AN EVALUATION OF TRAPPING EFFORTS TO CAPTURE BOBCATS, COYOTES, AND RED FOX [1]

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INTRODUCTION

Wildlife biologists are often involved in efforts to capture free-ranging felids and canids. The objective of these efforts is usually to remove individuals causing unwanted or excessive predation, or to obtain study animals. The most common method used to capture carnivores includes some type of leg-hold trap. Numerous references provide information on the technique of leg-hold trapping (Taylor 1971, Musgrove and Blair 1979); however few reports include an evaluation of these methods.

The objectives of our study were to examine seasonal variation in capture rates, evaluate selectivity of commonly used capture techniques, and to estimate the effort and cost to capture bobcats, coyotes, and red fox in a region having relatively low densities of these carnivores.

METHODS

Trapping efforts in 2 study areas were examined. The eastern area is located in Hancock and Washington Counties; the western area is in Somerset County. Extensive searches were often made throughout these areas to locate concentrations of bobcat, coyote, or red fox activity. Target animals were any bobcat, coyote, or red fox within the study areas. Captured target animals were equipped with a transmitting collar and released as part of a comprehensive study of predator ecology.

Several sizes of steel-jaw traps or leg snares were used. Traps were set in areas having an abundance of tracks or feces of target animals. Three basic trap sets were used including scent post, blind, and baited. A scent post set consisted of a conspicuous weed, stick, or rock sprayed with bobcat, coyote, or red fox urine. A trap was placed in the path we anticipated a target animal would use when investigating the scent. Blind sets were traps placed in trails or roads that were traveled by target animals. Baited sets included 1 or more traps placed adjacent to a meat bait, usually a carcass or portion of a carcass. The type of trap set used at each site was selected based on previous experience. All sets were considered to be available to bobcats, coyotes, and red fox.

Captures were recorded and compared by season and by type of trap set. Seasons were partitioned into spring (March-May), summer (June-August), and fall (September-November). To estimate the effort and cost of capturing a target animal, we compared total trapping effort (using approximately equal percentages of scent post (37%), blind (33%), and baited (30%) sets) to the resulting captures of target animals. Cursory examinations of trap-related injuries to target and nontarget species were also made.

RESULTS AND DISCUSSION

We recorded 197 captures of target and nontarget species including 8 bobcats, 44 coyotes, and 16 red fox. Frequently captured nontarget species included porcupines (*Erethizon dorsatum*), raccoons (*Procyon lotor*), snowshoe hare (*Lepus americanus*), and striped skunk (*Mephitis mephitis*) (Table 1).

Table 1. Captures during 7,572 leg-hold trapdays in Maine, 1981–1983.

Species	Captures
Bobcat	8
Coyote	44
Red Fox	16
Porcupine	52
Racoon	28
Snowshoe Hare	19
Striped Skunk	13
Dog	2
House Cat	1
Gray Squirrel	1
Eastern Chipmunk	1
Raven	4
Ruffed Grouse	2
Crow	3
Marsh Hawk	1
Brown Thrasher	1
Woodcock	1

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SEASONAL VARIATION

Capture rates of target and nontarget species varied by season (Table 2). Capture rates of bobcats, adult coyotes and red fox were greatest during spring. This apparent peak in vulnerability may be attributed to increased activity of carnivores during spring in response to the low in annual prey population cycles. Carnivores may also be moving longer distances and more frequently during spring while searching for mates. Conversely, vulnerability may be lowest during summer when adult carnivores restrict their movements while caring for young (Andelt et al. 1979, Caturano 1983, Harrison 1983). Reduced movement may also explain the lower vulnerability of nontarget animals during summer. Captures of pup coyotes were examined separately because they apparently responded differently to trap sets than did adult coyotes.

Table 2. Seasonal variations of capture rates of bobcats, coyotes, red fox, and nontarget species in Maine.

Species	Captures per 1,000 Trapdays		
	Spring*	Summer	Fall
Bobcats	1.5	1.0	0.5
Coyotes			
Adults	2.3	1.9	1.9
*Pups***		5.3	8.0
Red Fox	2.4	1.9	1.9
All Target Species	6.2	10.1	12.3
Nontarget Species	19.1	12.1	18.0

*Spring = March-May, Summer = June-August, Fall = September-November.
** Pup coyotes were considered to be available after July 1.

VARIATION BY TYPE OF TRAP SET

Capture rates of all species varied with the type of trap set (Table 3). Bobcats and adult coyotes were captured most efficiently by using blind sets, whereas pup coyotes seem to be most susceptible to baited sets and red fox to scent posts. Beasom (1974) reported that bobcats in Texas were most vulnerable to blind sets and coyotes to baited or blind sets. An apparent disadvantage of blind sets is the high capture rate of nontarget species. Nontarget mammals and birds accounted for approximately 62% of all captures with blind sets compared to 43 and 48% with scent post and baited sets.

Target animals had few capture-related injuries. We also examined 81 nontarget captures for injuries. Sixty percent of these animals sustained no injury or minor cuts and swelling, 10% had severe cuts, while 30% sustained fractures or other serious injuries. Since the initiation of our trapping efforts, we have examined methods to reduce the captures of nontarget species and capture-related injuries. Captures of small, nontarget species (e.g., squirrels, hare, birds) have been reduced by using steel-jaw traps equipped

Table 3. Captures of bobcats, coyotes, red fox, and nontarget species per 1,000 trapdays using 3 traps set types.

Species	Trap Set		
	Scent Post	Blind	Baited
Bobcats	0.5	2.1	0.7
Coyotes			
Adults	2.4	4.8	1.5
*Pups***	4.8	2.7	8.1
Red Fox	4.8	1.4	2.1
All Target Species	12.0	11.0	12.4
Nontarget Species	9.0	17.8	11.0

with adjustable tension screws on the trap pan. These screws can be tightened to prevent small animals from triggering the trap. We have also staked all steel-jaw traps with short chains (15-18 cm) to limit the momentum a struggling animal may obtain. In addition, leg holding cable snares were utilized in an effort to reduce capture related cuts. However, an evaluation of these techniques was beyond the scope of this study.

EFFORT AND COST PER CAPTURE

Bobcats required the largest amount of effort per capture, over 900 trapdays (Table 4). The estimated cost of this effort, excluding trapping equipment and vehicle costs, was about $1100. Estimated effort and cost to capture adult coyotes and red fox were less and pup coyotes were captured with the least effort.

Table 4. The estimated effort and cost to capture bobcats, coyotes, and red fox in Maine.

Species	Trapdays per Capture	Estimated Laborhours per Capture*	Estimated Cost per Capture**
Bobcats	909	227	$1,137
Coyotes			
Adults	473	118	592
Pups	270	68	338
Red Fox	476	119	595

* Estimated 0.25 laborhours to establish and maintain one trapday.
** Cost of one laborhour was estimated at $5; this does not incude trapping equipment or vehicle expenses.

Many factors probably influence trapping success including trapper experience, season, carnivore age, and carnivore density. Our goal was to capture study animals within specific areas, hence our efforts to capture target animals probably differ from fur trappers attempting to maximize captures. Therefore, our estimates of effort and cost chould not be specifically applied to other areas, but should provide useful insight to biologists considering the use of live-trapping methods to capture carnivores in specific areas, especially in areas having low densities. The large amount of effort and cost required to capture and mark an adequate sample of study animals may cause the investigators to consider alternative methods of studying these animals.

The controversy over the use of leg-hold traps has intensified in recent years. This controversy has been largely focused on the effects of trapping on target animals. Limited information is available on the effects to nontarget populations. Our results suggest that potentially large numbers of a few nontarget species (e.g., porcupines, raccoons, hare, skunks) may be captured while using leg-hold traps. The effects of trapping on local populations of nontarget species has yet to be determined.

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