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ALLEVIATING NUISANCE CANADA GOOSE PROBLEMS WITH ACOUSTICAL STIMULI

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ABSTRACT: Alarm/distress calls of Canada geese (*Branta canadensis*) were evaluated by themselves and in combination with racket bombs to determine their effectiveness in frightening Canada geese from nuisance situations at 2 Corps of Engineers campgrounds in Tennessee. Results based on goose censuses showed a significant ($P < 0.05$) reduction in goose numbers from nontreatment to treatment periods at both sites. Goose numbers were reduced an average of 71% when the calls alone were used. The combination of the calls and the racket bombs produced a 96% reduction in goose observations. Although a reduction in geese was observed during the treatment periods, continual harassment would appear to be necessary as reinvasion was noted after treatment was stopped. The scarcity of alternate feeding and loafing sites may have contributed to this lack of long-term control.

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INTRODUCTION

In addition to causing agricultural losses, expanding Canada goose populations are the source of many nuisance and health problems. Complaints come from urban and suburban areas where geese forage on grass lawns in parks, golf courses, and homeowners' backyards, and they also contaminate utility water supplies with their feces (Hawkins 1970, Laycock 1982, Conover and Chasko 1985).

Recently established resident flocks of Canada geese on some U.S. Corps of Engineers (Corps) water impoundments in the southeastern U.S. have reached population levels that have caused nuisance situations and are suspected of creating human health problems (Krzysik, pers. comm.). Typically, the geese forage and loaf on the mowed grass in the picnic and camping sites fouling the areas with an accumulation of feces. There is also concern that high concentrations of goose feces near beaches are contributing to higher bacteria counts thereby making swimming areas unfit for public use.

Because of the relatively recent nature of these problems, suitable solutions are not readily available. A non-toxic human food additive, dimethyl anthranilate (DMA), has shown some promise as a goose repellent and further testing is anticipated (Mason, pers. comm.). Conover (1985) demonstrated the utility of an insecticide/avian repellent, methiocarb, in significantly reducing goose foraging on grass. This use, however, is not now federally registered and may be impractical for all nuisance situations (i.e., grass in campgrounds or picnic areas). Other conventional techniques such as loud noises (firecrackers and exploders), shooting, and overhead or perimeter wires to discourage geese have been reported to be generally ineffective (Conover and Chasko 1985).

An interagency agreement between the Corps and the Denver Wildlife Research Center (U.S. Department of Agriculture, Animal Plant Health Inspection Service, Animal

Damage Control) was established in July 1986, and research was initiated at a Corps facility in middle Tennessee to evaluate goose distress/alarm calls and racket bombs to solve goose related problems.

METHODS

Test Sites

The study was conducted during July and August 1986 at the Cordell Hull Reservoir located on the Cumberland River in Smith and Jackson Counties in middle Tennessee. The Corps operates this lake primarily for the purposes of navigation, hydropower generation, and recreation. Canada geese were established on the lake during the mid-1970's and in the last few years they have reached population levels that have inhibited use of recreational facilities at campgrounds from May through September.

Two campgrounds, Defeated Creek and Salt Lick Creek, were chosen for this study because of a reported history of goose problems. These campgrounds are located about 7 miles apart and contained separate goose flocks. Both areas are bordered by water on 3 sides with most of the land area sloping gently to the water (Figures 1 and 2). The Defeated Creek and Salt Lick sites contain 117 and 150 campsites, respectively, most along the lakefront loop roads. Grass covers most of each campground and is mowed frequently. The grass and easy lake access appear to be the main attraction for the geese.

Population Census

Goose populations at the 2 campgrounds were censused twice daily on Monday, Wednesday, and Friday between 0945-1045 and 1245-1345 from 14 July to 22 August 1986. The census route consisted of slowly driving (5-10 mph) the lakefront loop road at each site (Figures 1 and 2) and recording the numbers, location (in reference to a particular numbered campsite) and activity (e.g., feeding, loafing, swimming) of each group of geese encountered in the campground and on the lake within 100 ft of

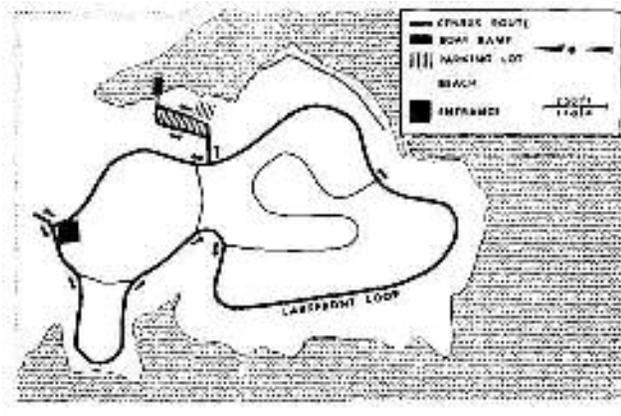


Fig. 1. Map of Defeated Creek Campground, Cordell Hull Lake, Carthage, TN showing Canada goose census route.

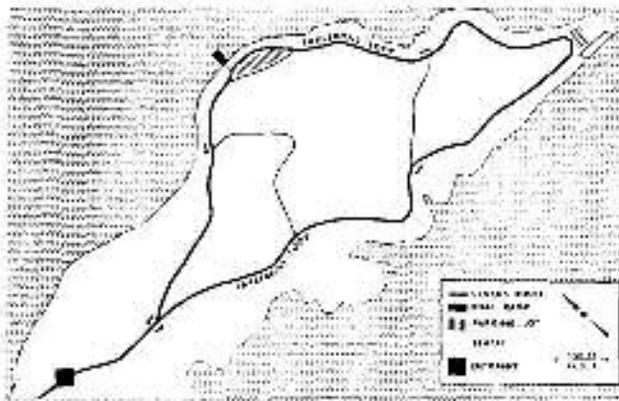


Fig. 2. Map of Salt Lick Creek Campground, Cordell Hull Lake, Carthage, TN showing Canada goose census route.

the shore. These population censuses were used to evaluate the efficacy of 2 goose harassment treatment regimes described below. Pretreatment counts (14-18 July) were conducted before the first week of treatment (21-25 July). Nontreatment counts (28 July-1 August) were also made between the first and second treatment (4-8 August). A posttreatment census was conducted from 11-22 August. With the exception of the morning counts on the first day of each treatment period, all counts during the 2 treatment periods were conducted an average of 62 minutes after a harassment trip was made through the campground. The morning counts on the first day (Monday) of each treatment period were not included in the analyses since harassment was not conducted until after the count. All population counts were made by the same individual driving a different model and color vehicle than was used during harassment.

Daily population means at each campground for each of the 5 periods (Pretreatment, Treatment 1, Nontreatment, Treatment 2, and Posttreatment) were ranked, and differences among periods were analyzed using the Kruskal-Wallis one-way ANOVA of ranks and Tukey's Student-

tized Range test. The RANK and ANOVA procedures in the Statistical Analysis System (SAS) Package (Helwig and Council, 1979) were used to perform the calculations.

Goose Harassment

The first 5-day treatment regime at both campgrounds (Treatment 1) began on 21 July. Alarm/distress calls that were recorded by the senior author while harassing a flock of 25 semi-wild Canada geese in Colorado were used in this test. The recording contained the alarm call of a single goose as well as a chorus of disturbed geese as they took flight. These calls were rerecorded onto a 3 minute continuous loop telephone answering machine outgoing message cassette tape. A Perma Power^R sound system (Perma Power Electronics Inc., Chicago, IL)¹ used to play the tape consisted of a Model S-302 32-watt amplifier providing power to a 2-speaker car-top carrier (Model S-1210). The alarm/distress tape was played on a Sony^R dictator Model BM-12. The call was directed at flocks of geese as they were encountered on the lakefront loop road. The vehicle was driven as close to the geese as possible (usually 50-75 ft at the beginning of the harassment period), and the tape was played for a maximum of 3 minutes or until the geese moved more than 100 ft from the shore. When harassing, the lakefront loop road route in both campgrounds was driven at 5-10 mph at approximate 2-hr intervals. Six trips, usually lasting 10-15 minutes each were made through each of the campgrounds between 0730 and 1730 on Tuesday, Wednesday, and Thursday. Only 4 trips were made on Monday (between 1000-1730) and Friday (between 0700-1400).

The second 5-day treatment period (Treatment 2) began 4 August. The lakefront loop road at both campsites was driven as during Treatment 1 and the taped goose call was directed at those geese encountered. Immediately after the call was played, from 1 to 6 racket bombs (Marshall Hyde Inc., Port Huron, MI) were also fired from a 15-mm pistol launcher in the direction of the flock of geese. Racket bombs make a continual whistling racket noise for a range of about 125 yds.

RESULTS

Significant ($P < 0.05$) reductions in goose numbers from Pretreatment to Treatment 1 and from the Nontreatment period to Treatment 2 at both sites occurred under both treatment regimes (Tables 1 and 2). Goose numbers were reduced an average of 75% at Defeated Creek Campground and 67% at Salt Lick Campground when the calls alone were used. The addition of the racket bombs during treatment appeared to be even more effective. Although goose populations returned to near pretreatment levels after Treatment 1, they were reduced an average of 97% and 95% at Defeated Creek and Salt Lick Creek Campgrounds, respectively, during Treatment 2 (Figures 3 and 4).

¹Mention of commercial products does not imply endorsement by the United States Government.

Table 1. Numbers of geese recorded on observation routes at Defeated Creek Campground, Cordell Hull Lake, Carthage, TN, 14 July-22 August 1986.

	Pretreatment ^{a,b,c}			Treatment 1 ^a			Nontreatment ^d			Treatment 2 ^{b,d}			Posttreatment ^e				
	14	16	18	21	23	25	28	30	1	4	6	8	11	13	15	19	22
A.M. 122	145	117	165*	26	0	0	90	132	168	146*	0	0	31	42	43	0	31
P.M. 133	152	140	106	37	0	0	109	101	153	0	0	20	0	41	57	31	38
Total	809			169			753			20			314				
N	5			5			6			5			10				
Mean	134.8			33.8			125.5			4.0			31.4				
S.E.	5.5			19.5			12.6			4.0			5.8				

^aPeriods with the same letter are significantly different from each other ($P < 0.05$).

^bPretreatment count.

Table 2. Numbers of geese recorded on observation routes at Salt Lick Campground, Cordell Hull Lake, Carthage, TN, 14 July-22 August 1986.

	Pretreatment ^{a,b,c}			Treatment 1 ^a			Nontreatment ^{d,e}			Treatment 2 ^{b,d}			Posttreatment ^{e,f}				
	14	16	18	21	23	25	28	30	1	4	6	8	11	13	15	19	22
A.M. 150	195	181	91*	0	0	0	88	134	156	66*	0	12	18	25	0	11	17
P.M. 154	172	136	0	145	128	103	95	193	23	0	0	87	19	14	8	19	19
Total	988			273			769			35			218				
N	6			5			6			5			10				
Mean	164.7			54.6			128.1			7.0			21.8				
S.E.	8.9			33.5			16.7			4.6			7.6				

^aPeriods with the same letter are significantly different from each other ($P < 0.05$).

^bPretreatment count.

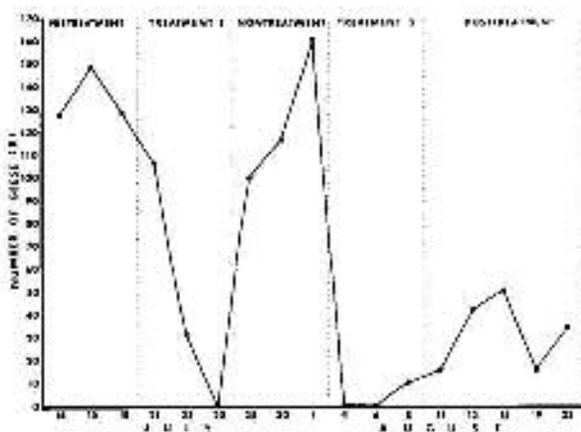


Fig. 3. Mean numbers of geese observed per day on census routes at Defeated Creek Campground, Cordell Hull Lake, Carthage, TN, 14 July-22 August 1986.

The effect that harassment had on the goose populations was further demonstrated by the number and activity of goose flocks encountered. During Pretreatment, 32 and 37 flocks (or groups) of geese were recorded at Defeated Creek Camp-

ground and Salt Lick Creek Campground, respectively. This amounted to 4.6 and 5.2 flocks per route at each site. During Treatment 1 only 6 (1.2 per route) and 2 flocks (0.4 per route) were recorded at Defeated Creek and Salt Lick Creek, respectively. During Pretreatment, 51 (74%) of 69 flocks observed were feeding or loafing on land (mostly grass areas), whereas during Treatment 1 only 1 (13%) of 8 flocks encountered was seen on land.

Nontreatment counts just before Treatment 2 produced 35 (5.0 per route) and 28 (4.0 per route) flocks at Defeated Creek and Salt Lick Creek, respectively. Of these 63 flocks, 47 (75%) were observed on land. During Treatment 2 only 5 flocks (0.5 per route) were encountered of which 2 (40%) were observed on land.

Relatively few racket bombs were required to supplement the tape during Treatment 2. Only 23 and 21 of these devices were used at Defeated Creek and Salt Lick Creek, respectively.

Posttreatment counts (11-22 August) were significantly different ($P < 0.05$) from initial pretreatment counts. A mean of 31 and 22 geese were recorded at Defeated Creek and Salt Lick Creek Campgrounds, respectively (Tables 1 and 2).

DISCUSSION

It was evident from the initiation of this study that the

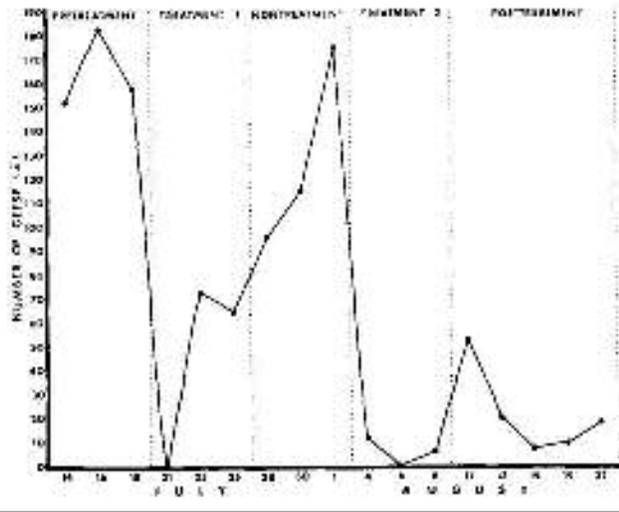


Fig. 4. Mean numbers of geese observed per day on census routes at Salt Lick Creek Campground, Cordell Hull Lake, Carthage, TN, 14 July-22 August 1986.

geese were frightened by the recorded alarm/distress call. During Treatment 1 the geese would move towards the lake in the first few seconds that the taped call was played. Typically, they would swim out at least 100 yds from the shore and proceed up or downstream. Once in the apparent security of the lake, however, they were obviously less frightened. The geese, however, did not appear to become acclimated to the sound. In fact, by the middle of Treatment 1 they would recognize the harassment vehicle as it approached and would retreat to the water and swim from shore before the recording was played. Because of this association with the vehicle, accurate data on location of flocks and goose activity patterns could not be gathered by the individual conducting the harassment.

The addition of the racket bombs during Treatment 2 was beneficial. Although only 44 of these devices were used at both campgrounds, they noticeably enhanced the harassment effort. In most instances, once the racket bomb was fired, the geese flew into the middle of the lake or out of sight. The geese took flight more readily during this second phase of the harassment than previously. This was probably a combination of the racket bombs and the fact that more time had passed since their flightless condition in early July.

The effect Treatment 1 had on the ease with which the geese were dispersed during Treatment 2 is unknown. Most likely the same geese were at each of the sites during both treatment periods and thus the possibility of carryover effects

exists.

Based on results of this study, continual harassment would probably be necessary to keep the geese off the campgrounds. This would be especially true if alternate feeding and loafing sites are not available. Goose numbers returned to near pretreatment levels the week after Treatment 1. Although there was a significant difference ($P < 0.05$) in goose numbers between Pretreatment (14-18 July) and Posttreatment (11-22 August) at both sites, there was a slight buildup of birds after harassment stopped (Figures 3 and 4). The efficacy of the goose harassment program, as in other damage situations, appears to be dependent on alternate sites for the geese to loaf and feed. Because of the topography of the area, few if any alternate sites were available in the study area. Although at least some of the geese at Defeated Creek moved over to a nearby picnic and swimming area during Treatment 1, most geese at Salt Lick Creek continued to return to the campground. During Treatment 2 most of the geese at both sites appeared to leave the campground areas shortly after treatment began. As discussed earlier, most geese in early August were probably more capable of flying further distances than they were during the first harassment period.

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