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TWO WALK-IN TRAP DESIGNS FOR GREAT HORNED OWLS AND RED-TAILED HAWKS

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Abstract.—Walk-in funnel traps were used to capture Great Horned Owls (*Bubo virginianus*) and Red-tailed Hawks (*Buteo jamaicensis*) in Iowa, and a modified walk-in trap, equipped with a spring-loaded door operated by a monofilament trip-wire was developed. Capture latencies were 37–59 trap-nights/owl and approximately 24 trap-days/hawk, although hawks were trapped for a much shorter duration than owls. No serious injuries or mortality occurred in 56 captures of owls and hawks. Both traps could be set and left unattended for long periods, but the trip-wire trap provided a more accessible entrance and prevented birds from escaping after capture. Both traps were easy to build and costs were comparable to, or less expensive than, other box-style raptor traps.

DOS TRAMPAS DISEÑADAS PARA LA CAPTURA DE *BUBO VIRGINIANUS* Y *BUTEO JAMAICENSIS*

Sinopsis.—Se diseñaron dos tipos de trampas para la captura de búhos (*Bubo virginianus*) y halcones de cola roja (*Buteo jamaicensis*) (Fig. 1 y 2). Las mismas fueron equipadas con una puerta de resorte operada con un alambre de monofilamento. La incidencia de captura fue de un búho por cada 37–59 noches de intento de atrapamiento y de un halcón aproximadamente cada 24 días de intentos de atrapamiento, aunque el período de tiempo dedicado a atrapar halcones fue menor que el de los búhos. No ocurrieron heridas serias o pérdida de animales en las 56 capturas de búhos y halcones. Ambos tipos de trampas pueden dejarse en funcionamiento por períodos prolongados de tiempo. La trampa con puerta de resorte proveyó una entrada más accesible a las rapaces y evitó que éstas excaparan luego de ser atrapadas. Ambas trampas fueron fáciles de construir y el costo muy comparable o menor que el de otros tipos de trampas típicas para la captura de rapaces.

Many techniques exist to live-trap birds of prey (Bloom 1987), but capturing some raptors often requires many trap types and considerable time and effort (Bloom 1987, Fuller and Christenson 1976). Commonly used designs such as the bal-chatri (Berger and Mueller 1959), bow trap (Meredith 1943, Tordoff 1954), harnessed pigeon (Webster 1976), padded leghold trap, and mist or dho-gaza nets (Bloom 1987, Bloom et al. 1992)

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may require extensive pre-trapping raptor searches and nearly constant attendance, which can be major disadvantages when distances between trapping sites are large and personnel are limited.

Peterson (1979) used modified Prairie-chicken (*Tympanuchus* spp.) walk-in funnel traps to capture Great Horned Owls (*Bubo virginianus*) and found the traps could be left unattended overnight without risking injury to captured birds. These walk-in traps were patterned after a design described by Hamerstrom (1984) for capturing Barred Owls (*Strix varia*).

In 1988 and 1989 we used similar funnel walk-in traps in Iowa to capture Red-tailed Hawks (*Buteo jamaicensis*) and Great Horned Owls. Funnels were constructed of welded-wire mesh instead of chicken wire for durability and ease of adjustment. We occasionally saw tracks near set traps indicating owls circled traps rather than entering directly through the funnels, and we observed some owls perched on top of traps or near the trap sides. This indicated that owls may have had difficulty finding entrances, possibly due to obstructed vision from the narrow funnel openings. Once trapped, owls occasionally escaped back through the welded-wire funnels, thereby increasing the risk of injury. We found no evidence, however, that owls were injured after escaping in this manner.

In 1989 we redesigned the funnel walk-in trap to accommodate a trip-wired, spring-loaded door mechanism in place of funnels. Like its predecessor, the trip-wire trap required minimal attendance when set. The trap also provided a larger, less obstructive entrance and reduced escapes following capture. We describe construction of funnel and trip-wire traps, their field use, and their performance for capturing Great Horned Owls and Red-tailed Hawks. Trap construction and described use were developed following criteria of the Animal Welfare Act.

MATERIALS AND CONSTRUCTION

Both traps consisted of wooden rectangular frames with welded-wire mesh panels attached to one or both ends and nylon webbing to cover the top and sides. Our funnel traps (Fig. 1) had welded-wire funnels placed at the two narrow ends. The funnel trap was modified into the trip-wire trap by closing off one funnel entrance and replacing the other entrance with a hinged door (Fig. 2). The trip-wire trap was sprung when a raptor walked in the entrance and tripped a monofilament line, causing the spring-loaded door to close behind. The following sections detail construction of the two traps.

Funnel and trip-wire trap box frame.—Trap frames were constructed from 1.91 × 6.35-cm boards. Upper and lower frame boards were screwed together at the corners. Vertical supports were then bolted to the inside corners of the upper and lower frame pieces to complete the basic frame design. Nylon webbing (#15 wall webbing with 5.1-cm square mesh, Nylon Net Company, Memphis, TN) treated with green, synthetic-base coating was placed over the top and sides of the trap frame. The webbing was then stretched tight and stapled to the outside frame.

Funnel design and attachment (funnel trap).—Funnels for the funnel

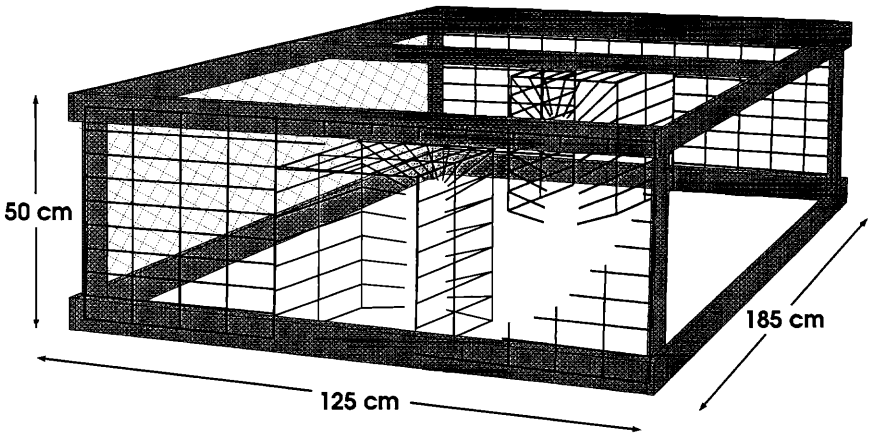

FIGURE 1. Walk-in funnel trap.

walk-in trap were shaped from a 90 × 120-cm section of 12.5-gauge welded-wire (5.1 × 10.2-cm mesh), bent in the form of a square funnel (Fig. 1). The last two rows of 5.1-cm tines were cut out of one end of the welded-wire and the 10.2-cm horizontal tines were bent inward and slightly down to close the entrance partially.

To install funnels, an opening was cut from the center of each welded-wire end panel. Leaving two horizontal rows of mesh at the top provided sufficient opening size. Rough edges of the welded-wire were filed smooth, and funnels were tied to the panel openings with 16-gauge wire. Funnel tines protruding into the trap were readjusted to desired opening size.

Door frame (trip-wire trap).—The trip-wire trap door was constructed of 1.9 × 3.8-cm lumber screwed together at the corners. A 38-mm corner iron was attached to each inside corner to add strength and prevent warping.

Doors were covered with nylon webbing in the same manner as trap frames. A door latch, bent from an 8 × 18-cm metal mending plate to a 45° angle, was attached to the bottom front board of each trap frame to hold the door shut after closure (Fig. 2). Two 38-mm fixed-pin utility hinges and two pull springs were used to attach each trap door and ensure rapid closing. Pull springs were approximately 26-cm long and 1.1-cm wide with a 1.025-mm wire diameter. The springs were attached to 3.5-cm screw eyes placed on the door frame and along the bottom of the trap frame.

Trip-wire frame and mechanism.—The trip-wire frame was assembled from 1.9 × 3.8-cm lumber and placed far enough into the trap to prevent the closing door from injuring an entering raptor. The trip-release mechanism incorporated two 18-kg test monofilament lines, an 8-mm flat washer, and a number 16 duplex nail bent 90° approximately 1.5 cm from the

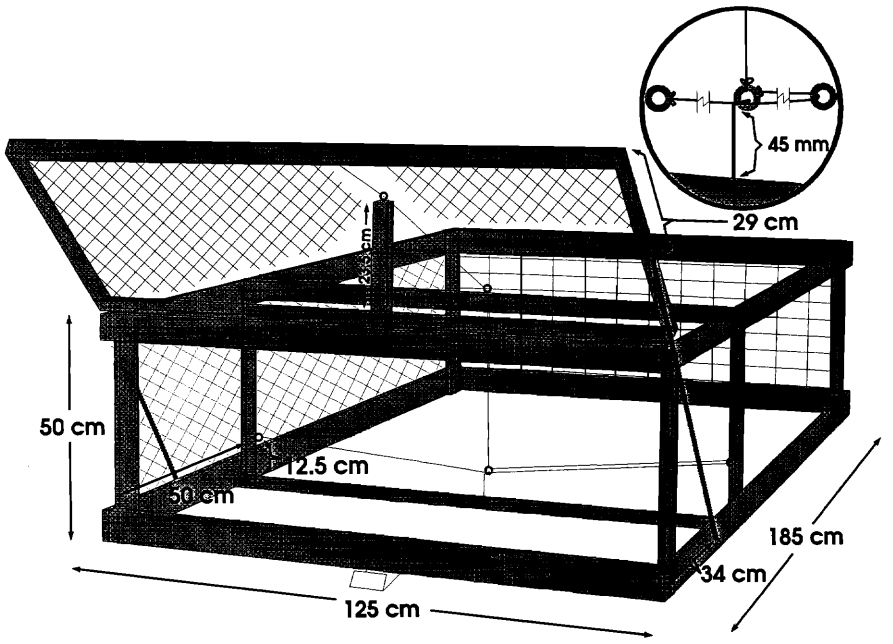

FIGURE 2. Walk-in trip-wire trap with inset of washer and nail trip-release mechanism.

pointed end (Fig. 2). One monofilament line formed the horizontal trip-wire, which spanned the trap bottom. The other line (vertical trip line) was tied to the washer and threaded through two screw eyes and tied to a third eye on the lower door frame. The bent nail was centered and stapled head down on the bottom board of the trip-wire frame, with the bent end facing toward the rear of the trap. The washer was placed precariously on the very tip of the bent nail to allow release of the door upon the slightest pressure placed against the trip-wire. Enough vertical trip line was used to hold the door at an angle producing enough tension to keep the washer in place on the nail, but not cause the door to swing backward. Filing each nail where the washer rested controlled trip-wire sensitivity.

FIELD USE

Great Horned Owls and Red-tailed Hawks were trapped in Lucas and Wayne Counties, Iowa (40°57′N, 93°18′W). Land use consisted of corn and soybean production, pasture, and intermittent tracts of disturbed woodlots, bottom woodlands, and wooded ravines or waterways. Great Horned Owls were trapped from 5 Mar. to 16 Jun. 1988 and from 27 Jan. to 14 Jul. 1989. Red-tailed Hawks were intentionally trapped from 5 Mar. to 15 May 1988 but only captured incidently in 1989.

Pigeons (*Columba livia*), domestic chickens (*Gallus gallus*), or captive-

bred Northern Bobwhite (*Colinus virginianus*) served as lure animals. Lure animals were placed in welded-wire cages for protection. Traps were set by placing lure cages between funnels of the funnel trap, or behind and well away from trip-wire mechanisms of the trip-wire trap.

In 1988 we left funnel traps set for 24-h periods to catch hawks and owls, although lure animals were changed 2–3 times daily. In 1989 traps were set in the afternoon and checked the following morning. Lure animals were removed from traps during the day. Traps were not set, or were checked frequently during precipitation events or when temperatures fell below freezing.

We used 1–11 funnel traps simultaneously in 1988, and 1–25 funnel and trip-wire traps in 1989. Traps were placed in open agricultural areas near perch trees, utility poles or within 25 m of hedgerow or forest edge.

Trip-wire traps were used from 22 Feb. to 14 Jul. 1989, and were used exclusively from 22 Feb. to 6 Jun. 1989. After 6 Jun. 1989, we placed both trap types within range of previously radio-tagged owls to recapture specific individuals.

RESULTS AND DISCUSSION

Funnel trap use in 1988 resulted in captures of 11 adult Great Horned Owls in 462 trap-nights. Three adult and four immature Red-tailed Hawks were captured in approximately 165 trap-days. Capture latencies averaged 42.0 trap-nights/owl and 23.6 trap-days/hawk. Owls were captured 19 times in 1988, resulting in a total capture latency (including recaptured individuals) of 24.3 trap-nights/capture.

In 1989 we captured three owls in 178 trap-nights (59.3 trap-nights/owl) with funnel traps and 15 owls in 554 trap-nights with trip-wire traps (36.9 trap-nights/owl). Owls were captured 28 times (including recaptures), averaging 25.4 trap-nights/capture with funnel and 26.4 trap-nights/capture with trip-wire traps. Two adult Red-tailed Hawks were captured incidently in 1989, one in each trap type.

Although trip-wire traps captured 83% of the owls in 1989, we could not directly compare capture rates between the two trap types because trap placement was not random, different lure animals were used, and only trip-wire traps were used during a 3-mo period from late winter to spring.

The funnel trap design was advantageous for capturing multiple birds in the same trap. We captured two adult Red-tailed Hawks (mated pair) in one funnel walk-in trap, and an adult owl with a recently fledged juvenile owl in another. Multiple bird captures may increase the risk of injury, but we found no evidence of harm or aggressiveness when two related birds were in the same trap. We found funnel traps were not as effective holding owls after capture, however. On three occasions we noticed Great Horned Owl talon marks in the snow inside a funnel trap or owl feathers near and inside the trap, but no owl in the trap. There was no evidence that any owl escaped from a trip-wire trap.

Although owls and hawks could have remained in the traps nearly 12

h after capture, we observed no serious injuries or mortality with either trap design. Owls and hawks remaining in a trap for extended periods exhibited only minor scrapes on the cere from bumping the webbing. The welded-wire funnels did not appear to induce injury. Other trapping techniques such as mist nets have injured raptors (Fuller and Christenson 1976), especially when monitored infrequently.

We found no evidence of predation on trapped owls and hawks, although foxes (*Vulpes vulpes*) and coyotes (*Canis latrans*) were abundant on the study area and raccoons (*Procyon lotor*) and opossums (*Didelphis virginiana*) occasionally raided traps when no raptors were present. Trapping in areas where Golden Eagles (*Aquila chrysaetos*) occur may require additional monitoring to avoid predation attempts on trapped individuals.

Both traps were simpler in design, easier to transport, and equally or less expensive to build than other containment designs such as the Swedish goshawk trap (Kenward et al. 1983, Meng 1971). Traps were easily transported, 2–3 at a time, in a pick-up truck or on a small trailer. We made one trap in 2–3 h at a cost of $30–45 (U.S.) for materials.

In some cases the two designs may be more effective than bal-chatri, dho-gaza nets, or bow nets (Berger and Mueller 1959, Bloom et al. 1992, Tordoff 1954). Although success of these other designs is usually measured in minutes or hours, one must consider time required to locate trapable birds and assemble equipment.

We recommend walk-in traps be used in combination with other trap designs to increase capture efficiency when trapping Great Horned Owls or Red-tailed Hawks. Walk-in traps require less monitoring and can be set overnight or in the day at multiple trapping stations while personnel are actively trapping roadsides with a bal-chatri or pigeon harness, or while mist netting from a blind. Recapturing individuals may be more successful when using several trap designs, because raptors may be less likely to become "trap shy" (Fuller and Christenson 1976).

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