J. Field Ornithol., 62(3):378-385

WALK-IN TRAPS FOR CAPTURING GREATER PRAIRIE-CHICKENS ON LEKS

MICHAEL A. SCHROEDER
Department of Fishery and Wildlife Biology
Colorado State University
Fort Collins, Colorado 80523 USA

CLAIT E. BRAUN
Colorado Division of Wildlife
Wildlife Research Center
317 West Prospect Road
Fort Collins, Colorado 80526 USA

Abstract.—Walk-in traps were used to capture 132 female and 99 male Greater Prairie-Chickens (*Tympanuchus cupido*) in northeastern Colorado during 1986–1989. Females were captured on 6.7% and males on 5.0% of 1970 funnel days (usually one funnel per trap). Trap placement on leks influenced capture success of males and females; both sexes were more difficult to capture as they walked away from the center of leks than toward the center of leks. The likelihood of capturing females appeared to peak during 5–20 April; these dates corresponded to the peak period of female attendance on leks. In contrast, males were captured throughout the breeding season (March–April). This technique provides excellent opportunities to capture prairie grouse, particularly females, with minimal disturbance on leks.

TRAMPAS DE TÚNELES PARA LA CAPTURA DE *TYMPANUCHUS CUPIDO* EN LEKS

Sinopsis.—En un estudio que se llevó a cabo en el noreste de Colorado durante 1986–1989 se utilizaron trampas de túneles, para la captura de 132 hembras y 99 machos de pollos de la pradera (*Tympanuchus cupido*). En 1970 días-túneles (cada conjunto de túneles contado como un día-tunel) se capturaron 6.7% y 5.0% de hembras y machos, respectivamente. La localidad de la trampa en los leks influyó en el éxito de captura de hembras y machos; ambos sexos resultaron ser más dificiles de capturar mientras se movían desde el centro del lek hacia la periferia que durante el movimiento en dirección contraria. La probabilidad de capturar hembras pareció maximizarse del 5–20 de abril; estas fechas corresponden al pico del periodo de visita al lek por parte de las hembras. En contraste, los machos fueron capturados a través de toda la época de reproducción (marzo-abril). Esta técnica facilita la captura de hembras, con disturbios mínimos al lek.

Numerous techniques have been used for capturing prairie grouse including cannon nets (Giesen et al. 1982, Silvy and Robel 1968), mist nets (Campbell 1972, Silvy and Robel 1968), spotlights (Drewien et al. 1967, Giesen et al. 1982), helicopters (Brown 1981), drop nets (Jacobs 1958), bownets (Anderson and Hamerstrom 1967), noose carpets (Berger and Hamerstrom 1962) and walk-in traps (Hamerstrom and Hamerstrom 1973, Haukos et al. 1990, Toepfer et al. 1988). Many of the techniques included modifications such as trap placement (leks, bait sites and travel corridors), trap design (Haukos et al. 1990), and use of hen decoys (Anderson and Hamerstrom 1967) and male vocalizations (Silvy and Robel 1967). Other than Toepfer et al. (1988) and Haukos et al. (1990),

little has been documented about the specific use of walk-in traps at lek sites.

This paper describes the design and documents the effectiveness of walk-in traps at Greater Prairie-Chicken (*Tympanuchus cupido*) leks in northeastern Colorado. Although similar trapping systems were described for Greater Prairie-Chickens by Toepfer et al. (1988) and for Lesser Prairie-Chickens (*T. pallidicinctus*) by Haukos et al. (1990), aspects of the trap design and effectiveness were different.

METHODS

We used walk-in traps to capture Greater Prairie-Chickens on 17 leks in 1986–1989 on a 301-km^2 area centered 10 km northeast of Eckley, Colorado (40°11′N, 102°22′W). There were 2–24 males at each lek (based on at least two counts). The area consisted of grassland, sand sagebrush (*Artemisia filifolia*) and small soapweed (*Yucca glauca*) intermixed with irrigated fields, primarily of corn. Lek sites generally were on exposed areas with relatively short and sparse vegetation; blue grama (*Bouteloua gracilis*) typically was dominant.

Walk-in traps were made with 183 × 46 cm sections of 5 × 10 cm welded wire. Approximately 32 traps were made from a 30.5-m roll of 91-cm tall wire. By cutting the roll in half lengthwise, each trap had a series of 5 cm points that could be imbedded in the ground. A funnel was made for each trap with 2.5 cm chicken-wire (poultry netting) (Fig. 1). Funnels were fitted between the ends of each cut section of welded wire (Fig. 2), and any exposed wire points were bent so captured birds would not hurt themselves. Each trap was covered with nylon net with a mesh size of 1.27 × 1.27 cm (nylon string was approximately 0.16 cm in diameter). Although the nets were white, tan or blue, all colors were light and/or faded. The nylon net was laced with string near the edge of each trap so that birds could be retrieved through the net.

Each walk-in trap was arranged with chicken-wire leads (5–15 m long and 46 cm high) to maximize the potential for success. All traps and leads were secured with metal stakes pushed into the ground. Although all traps were placed in or near the center of prairie-chicken activity on the lek, several basic arrangements were used (Fig. 3). Some traps were oriented such that birds were likely to encounter the trap when walking toward the center of the lek and others were positioned so that birds would encounter traps when walking away from the center. Although definitions of trap orientation (inward, neutral and outward) were somewhat arbitrary, they enabled the relative effectiveness of different trap orientations to be compared.

Trapping protocol was relatively consistent throughout the study. Traps typically were set on 2–3 leks for each researcher; this enabled us to monitor traps and remove captured birds on a regular basis (every 30–45 min). Although traps frequently were left in position 24 h a day, we only monitored them in the mornings and evenings when birds were present on leks. We used a relative arbitrary set of considerations to justify

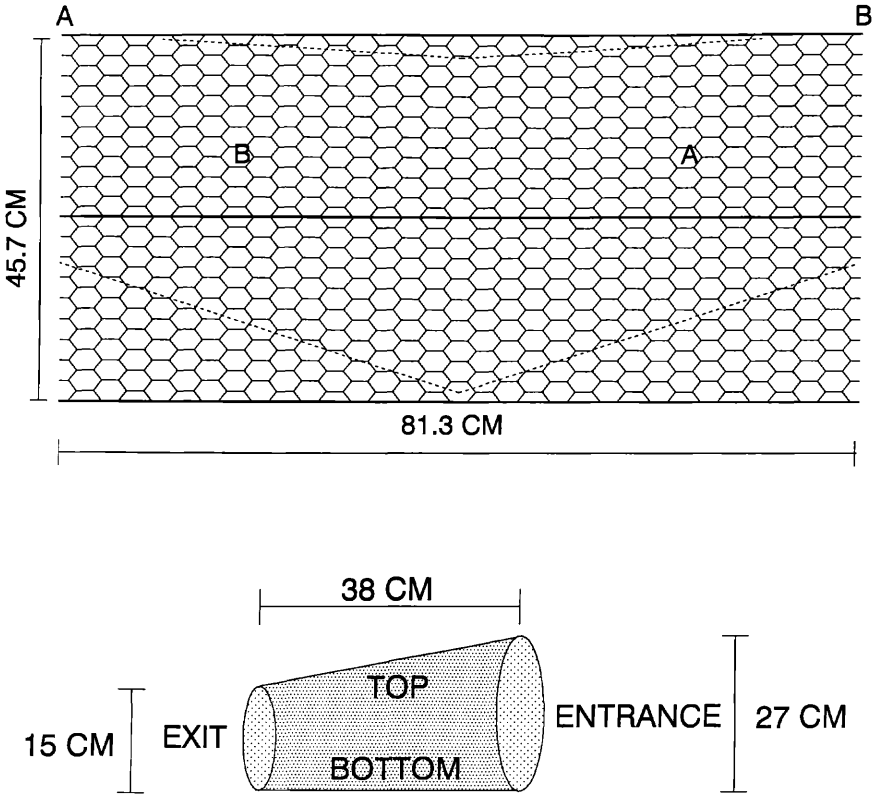

FIGURE 1. Funnel design for Greater Prairie-Chicken walk-in traps in northeastern Colorado, 1986–1989. To construct, dashed lines should be folded, similar letters should be connected and exposed points should be blunted.

the removal of birds from traps, and by necessity, the disturbance of the lek: 1) more than 1 bird was in a single trap, 2) birds were in traps a 'long' time, 3) other uncaptured birds had left the lek, 4) the potential to capture additional birds was low, and 5) a raptor was observed on or near the lek.

RESULTS

A total of 1970 funnel days (each set funnel counted as a funnel day) was used to capture 231 birds (Table 1). Traps were more likely to capture females than males ($\chi^2 = 5.008$, $P = 0.025$). In addition, the three orientations of traps were variable with respect to trapping efficiency of both males ($\chi^2 = 7.055$, $P = 0.070$) and females ($\chi^2 = 7.907$, $P = 0.048$). Both sexes apparently were more difficult to catch in traps facing inward (Table 1). Trapping dates within the breeding season appeared to be more important for capturing females than males (Fig. 4). Females

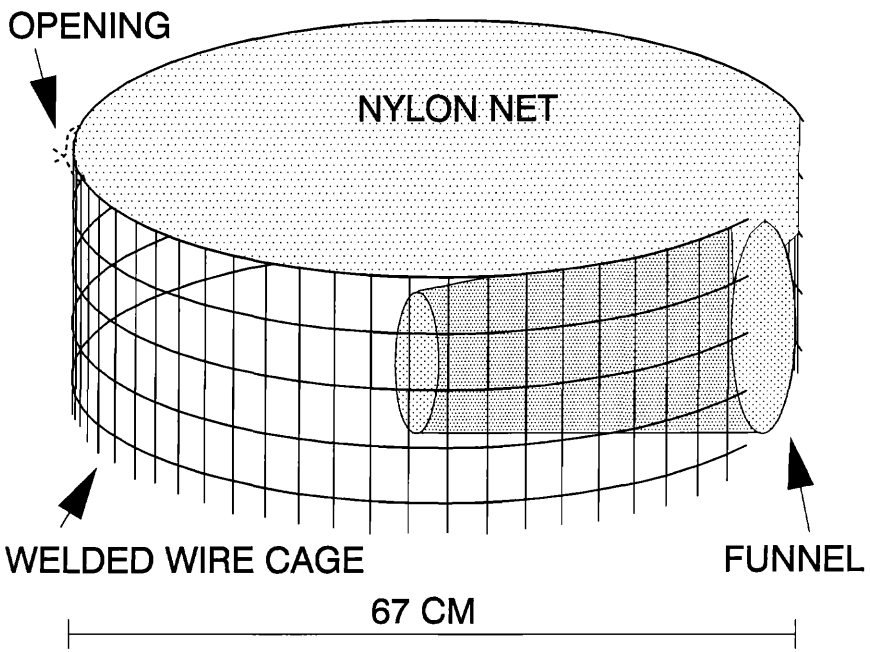

FIGURE 2. Configuration of funnel, welded wire cage and nylon net for walk-in trap for capturing Greater Prairie-Chickens in northeastern Colorado, 1986–1989.

were caught more easily during 5–20 April, while trapping success for males remained relatively stable throughout the breeding season. Furthermore, most birds (82%) were captured during the morning time periods.

At least 20 birds escaped through the funnels after they were captured; the funnel described herein was designed to reduce these escapes (previous funnels were shorter). Although a few birds may have escaped through holes in the netting, these escapes were relatively easy to prevent. In addition, three birds escaped during the process of removing birds from traps.

Approximately 10% of birds captured were slightly injured as a result of being trapped. These injuries consisted of small cuts on the forehead directly above the maxilla, the wing near the base of the alula, and the back of the neck and head. The former injury was common when birds were in traps for long periods of time; they constantly probed their heads through the sides of traps. The latter two injuries were common when males were captured simultaneously in the same trap; head injuries were caused by pecking by the other bird and wing injures by attempts to escape. Frequency of all injuries was reduced by rapid removal of birds from traps and improvements in trap design (elimination of exposed metal points). Most birds were in traps 30–45 min before removal. When more

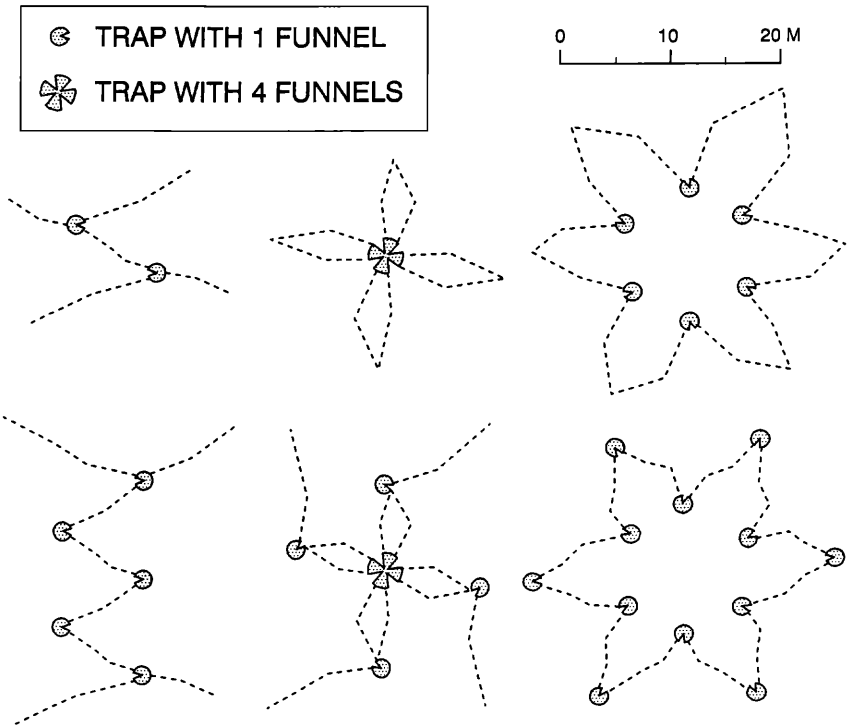

FIGURE 3. Typical arrangements of walk-in traps and 46-cm high chicken-wire leads (dashed lines) for capturing Greater Prairie-Chickens in northeastern Colorado, 1986–1989. The open sides of traps represent the direction of entrance by birds.

than one bird was in a single trap, they were removed within 15 min of capture.

Eight mortalities were recorded during 1986–1987 (3.5% of all captures). Two males apparently died of heat stress while in traps, one male was impaled by the bottom of the trap as he tried to escape and one male

TABLE 1. Trap success for male and female Greater Prairie-Chickens in relation to trap orientation in northeastern Colorado, 1986–1989. Funnel openings were pointed toward the center of the lek (inward), away from the center of the lek (outward) or with no particular direction (neutral).

Category	Funnel days	Males		Females		Total	
		N	%	*N*	%	*N*	%
Inward	753	25	3.32	35	4.65	60	7.97
Outward	425	26	6.12	36	8.47	62	14.59
Neutral	792	48	6.06	61	7.70	109	13.76
Total	1970	99	5.03	132	6.70	231	11.73

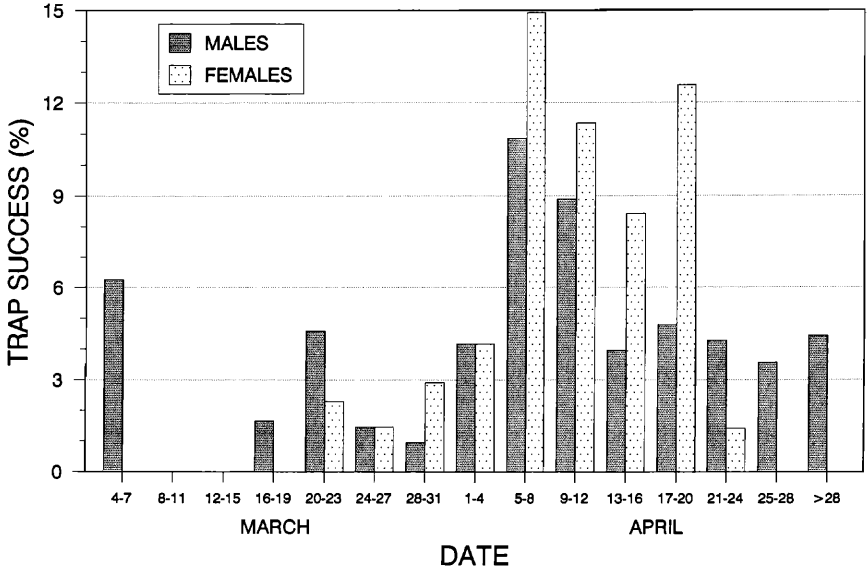

FIGURE 4. Distribution of Greater Prairie-Chicken trapping success during the breeding season in northeastern Colorado, 1986–1989.

was killed by another male in the same trap. Four birds (three females and one male) were killed by raptors when they were in traps; one was killed by a Ferruginous Hawk (*Buteo regalis*) and three were killed by a Golden Eagle (*Aquila chrysaetos*). The Golden Eagle mortalities all occurred on the same morning and lek. Seven of the eight mortalities could have been prevented with increased monitoring of traps. For example, both Northern Harriers (*Circus cyaneus*) and Ferruginous Hawks attempted to kill birds at least four times on leks during 1988–1989; these mortalities were prevented by prompt removal of captured birds.

DISCUSSION

Techniques for capturing males and females were not identical in this study. Overall, the effectiveness of these techniques for capturing males and females could not be compared because the abundance of neither sex was known. Females apparently were easier to capture, however, when traps were placed where they were apt to move; typical female movement on leks was often determined with observations of leks (from a vehicle or a blind). In contrast, males appeared to be easier to catch when traps and chicken-wire leads were rearranged frequently. Females apparently moved throughout the lek while each male remained on a relatively small area.

Traps in this study were specifically arranged to maximize the potential for trapping females. A trap with four funnels was specifically designed

to optimize the spacial arrangement of traps and leads in the middle on leks; this design appeared to be useful for capturing females. Likewise, funnels were modified several times to increase either the likelihood of a bird entering and/or remaining in the trap. Trapped birds circled inside the traps trying to find a way out. If funnels were too high (distance between ground and top of funnel) and/or short (distance between openings of funnel), birds were more likely to walk around the funnel rather than walk over it. The former behavior often resulted in the bird's escape.

Success rates (captures/funnel day) for capturing Greater Prairie-Chickens were relatively low (12%) when compared to a similar technique used for Lesser Prairie-Chickens (35%) (Haukos et al. 1990). Haukos et al. (1990), however, defined a connecting set of traps and leads as one trap unit. An equivalent definition in this study resulted in a success rate of approximately 60%. Also, our trapping technique was more effective for capturing females. These considerations are contingent on the density of birds on leks, the relative propensity of females to enter traps, and the number of funnels per trap, however. Additionally, the likelihood of capture for males and females was occasionally affected by the presence of birds in traps; captured birds often attempted to chase or avoid birds that were outside traps. Whether these interactions increased or decreased the likelihood of capture was not known.

Walk-in traps have several advantages over other trapping methods (Haukos et al. 1990). Unlike most other trapping techniques, they can be set unattended on several leks at the same time. This minimizes disturbance, especially if traps can be monitored from relatively far away. Additionally, walk-in traps are inexpensive to make and/or modify; each trap cost less than $10 (US) to make (including chicken-wire leads). Finally, walk-in traps on leks appear to be particularly effective for capturing females, whereas most methods are relatively more effective for capturing males.

ACKNOWLEDGMENTS

M. E. Rasmussen and L. A. Robb assisted with fieldwork, R. E. Bennetts, R. L. Knight, O. B. Myers, L. A. Robb, B. Van Horne and G. C. White provided helpful discussions during the research, and T. D. I. Beck, M. Dimare, F. Hamerstrom, R. L. Knight, L. A. Robb, R. J. Robel, W. D. Snyder, B. Van Horne and G. C. White reviewed earlier drafts of the paper. This work was supported by the Colorado Division of Wildlife through Federal Aid in Wildlife Restoration Project W-152-R and the Nongame Checkoff Fund.

LITERATURE CITED

ANDERSON, R. K., AND F. HAMERSTROM. 1967. Hen decoys aid in trapping cock prairie chickens with bownets and noose carpets. J. Wildl. Manage. 31:829–832.

BERGER, D. D., AND F. HAMERSTROM. 1962. Protecting a trapping station from raptor predation. J. Wildl. Manage. 26:203–206.

BROWN, D. L. 1981. The helinet: a device for capturing prairie chickens and Ring-necked Pheasants. Proc. Southeast. Assoc. Fish Wildl. Agencies 35:92–96.

CAMPBELL, H. 1972. A population study of Lesser Prairie Chickens in New Mexico. J. Wildl. Manage. 36:689–699.

DREWIEN, R. C., H. M. REEVES, P. F. SPRINGER, AND T. L. KUCK. 1967. Back-pack unit

for capturing waterfowl and upland game by nightlighting. J. Wildl. Manage. 31:778–783.

GIESEN, K. M., T. J. SCHOENBERG, AND C. E. BRAUN. 1982. Methods for trapping Sage Grouse in Colorado. Wildl. Soc. Bull. 10:224–231.

HAMERSTROM, F. N., JR., AND F. HAMERSTROM. 1973. The prairie chicken in Wisconsin. Highlights of a 22-year study of counts, behavior, movements, turnover and habitat. Wisconsin Dep. Nat. Resour., Tech. Bull. 64.

HAUKOS, D. A., L. M. SMITH, AND G. S. BRODA. 1990. Spring trapping of Lesser Prairie-Chickens. J. Field Ornithol. 61:20–25.

JACOBS, K. F. 1958. A drop net trapping technique for Greater Prairie Chickens. Proc. Okla. Acad. Sci. 38:154–157.

SILVY, N. J., AND R. J. ROBEL. 1967. Recordings used to help trap booming Greater Prairie Chickens. J. Wildl. Manage. 31:370–373.

———, AND ———. 1968. Mist nets and cannon nets compared for capturing prairie chickens on booming grounds. J. Wildl. Manage. 32:175–178.

TOEPFER, J. E., J. A. NEWELL, AND J. MONARCH. 1988. A method for trapping prairie grouse hens on display grounds. Pp. 21–23, *in* A. J. Bjugstad, Tech. Coord. Prairie chickens on the Sheyenne National Grasslands. U.S. Dep. Agric. Gen. Tech. Rep. RM-159.

Received 4 Dec. 1990; accepted 12 Jan. 1991.