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Relative Effects of Baiting and Supplemental Antlerless Seasons on Wisconsin's 2003 Deer Harvest

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Abstract

*Establishing hunting regulations that facilitate population reduction is an important white-tailed deer (*Odocoileus virginianus*) management strategy. Increased opportunity to hunt antlerless deer and use of bait to attract are 2 strategies widely used by managers to increase harvests. While facilitating harvest, baiting deer also may increase disease transmission, create hunter conflict, or adversely impact other resources. Management for reduced deer populations requires that costs associated with baiting (e.g., disease transmission risk) be weighed against benefits (e.g., increased hunter efficiency). We quantified the effects of baiting on Wisconsin's firearm and archery deer harvests relative to supplemental antlerless-only firearm seasons (SAFS) by modeling changes in the 2002–2003 harvests as functions of deer density, population goals, supplemental antlerless seasons, and a partial ban on baiting in 2003. With other variables held constant, the 2003 bait ban equated to roughly 0.1 deer/km^2 fewer deer harvested by archers (antlerless and antlered). The reduction was offset by an equivalent increase in harvest by deer hunters with firearms. Thus, the net impact of a baiting ban was negligible. In 2003, SAFS resulted in an increase of 1.2 antlerless deer/km^2 killed even though a decrease of 1.6 antlerless deer/km^2 killed was associated with SAFS in 2002. Our analysis suggests that creating additional opportunities for hunting antlerless deer with firearms was more effective at achieving herd reduction than baiting.* (WILDLIFE SOCIETY BULLETIN 34(2):322–328; 2006)

Key words

antlerless seasons, baiting, firearms, harvest, hunting, Odocoileus virginianus*, regulations, white-tailed deer, Wisconsin*.

Free-ranging white-tailed deer (*Odocoileus virginianus*) can be conditioned to concentrate their activity around supplemental food placed in their environment (Henke 1997, Garner 2001). Landowners, wildlife managers, and researchers have exploited this behavioral trait (Rongstad and McCabe 1984, DeNicola et al. 1997, Kilpatrick et al. 1997, Linhart et al. 1997, Kilpatrick and Stober 2002, Bartelt et al. 2003). When this conditioning is used to facilitate recreational hunting of deer, it is considered baiting. Baiting deer for recreational hunting continues to be controversial and has been prohibited in many states (Beauchaine 2000).

The early controversy over baiting revolved around issues of fair chase and hunter conflicts (Lahde 1998, Peyton 1998, Michigan Department of Natural Resources 1999). In addition, ecological impacts of supplemental feeding included increased browsing pressure at feeding sites (Doenier et al. 1997) and attraction of mammalian nest predators (Cooper and Ginnet 2000). More recently, managers have identified concentration of deer activity around feeding sites as a risk for facilitating spread of infectious diseases (Bartelt et al. 2003, Dunkley and Cattet 2003). Researchers in Michigan, USA, have linked temporal and spatial variation in the spread of bovine tuberculosis (TB; *Mycobacterium bovis*) to changes in baiting and supplemental winter feeding of wild deer (Hickling 2002, O'Brien et al. 2002, Miller et al. 2003). In addition, behavioral studies have demonstrated fine-scale behaviors at feeding sites that would enhance infectious contacts between sick deer and healthy deer (e.g., muzzle contact, sparring; Garner 2001, Miller et al. 2003).

Increased harvest and bans or restrictions on supplemental feeding (including baiting) have been effective strategies for reducing infectious disease in white-tailed deer populations (O'Brien et al. 2002, Miller et al. 2003). Disease risks motivated managers in Wisconsin to implement a statewide ban on baiting and feeding deer as 1 of a 3-part strategy to contain and eradicate an outbreak of chronic wasting disease (CWD) in southern Wisconsin, USA (Bartelt et al. 2003). A statewide ban on baiting and feeding was implemented as part of an emergency rule prior to the 2002 hunting season.

Public outcry over the baiting and feeding ban ultimately prompted Wisconsin legislators to reject a statewide ban. In turn, legislation was crafted enacting permanent rules for battling CWD (Heberlein 2004). This legislation contradicted recommendations of wildlife managers and disease experts. Opponents of the statewide ban pointed to culling operations that used baiting (e.g., Kilpatrick and Stober 2002) to facilitate population reduction and argued that baiting would similarly increase efficiency for recreational hunters (Heberlein 2004). During 2003, the statewide ban was lifted in all but 22 counties (Fig. 1). These counties had baiting bans because of county-level initiatives or the identification of deer or elk (*Cervus elaphus*) that were positive for CWD or TB in captive or wild herds within their borders or within 16 km of their borders.

The benefits of baiting to enhance population control may not offset increased disease risk (O'Brien et al. 2002, Miller et al. 2003). Quantification of baiting effects on deer harvest must be evaluated relative to more traditional means of increasing harvest by hunters (e.g., additional antlerless hunting opportunity). Our objective was to estimate the relative effects that baiting and supplemental antlerless-only firearm seasons (SAFS) had on the 2003 deer harvest rates in Wisconsin.

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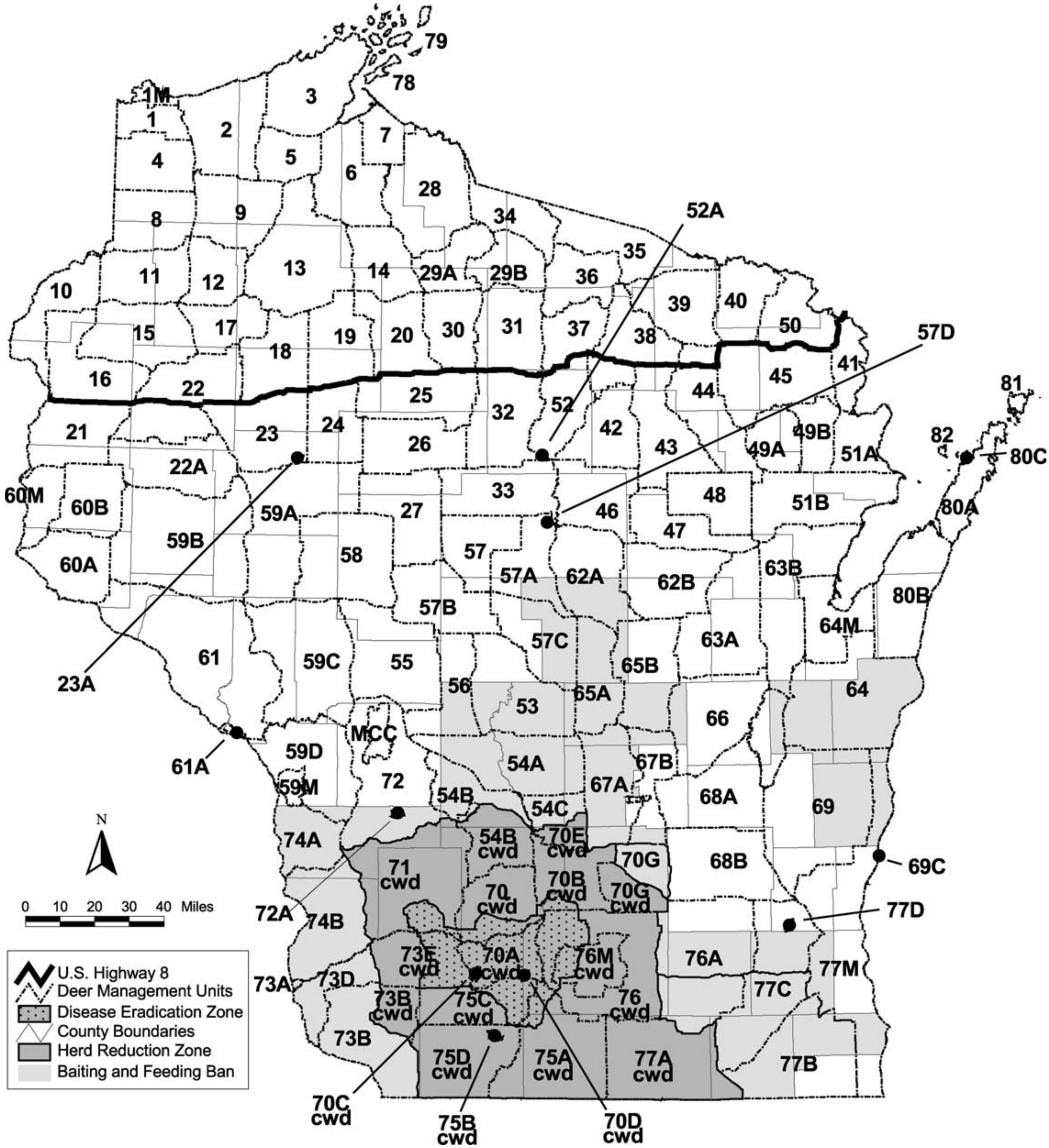

Figure 1. Map of Wisconsin, USA, showing county boundaries and deer management units in 2003. Darkly shaded and stippled regions were aggressively managed for deer herd reduction in response to an outbreak of chronic wasting disease (CWD). Shaded counties outside the CWD management zones indicate areas where the practice of deer baiting was banned in 2003.

Methods

Wisconsin regulates deer harvest relative to estimated carrying capacity and human tolerances for deer and requires mandatory reporting of all hunter-killed deer (Wisconsin Department of Natural Resources 2001). Actual dates vary from year to year, but archery hunting occurs from mid-September to mid-November and again from early December to early January (103 days in 2003); firearm hunting occurs during a late-November general firearm season (9 days) and an early December muzzleloader season (10 days). An archery license authorizes the hunter to bag 1 deer (antlered or antlerless) anywhere in the state. A firearm license authorizes the harvest of 1 antlered deer anywhere in the state. Unit-specific antlerless gun harvest is regulated by a variable quota system to allocate either-sex and "bonus" antlerless permits in units substantially above goals. Availability of additional bonus antlerless permits was 2/hunter/day in units designated for SAFS.

Since 1996, SAFS were implemented as herd-control measures for individual deer management units (DMUs) meeting 2 criteria: estimated posthunt populations >20% population goals, and histories indicating that the conventional season framework would likely not achieve posthunt populations within 20% of goal. Antlerless deer include female deer and male deer with antlers smaller than 7.7 cm. The SAFS were 4-day hunts occurring during late October to early November and again during mid-December (total = 8 additional days).

Study Design

The statewide ban on baiting in 2002 and partial ban in 2003 offered us an opportunity to evaluate the effects on deer harvests from 2002 to 2003 because the partial ban was implemented independent of deer density, population goals, or SAFS. We used DMUs as sampling units to evaluate 4 dependent variables: 1) change in archery harvest of antlerless deer, 2) change in archery harvest of antlered deer, 3) change in firearm harvest of antlerless deer, and 4) change in firearm harvest of antlered deer (Table 1). In each case, we modeled change in terms of deer km^2 deer range. Deer range was defined as permanent cover (i.e., forest, brushland, or marsh patches >4.0 ha) and agricultural and grassland within 100 m of permanent cover (Wisconsin Department of Natural Resources 2001). We excluded DMUs with <129.5 km^2 deer range and DMUs subjected to unusually intensive harvest associated with management of Wisconsin's CWD outbreak. We also excluded DMUs north of U.S. Highway 8 because these DMUs had a reduced SAFS in 2002 and 2003 (4 days instead of 8) and because habitat and land-ownership patterns are different from those found in the 22 counties where baiting was banned in 2003 (Fig. 1).

Covariates used to compare the effects of SAFS and baiting on deer harvest included SAFS in 2002 and 2003 (SAFS02 and SAFS03, respectively; 0 = no SAFS, 1 = SAFS), and presence of a baiting ban in 2003 (0 = no restriction on baiting, 1 = baiting banned in >33% of the DMU). Effort required to harvest a deer in the Midwest likely is a function of deer density (Van Deelen and Etter 2003), and Wisconsin managers set antlerless quotas by evaluating DMU deer densities relative to goals that vary with ecological and social carrying capacity (Wisconsin Department of Natural Resources 2001). Moreover, exploratory analysis (T. R. Van Deelen, University of Wisconsin, Madison, Wis., USA, unpublished data) indicated that DMU deer density (DENS) and DMU population goals (GOAL, both in terms of deer/km^2 deer range) were important predictors of change in harvest so these variables were included in the analysis (Table 1). Deer density was a prehunt estimate based on a sex–age–kill reconstruction from harvest data (Wisconsin Department of Natural Resources 2001).

Analysis

We used multiple regression to fit 6 models to each of the 4 dependant variables. The 6 models were posited a priori to represent differing though plausible explanations of variation in the change in harvest from 2002 to 2003. Models also were selected to enable estimation and comparison of SAFS and baiting effects while controlling for the effects of variation in population density and goals (Table 1). We used Akaike's Information Criterion for small sample sizes (AIC$_c$; Burnham and Anderson 1998) to compare models for each data set. We designated a >95% confidence set of models for each dependent variable using Akaike weights (w_i) and computed unconditional parameter estimates. Unconditional parameter estimates are parameter estimates conditioned on a >95% confidence set of models rather than on a single best model (Burnham and Anderson 1998).

Results

We used data from 66 DMUs; 20 had SAFS in 2002, 31 had SAFS in 2003, and 25 had much or all of their area included

Table 1. Suite of models used to evaluate variation in the change in deer harvest in Wis., USA, from 2002 to 2003 (Y). Covariates included deer density (DENS), deer population goals (GOAL), supplemental antlerless firearm seasons in 2002 (SAFS02) and 2003 (SAFS03), and a partial ban on deer baiting in 2003 (BAIT).

Number	Structure	Interpretation
1	$Y = \beta1 + \beta2(DENS) + \beta3(DENS*GOAL) + \varepsilon$	Change is a function of deer density and deer density relative to goal.
2	$Y = \beta1 + \beta2(DENS) + \beta3(DENS*GOAL) + \beta4(BAIT) + \varepsilon$	Change is a function of deer density, deer density relative to goal, and baiting.
3	$Y = \beta1 + \beta2(DENS) + \beta3(DENS*GOAL) + \beta4(SAFS03) + \varepsilon$	Change is a function of deer density, deer density relative to goal, and SAFSs in 2003.
4	$Y = \beta1 + \beta2(DENS) + \beta3(DENS*GOAL) + \beta4(SAFS03) + \beta5(BAIT) + \varepsilon$	Change is a function of deer density, deer density relative to goal, SAFSs in 2003, and baiting.
5	$Y = \beta1 + \beta2(DENS) + \beta3(DENS*GOAL) + \beta4(SAFS03) + \beta5(SFAS02) + \varepsilon$	Change is a function of deer density, deer density relative to goal, and SAFSs in 2003 and 2002.
6	$Y = \beta1 + \beta2(DENS) + \beta3(DENS*GOAL) + \beta4(SAFS03) + \beta5(SFAS02) + \beta6(BAIT) + \varepsilon$	Change is a function of deer density, deer density relative to goal, SAFSs in 2003 and 2002, and baiting.

under the baiting ban in 2003 (Fig. 1). Changes in harvest generally were positive indicating more deer harvested in 2003 than in 2002. The 2003 harvests, in terms of deer/km^2 deer range, averaged 0.7 (range = 0.0–1.6) for archery antlered kill, 0.6 (range = 0.1–1.8) for archery antlerless kill, 1.8 (range = 0.7–4.4) for firearm antlered kill, and 3.0 (range = 0.4–7.6) for firearm antlerless kill.

Mean change across all 66 DMU was 0.2 (range = −0.3 to 0.5) deer/km^2 deer range in the archery antlered harvest, 0.3 (range = 0.0 to 1.3) in the archery antlerless harvest, 0.2 (range = −0.4 to 0.8) in the firearm antlered harvest, and 0.8 (range = −2.6 to 4.2) in the firearm antlerless harvest.

Change in Archery Harvest of Antlered Deer

Optimal models of change in archery harvest of antlered deer included covariates reflecting BAIT and SAFS03 (Table 2). The 2 models in the >95% confidence set had nearly equivalent w_is and differed only by the inclusion of SAFS02. Unconditional estimates of partial regression coefficients for SAFS03 and BAIT did not include zero in their 95% confidence intervals indicating a meaningful effect on change in harvest (Table 3). Both coefficients were negative. Holding all other variables constant, having an SAFS in 2003 represented a net decrease in archery harvest of antlered deer of 0.1 deer/km^2 deer range for DMUs in this study. Similarly, having a significant portion of the DMU under a bait ban equated to a decreased harvest of 0.1 deer/km^2 deer range (Table 3).

Change in Archery Harvest of Antlerless Deer

The optimal model of change in archery harvest of antlerless deer included all 3 covariates. Other models were unimportant (Table 2); thus, the >95% confidence set was model 6 (Table 1). Ninety-five percent confidence intervals for SAFS02 and BAIT did not include zero. The SAFS03 had a positive effect while SAFS02 and BAIT had negative effects. With other variables held constant, an SAFS in 2003 represented an increased harvest of about 0.1 antlerless deer/km^2 deer range harvested by archers in these DMU. By the same token, an SAFS in 2002 or a ban on baiting represented 0.2 and 0.1 fewer deer/km^2 deer range harvested (Table 3).

Change in Firearm Harvest of Antlered Deer

The 3 models in the >95% confidence set for change in firearm harvest of antlered deer were the models that included BAIT as a covariate (Table 2). The remaining 3 models were unimportant. All 6 models had bias-adjusted R^2 values that were quite low (range = 0.07–0.09), indicating substantial unexplained variance (Table 2). Unconditional estimates of the partial regression coefficients for SAFS03 and SAFS02 had 95% confidence intervals that included zero (Table 3). The 95% confidence interval for BAIT's coefficient did not. With other variables held constant, the effect of having a substantial portion of these DMUs under a baiting ban was an increase in the firearm antlered deer harvest of 0.2 deer/km^2 deer range (Table 3).

Change in Firearm Harvest of Antlerless Deer

Optimal models of change in firearm harvest of antlerless deer include covariates SAFS03, SAFS02, and BAIT (Table 2). Models that did not contain SAFS covariates were unimportant. Adjusted R^2 were highest for these models indicating less unexplained variance relative to modeling with the other data sets (Table 2). Unconditional estimates of partial regression

Table 2. Model comparisons for 4 datasets reflecting the change in deer harvests, 2002–2003, in 66 Wis., USA, deer management units.

Dependent variable[a]	Rank	Covariates[b]	K	Error SS	AIC$_c$	w_i	Cum(w_i)	Adj. R^2
Change in archery antlered harvest	1	DENS, DENS*GOAL, SAFS03, BAIT	6	4.76	−291.6	0.52	0.52	0.29
	2	DENS, DENS*GOAL, SAFS03, SAFS02, BAIT	7	4.66	−291.4	0.47	0.99	0.29
	3	DENS, DENS*GOAL, BAIT	5	5.27	−283.7	0.01	1.00	0.23
	4	DENS, DENS*GOAL, SAFS03, SAFS02	6	5.80	−271.8	0.00	1.00	0.14
	5	DENS, DENS*GOAL, SAFS03	5	5.99	−270.9	0.00	1.00	0.12
	6	DENS, DENS*GOAL	4	6.60	−263.4	0.00	1.00	0.05
Change in archery antlerless harvest	1	DENS, DENS*GOAL, SAFS03, SAFS02, BAIT	7	16.2	−166.8	0.97	0.97	0.35
	2	DENS, DENS*GOAL, SAFS03, SAFS02	6	17.9	−159.1	0.02	0.99	0.30
	3	DENS, DENS*GOAL, BAIT	5	18.8	−156.5	0.01	1.00	0.27
	4	DENS, DENS*GOAL, SAFS03, BAIT	6	18.4	−156.4	0.01	1.01[c]	0.27
	5	DENS, DENS*GOAL	4	20.0	−152.5	0.00	1.01[c]	0.24
	6	DENS, DENS*GOAL, SAFS03	5	19.7	−151.8	0.00	1.01[c]	0.24
Change in firearm antlered harvest	1	DENS, DENS*GOAL, BAIT	5	23.8	−132.9	0.44	0.44	0.08
	2	DENS, DENS*GOAL, SAFS03, SAFS02, BAIT	7	22.8	−132.6	0.39	0.83	0.09
	3	DENS, DENS*GOAL, SAFS03, BAIT	6	23.8	−130.6	0.14	0.97	0.07
	4	DENS, DENS*GOAL, SAFS03, SAFS02	6	24.7	−126.9	0.02	0.99	0.03
	5	DENS, DENS*GOAL	4	26.0	−126.3	0.02	1.01[c]	0.02
	6	DENS, DENS*GOAL, SAFS03	5	26.0	−124.1	0.01	1.02[c]	0.00
Change in firearm antlerless harvest	1	DENS, DENS*GOAL, SAFS03, SAFS02	6	167.4	64.4	0.69	0.69	0.64
	2	DENS, DENS*GOAL, SAFS03, SAFS02, BAIT	7	166.2	66.0	0.31	1.00	0.63
	3	DENS, DENS*GOAL, SAFS03	5	335.9	131.8	0.00	1.00	0.28
	4	DENS, DENS*GOAL, SAFS02, BAIT	6	329.6	132.2	0.00	1.00	0.28
	5	DENS, DENS*GOAL, BAIT	5	352.6	136.6	0.00	1.00	0.25
	6	DENS, DENS*GOAL	4	360.6	136.7	0.00	1.00	0.24

[a] Deer/km^2 deer range.
[b] DENS = deer density, Goal = deer density goal, SAFS02 = supplemental antlerless firearm season in 2002, SAFS03 = supplemental antlerless season in 2003.
[c] Cumulative (w_i) >1 due to rounding errors.

Table 3. Unconditional parameter estimates (Burnham and Anderson 1998) for multiple regression models of the changes in deer harvest, 2002–2003 in 66 Wis., USA, deer management units.

		Covariates									
		DENS		DENS*GOAL		SAFS03		SAFS02		BAIT	
Dependent variable[a]	*N* Models	Mean	95%. CI	Mean	95% CI	Mean	95% CI	Mean	95% CI	Mean	95% CI
Archery antlered harvest	2	0.01	0.00–0.02	0.00	0.00	−0.10	−0.17– −0.03	0.04	−0.03–0.11	−0.12	−0.17– −0.06
Archery antlerless harvest	1	0.02	0.00–0.04	0.00	0.00	0.14	0.00–0.29	−0.19	−0.32–0.06	−0.14	−0.03– −0.24
Firearm antlered harvest	3	0.00	−0.02–0.02	0.00	0.00	0.02	−0.14–0.18	−0.15	−0.29–0.03	0.15	0.02–0.28
Firearm antlerless harvest	2	0.05	0.00–0.10	0.00	0.00	1.16	0.71–1.60	−1.64	−2.05– −1.22	0.12	−0.23–0.45

[a] Deer km^2 deer range.

coefficients had 95% confidence intervals that did not include zero for SAFS03 and SAFS02 but not for BAIT. With other variables held constant, having an SAFS in 2003 equated to a net increase of 1.2 antlerless deer/km^2 harvested in these DMU. Conversely, with other variables held constant, having an SAFS in 2002 resulted in a net decrease of 1.6 antlerless deer/km^2 deer range harvested in 2003 (Table 3).

Discussion

Our analysis demonstrated that SAFS and baiting influenced deer harvests in Wisconsin from 2002 to 2003. Baiting tended to increase the archery harvest while decreasing the firearm harvest. Changes in the harvest attributable to baiting were smaller by an order of magnitude relative to increase in antlerless kill attributed to SAFSs.

We used a quasi-experimental approach to evaluate the effects that baiting has on deer harvest. The key experimental treatment in this analysis was a partial baiting ban applied in 2003 independently of DMU densities, goals, and use of SAFS. Previous evaluations of the effectiveness of baiting compared the self-reported efficiency of hunters using bait to that of hunters who did not use bait even though baiting was legal at the time (Bartelt et al. 2003). In these studies, hunters using baits reported killing slightly more deer/days afield than those who did not. Hunters who did not bait tended to hunt longer; thus, the number of deer killed/hunter was relatively unaffected by baiting (Bartelt et al. 2003).

Hunters who voluntarily restrict the range of techniques available to them may represent a specialized subset willing to invest additional effort in activities like scouting and patterning deer. Degree of specialization in deer hunters correlates with other factors (e.g., skill, level of commitment) influencing harvest success (Miller and Graefe 2000). Hence, analysis of the effects of baiting restrictions based on studies of voluntary behavior by hunters is likely to be confounded by other characteristics associated with specialization of those who did not use bait.

Deer concentrate their activities around sites where supplemental food is provided (Henke 1997, Garner 2001, Kilpatrick and Stober 2002); thus, baiting potentially can alter the vulnerability of local deer by sequestering them in areas (e.g., private lands) where other hunters do not have access (Bartelt et al. 2003). The extent to which baiting impacts hunters who do not bait has not been studied. Nonetheless, interaction—mediated by deer behavior—complicates inferences that can be drawn from previous survey research for managers needing to evaluate blanket regulatory bans on baiting.

Change in Archery Harvest

Having an SAFS during the same year (i.e., 2003) negatively impacted the harvest of antlered deer by archers. This may reflect the disruption by or displacement of archers during the 8 days of SAFS hunting. Early SAFS hunting occurred during the rut—a period when antlered deer are especially vulnerable to archers. Similarly, restrictions on baiting also reduced the harvest of antlered deer by archers probably because archers commonly use bait to attract and position deer for shooting. Comparisons of the unconditional parameter estimates (Table 3) suggest that, in terms of the number of deer harvested in these DMUs, the ability to bait offsets the hunting opportunities lost because of SAFS. Change due to SAFS in 2003 and baiting was 14 and 17% of the mean harvest of antlered deer, respectively.

In contrast to archer harvest of antlered deer, SAFS in 2003 were associated with increased archer harvest of antlerless deer (Table 3). The SAFS are unpopular with archers because they are conducted in October when hunting opportunity would otherwise be exclusive to archers. Implementing an SAFS may provide an incentive for archers to harvest additional antlerless deer to avoid having their local DMUs qualify for SAFS the following year. Archer harvest of antlerless deer was negatively associated with having an SAFS the previous year. This may be evidence that SAFS are effective at reducing deer populations, especially the antlerless segment, the following year. Archer harvest of antlerless deer declined by roughly 0.1 deer/km^2 deer range in response to baiting bans in 2003 (Table 3).

Change in Firearm Harvest

Low adjusted R^2 values indicated that change in the firearm harvest of antlered deer was poorly described by the models we fit. Given this caveat, firearm harvest of antlered deer appeared to be relatively unaffected by SAFS in 2003 or 2002 (Table 3). By design, SAFS had effects on change in the firearm harvest of antlerless deer. Absolute values of the unconditional parameter estimates associated with SAFS03 and SAFS02 were roughly an order of magnitude greater for the firearm antlerless harvest data set (Table 3) relative to other data sets. The SAFS in 2003 equated to an increase of 1.2 antlerless deer/km^2 deer range harvested by firearm deer hunters in 2003. The SAFS in 2002 equated to a 1.6 deer/km^2 decline in antlerless deer harvested; evidence that SAFSs are effective at reducing population levels.

Unconditional parameter estimates indicated an essentially reciprocal relationship between archer harvest and firearm harvest relative to the baiting ban in 2003 (given caveats about models fit to the firearm antlered data set). Whereas the bait ban associated with a roughly 0.2 deer/km^2 deer range decrease in harvest by archers (antlered and antlerless), the bait ban associated with a roughly 0.2 deer/km^2 deer range increase in harvest by firearm hunters (Table 3). Since most archery hunting occurs before the firearm deer season, this reciprocal relationship may reflect a compensatory mechanism. The deer that might otherwise be killed by archers using bait may later be killed by firearm hunters.

Management Implications

Management difficulties associated with widespread and chronic overabundance of deer and discrete areas where rapid population reduction is a goal in some cases (e.g., disease outbreaks) are exacerbated by declining effectiveness of recreational hunting as a deer population control mechanism (Brown et al. 2000, Riley et al. 2003). Consequently, even marginal increases in hunter efficiency would be welcomed in many cases. In the case of baiting, negligible changes in hunter efficiency (Bartelt et al. 2003, this study) must be weighed against increased disease risks, and environmental and social costs (Doenier et al. 1997, Cooper and Ginnet 2000, O'Brien et al. 2002, Dunkley and Cattet 2003). In our study, increased hunter opportunity in the form of SAFS in 2003 was more effective in increasing the kill from 2002 to 2003. Moreover, lagged negative effects of SAFS in 2002 are consistent with population reduction. We caution, though, that increased opportunity to harvest antlerless deer may become ineffective when demand for venison or hunting opportunity becomes saturated (Van Deelen and Etter 2003, Giles and Findlay 2004). Long-term solutions to overabundance must include increased hunter numbers, increased willingness to harvest additional deer (e.g., venison donation programs) and increased hunter efficiency.

Demonstrated disease risks associated with baiting (e.g., O'Brien et al. 2002, Palmer et al. 2004) probably justifies baiting bans in large geographic areas surrounding outbreaks of infectious disease (Williams et al. 2002, Bartelt et al. 2003). Management actions must, however, be sensitive to the fact that baiting is very popular with some stakeholders in jurisdictions where it is currently legal. Dramatic changes in policy may alienate stakeholders and create further road blocks to management programs apart from the scientific support behind them (Heberlein 2004). Experience in Wisconsin is instructive. Managers should resist the establishment of baiting for deer where it is currently not permitted and should enlist the help of human dimensions and education specialists to end the practice where baiting is currently entrenched.

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