilera, E., R. Knight, J. L. Cummings. 1991. An evaluation of two hazing methods for urban Canada geese. Wildlife Society Bulletin 19:32-35  
Dolbeer, R. A. and S. E. Wright. 2008. Wildlife Strikes to Civil Aircraft in the United States 1990-2007. Federal Aviation Administration National Wildlife Strike Database. Serial report number 14. 57 P. Office of Airport Safety and Certification, Washington, DC.  
Hill, Brenda (Pers Communication, Aug. 2008) Wildlife Biologist Wisconsin Dept. of Natural Resources, Horicon Service Center, Horicon, Wisconsin.  
Mott, D. F. and S. K. Timbrook. 1988. Alleviating nuisance Canada goose problems with acoustical stimuli. Proc. Vertebr. Pest Conf. (A. C. Oatby and R. E. Marsh, Eds.)13:301-305.  
White, H. B. and D. L. Combs. 2004. Molt-site fidelity and subflocking in giant Canada geese in Tennessee. Pages 161-168 in T. J. Moser, R. D. Lien, K. C. VerCauteren, K. F. Abraham, D. E. Anderson, J. G. Bruggink, J. M. Coluccy, D. A. Grabe, J. O. Leafloor, D. R. Luukkonen, and R. E. Trost, editors. Proceedings of the 2003 International Canada Goose Symposium, Madison, Wisconsin, USA. Whitford, P. C. 1987. Vocal and visual communication and other social behavior in Canada geese (Branta canadensis maxima). Dissertation. University of Wisconsin-Milwaukee. 430 p.  
Whitford, P. C. 1998. Vocal and visual communication of giant Canada geese. Pages 375-386 in D. H. Rusch, M. D. Samuel, D. D. Humbug, and B. D. Sullivan, eds. Biology and management of Canada geese. Proc. Int. Canada Goose Symposium, Milwaukee, Wis.  
Whitford, P. C. 2002. Shoreline characteristics of urban lakes as a factor in nuisance goose problems. The Passenger Pigeon. Vol. 64:4:271-281  
Whitford, P. C. 2003. Use of alarm/alert call playback and human harassment to end Canada goose problems at an Ohio business park. Proceedings of the 10th Wildlife Damage Management Conference. K. A. Fagerstone, G.W. Wilmer, Eds. P 245-255.

## Contact information

Philip C. Whitford  
Capital University, Biology Dept.  
One College and Main  
Columbus OH 43209  
pwhitfor@capital.edu

