

Reducing Injuries to Terrestrial Furbearers by Using Padded Foothold Traps

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pendicular arrangement may be more of a deterrent than a parallel one, because birds have to fly into a square and not a long row. However, neither of these options would be practical for most blueberry plantings, because people harvesting the berries must walk between the rows of plants.

The tape may be more effective for protecting shorter crops where birds have less room to maneuver under the tape. Growers in Washington reported using Bird-Scaring Reflecting Tape successfully on strawberries (M. Pitzler, U.S. Dep. Agric., pers. commun.). Further studies are needed to elucidate how birds react to the tape in various situations in order to determine its utility on other fruit crops.

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REDUCING INJURIES TO TERRESTRIAL FURBEARERS BY USING PADDED FOOTHOLD TRAPS

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The standard foothold trap is used widely in North America as the most common means

of harvesting many furbearers; >66% of all traps purchased in the United States are of this type (Woodstream Corp., Lititz, Pa.). In spite of the introduction of killing traps, such as the Conibear® (reference to trade names or com-

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Table 1. Point scores assigned to limb injuries of furbearers captured in foothold traps. Points were accumulated for each type of unrelated injury.

Description of injury	Points scored
Apparently normal	0
Edematous swelling and hemorrhage	5
Cutaneous laceration <2 cm	5
Cutaneous laceration >2 cm	10
Tendon or ligament laceration	20
Joint subluxation	30
Joint luxation	50
Compression fracture above or below carpus	30
Simple fracture at or below carpus or tarsus	50
Compound fracture at or below carpus or tarsus	75
Simple fracture above carpus or tarsus	100
Compound fracture above carpus or tarsus	200
Amputation of digits	
1 digit	50
2 digits	100
3 digits	150
4-5 digits	200
Amputation above digits	400

panies does not imply endorsement), many species can only be caught routinely with a foothold trap.

In response to concern about leg injuries sustained by animals captured in foothold traps, padded-jaw traps have been developed and tested. Earlier studies (R. G. Linscombe and N. W. Kinler, La. Dep. Wildl. and Fish., Prog. Rep. 1983; Tullar 1984) indicated that padded traps substantially reduced limb injury. The Woodstream Corporation began marketing a padded trap in the U.S. and Canada in 1984 under the trade name Soft Catch®.

The Fur Resources Committee of the International Association of Fish and Wildlife Agencies was formed in 1975 to promote the intelligent use of fur resources through effective wildlife management and to provide direction and coordination for fur resources research. The committee believed wildlife biologists should have information on both the effectiveness of the new padded trap and its capability to reduce injury. Accordingly, a study was undertaken in 9 states, and super-

vised by furbearer biologists in those states, to test the new padded trap under various trapping and weather conditions. We compared the type and magnitude of limb injury sustained by furbearers captured by padded versus standard foothold traps.

METHODS

Bobcats (*Felix rufus*), coyotes (*Canis latrans*), red foxes (*Vulpes vulpes*), gray foxes (*Urocyon cinereoargenteus*), and raccoons (*Procyon lotor*) were caught by cooperating trappers during 1984-1985. Bobcats were caught in Arizona, Georgia, Kansas, Louisiana, and Texas; coyotes in Arizona, Idaho, Kansas, and Texas; and red and gray foxes in Georgia, Louisiana, Minnesota, New York, and Texas. Raccoons were trapped in Georgia, Louisiana, Minnesota, Mississippi, New York, and Texas.

We tested 2 standard foothold traps, Victor coil spring traps Nos. 1½ and 3. These traps were modified by moving the side-mounted 15-cm chain to the bottom and center of the trap. We replaced the (angular) jaws on No. 3 traps with rounded jaws. We also tested 2 padded traps, the "fox" and "coyote" Soft-Catch®. The first corresponded in size to a No. 1½ and was used for raccoons, red foxes, gray foxes, and eastern bobcats, while the second corresponded to a No. 3 and was used for coyotes and western bobcats. Participating biologists indicated that these trap sizes, types, and brands were used most often for taking the above species.

State biologists instructed selected trappers on procedures. Padded and standard traps were alternated along trap lines and all traps were staked.

Captured animals were killed as soon as possible upon approach to the trap site and a numbered aluminum tag was attached to the trapped foot. Before skinning, trappers removed limbs at least 15 cm above the point of trap strike, except for raccoon limbs, which were removed as far as practical above the point of trap strike. Limbs were frozen until analysis.

Limbs were identified by a numbered tag only, assuring that persons performing radiographic and necropsy procedures were unaware of the type of trap that captured the animal. Limbs were thawed and radiographed by taking standard anterior-posterior and lateral views. Limbs were then skinned and dissected, with all traumatic injuries being noted in descriptive terms and given a limb damage score (Table 1), based on a procedure modified from Olsen et al. (1986). Points were assigned for each category only once (e.g., 2 lacerations each <2 cm long would score 5 points). No additional points for skin laceration were awarded if the laceration was, by definition, part of a higher scoring injury (compound fracture or amputation). Likewise, tendon damage or a fracture considered part of an amputation was not scored separately from the amputation. The score for any particular limb was the sum of points assigned for injuries to that limb.

Table 2. Cumulative scores^a assigned to 5 furbearer species captured in padded and standard foothold traps in 9 states in 1984–1985.

Species (Region)	Trap ^b type	n	Injury score classes						P ^c
			0–15	20–45	50–80	85–120	125–395	400+	
Red fox	P	30	26	2	2	0	0	0	0.01
(East)	S	48	22	8	14	3	1	0	
Gray fox	P	27	15	3	7	0	2	0	0.01
(East)	S	38	12	3	12	7	4	0	
Bobcat	P	7	5	0	0	1	1	0	0.30
(East)	S	14	8	4	2	0	0	0	
Raccoon	P	25	10	1	5	1	7	1	0.39
(Northeast)	S	35	12	4	7	5	4	3	
Raccoon	P	75	35	6	9	6	17	8	0.01
(Southeast)	S	98	22	12	11	5	24	16	
Bobcat	P	24	19	2	3	0	0	0	0.02
(West)	S	33	21	4	5	2	1	0	
Coyote	P	31	20	6	3	2	0	0	0.01
(West)	S	36	10	7	14	0	5	0	

^a Point scores given in Table 1.

^b P = padded, S = standard.

^c Mann-Whitney *U*-test of different injury scores between trap types.

We used a Mann-Whitney *U*-test (Conover 1980) to compare ranks of summed scores for the 2 types of traps. Data from different states were combined as long as there was no evidence of differences among states. However, data from bobcats in the East and West were kept separate because larger traps were used in the West than in the East. The West was defined as Arizona, Kansas, and Texas for grouping coyote and bobcat data. Coyotes captured in Idaho were grouped into a separate region because of differential visitation rates between trap types (Linscombe and Wright 1988). The only bobcats caught in the East were from Georgia and Louisiana. Red and gray foxes were caught in Georgia, Louisiana, Minnesota, Mississippi, New York, and Texas; these states composed the East region. Raccoon data were separated into Northeast (Minn. and N.Y.) and Southeast (Ga., La., Miss., and Tex.).

RESULTS

The distribution of the cumulative injury scores for all 5 species resulted in natural groupings (Table 2). Obvious clusters occurred at injury scores of 5 and 10, 30–40, 55 and 60, near 100, 155, near 200, and 400–410. The 0–15 range reflected small cuts and bruises. The 30–40 point range represented minor joint damage in addition to cuts and bruises. The 55–60 point scores were primarily a result of dislocated joints or simple fractures below the carpals or tarsals. Simple fractures above the

carpus or tarsus or compound fractures below the carpus or tarsus usually resulted in scores near 100. Scores in the 155–200 range were the result of amputation of ≥ 2 digits or compound fractures of the limb. Scores ≥ 400 resulted from limb amputation.

The “fox” padded trap caused less damage than the No. 1½ standard trap on both red and gray foxes (Table 2). Only 7% of red foxes had ≥ 50 points of damage with the padded trap, but 38% had ≥ 50 points of damage from the standard trap. For gray foxes, 33% caught in padded traps had ≥ 50 points damage, while 61% of those caught in standard traps had this much or more damage. With the standard trap, gray foxes had more damage than red foxes; 29% of gray foxes had > 80 points damage, whereas only 8% of red foxes had this much damage.

Seven bobcats were caught with the “fox” padded trap and 14 with standard traps. There was no difference in the injury level for this species (Table 2).

Raccoons in the Northeast showed no difference in the amount of damage for the 2 trap types; however, raccoons in the Southeast had significantly less damage with the padded trap

than with the standard trap (Table 2). For the padded trap, 47% of raccoons had <15 points of damage, but only 22% had this little damage with the standard trap. Analysis showed that raccoons in the Northeast had less damage from standard traps than those in the Southeast ($P < 0.01$). The degree of injury associated with padded traps was not different ($P = 0.71$) between the Northeast and Southeast.

The "coyote" padded trap used in the West reduced damage to bobcats; only 13% had injuries that scored ≥ 50 points. Twenty-four percent of bobcats captured with the No. 3 standard trap had ≥ 50 points damage (Table 2). The difference in injury associated with trap types was even more striking for coyotes; 53% of coyotes had ≥ 50 points damage with the standard trap, while only 16% had this much damage with the padded trap. Twenty-four coyotes were caught in Idaho with only 4 in padded traps. No significant difference ($P > 0.10$) in damage between trap types was found, although the sample size for padded traps was small.

DISCUSSION

Scores for limb injury > 50 points indicate serious damage, and those > 125 are considered severe damage. Reduction in serious or severe injuries should be 1 goal of any new trap.

For red foxes the padded trap substantially reduced the frequency of serious and severe injuries resulting in only relatively minor injuries. However, the smaller gray fox was more likely to receive serious injury than the red fox with padded traps. Tullar (1984) also reported that padded traps were effective for reducing injury in foxes (red and gray fox samples were combined).

The small sample size for bobcats taken with the smaller traps makes conclusions concerning the padded trap premature; however, most bobcats were not seriously injured even with the No. 1½ standard trap. This low level of

injury may be a result of the relatively large size of the foot, the shape of the foot, or the passive response of a trapped bobcat.

Raccoons in the Southeast appeared to be injured more frequently than Northeast raccoons when caught in standard traps. This difference could be related to the larger size of the Northeast raccoons or behavioral response at different temperatures. Tullar (1984) concluded that resulting injuries were not different with standard and padded traps ($P > 0.05$) for raccoons in New York. However, we examined Tullar's data using a 1-tailed statistical test (appropriate because we were interested only in identifying traps that caused *less* damage) and concluded that the padded traps caused less damage than the standard ($P = 0.05$). The frequency and severity of injury to raccoons in the Southeast was reduced using padded traps; however, injury scores are still high and more work is needed to further improve padded traps for raccoons.

The "coyote" padded trap caused less injury to both coyotes and bobcats than the No. 3 standard trap. This finding agrees with the results of another recent study of coyotes captured with several different types of padded traps in Western states (Olsen et al. 1986). The difference in results for bobcats in the East and the West is due to the greater damage caused by the larger standard trap used in the West. However, 2 bobcats captured with the larger standard trap had only minor damage.

Results of this study indicated that padded traps can substantially reduce limb injury to coyotes, bobcats, red and gray foxes, and raccoons as compared to injuries from standard foothold traps. Properly used, the padded trap has the potential for reducing injury. Thus, padded traps are a more humane method for harvesting these terrestrial furbearers.

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EFFICIENCY OF PADDED FOOTHOLD TRAPS FOR CAPTURING TERRESTRIAL FURBEARERS

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In recent years trapping of furbearers has been criticized as being inhumane, and numerous attempts have been made to abolish trapping in the United States (Gentile 1987). One reaction in the wildlife profession has been to encourage and support the development and use of more humane traps. The Soft-Catch® trap (Woodstream Corp., Lititz, Pa.) is designed to reduce injuries while maintaining acceptable capture efficiency (reference to trade names or companies does not imply endorsement). The Fur Resources Committee of the International Association of Fish and Wildlife Agencies designed and implemented a study, which was conducted in 9 states, to evaluate the efficiency of the Soft-Catch trap. We report on a comparison of capture efficiency between padded-jaw foothold traps and standard steel-jaw traps.

METHODS

We compared Victor "fox" and "coyote" Soft-Catch padded traps and Nos. 1½ and 3 Victor coil spring

traps. Minor modifications to the standard traps included moving the side-mounted chain to the center and replacing the square jaws with rounded jaws on the No. 3 traps.

Furbearer biologists in each state were responsible for selecting trappers and supervising record keeping. Fifty-one trappers participated in the study during 1984-1985. Each trapper was supplied with 12 Soft-Catch traps and 12 standard traps, which were alternated along traplines. Trapping procedures (lures and type of set) varied among trappers and even along a trapline, but care was taken to insure that equal numbers of both trap types were used with each technique. All traps were set on dry ground and staked securely. Each trapper was assigned a quota for each trap type for 1 species and was instructed to continue trapping with both types of traps until the quota was reached. This requirement insured that both trap types were used in about equal numbers for all weather conditions encountered.

We pooled results where statistical tests indicated that no differences could be detected between states. Georgia, Louisiana, Minnesota, Mississippi, New York, and Texas (partial) composed Region 1. Region 2 was defined as Arizona, Kansas, and Texas (partial); and Region 3 included only Idaho.

Region 1 alternated the No. 1½ standard and "fox" padded traps for the capture of bobcats (*Felis rufus*), red foxes (*Vulpes vulpes*), gray foxes (*Urocyon cinereoargenteus*), and raccoons (*Procyon lotor*). Trappers in