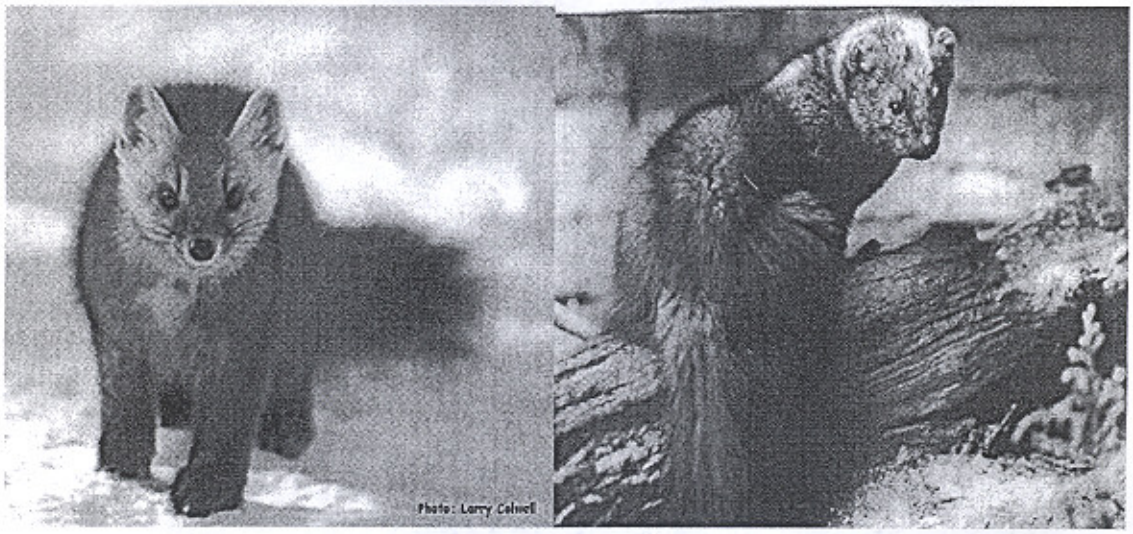
Final Report

A survey and habitat evaluation of American marten and fisher in the Big Creek Drainage, Central Idaho



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ABSTRACT

The American marten (*Martes americana*) and fisher (*Martes pennanti*) are sensitive species whose presence can be representative of a of healthy forest ecosystem. Both of these species have and are currently facing threats of habitat loss due to logging and extensive fire, habitat fragmentation, and overharvest. Due to these threats, marten and fisher are considered "threatened" or "species of concern" in numerous states. Thus, the need to understand their biology is of great importance. This is especially true in a large wilderness area such as the Frank Church Wilderness of central Idaho, where habitat has recently been affected by fire and fisher translocation efforts have occurred. The summer of 2005, I surveyed for marten and fisher in 4 areas around the University of Idaho Taylor Ranch Field Station to help resource managers such as the U.S. Forest Service and Idaho Department of Fish and Game better understand the animals' presence and distribution. I used an enclosed sooted trackplates with a new style of hair snares to survey for both marten and fisher. I also attempted to measure vegetative characteristics of the areas to obtain a better overall understanding of marten and fisher summer habitat in central Idaho. Though I was unable to collect the data I hoped for, I believe that my results and suggestions for further research will be useful in future endeavors.

Introduction and Background

The integrity of an ecosystem may be measured by the health of its vertebrate carnivore populations. The American marten (*Martes americana*) and fisher (*Martes pennanti*) are two forest carnivores that are useful indicators of healthy forest ecosystems (Zielinski and Kucera 1995). They are species sensitive to changes in the environment and have become a focus of forest wildlife research. Scientific concern over their status throughout the western United States has led to increasing interest in their "natural history, population ecology, biogeography, habitat requirements, and management needs" (Zielinski and Kucera 1995).

The purpose of my study to detect marten and fisher in a portion of the Frank Church Wilderness, Idaho, was to give researchers, land managers, and the Idaho Department of Fish and Game a starting point for long-term mustelid research in the area. The Frank Church is a unique study area with recent fire activity, a documented trapping history, and fisher translocation efforts. I hoped to examine the important attributes of marten and fisher habitat and the effects of fire on these features. Since many of the research methods I used have been predominantly utilized in the winter season, my study tested new methods for summer detection of marten and fisher. My study also tried to test a new gun cleaning brush hair snare used only recently by Idaho Department of Fish and Game.

Species Description

Both marten and fisher occupy a variety of habitat types with preference for mixed or coniferous forests (Jones 1991; Zielinski and Kucera 1995). Optimum habitat elements appear to be found in mature old-growth coniferous forests with a well established understory of coarse woody debris (CWD), which can include stumps and fallen logs, and a denser canopy. Lush shrub and forb vegetation and the support of prey species can also be components of optimum

habitat (Clem 1977; Coffin et al. 2002; Jones 1991). In Idaho fisher have been sighted in habitat types ranging from subalpine fir-beargrass at 6000 ft to yellowpine-bluebunch wheatgrass at 2500 ft, with the majoring occurring in grand fir or subalpine fir habitat types at elevations over 5000 ft (Luque 1983).

One group of researchers believe that although their research and studies in the past decade (Fager 1991, Kujala 1993, Coffin 1994) showed that marten prefer and may be dependent on mature forests in some seasons, they use a variety of habitats. Coffin et al. (2002) described "good" quality marten habitat in general terms as including large trees, well-developed canopy cover, large diameter deadfall, and abundant herbaceous ground cover. Research suggests that these characteristics are also important to fisher (Clem 1977; Fowler and Golightly 1993; Jones 1991; Williams 1963).

There are conflicting results in past research about the use of open spaces and the effects of fire on the habitat for these species. Several studies claim both marten and fisher make little use of open clearings, but may use riparian areas, meadows, and forest edges (Clem 1977; Jones 1991; Thompson and Harestad 1994). In Yellowstone, martens did not readily cross open areas wider than 100 m (Bissonette and Sherburne 1993). Yet, another study conducted in Idaho said that although open meadows and burns may be avoided in the winter they may be used in the summer and fall seasons as long as they provide adequate cover and food (Koehler and Hornocker 1977).

Similar conflicting results have been found concerning burned areas. A study conducted in southwestern Montana by the U. S. Forest Service found that marten are highly mobile and move freely through burned areas to reach unburned patches (Coffin et al. 2002). One Idaho study stated that "fisher in the Northern Rockies have evolved under a fire regime which created

numerous small openings within a matrix of mature-forested habitats", and "conversion of some percentage of older age-classes to younger age-classes may promote a diversity of prey species and thus, have along term benefit for fisher populations" (Jones 1991). Yet fire creates open areas and these may be avoided as previously stated. Jones (1991) stated, "the immediate effects of fire on marten and fisher habitat may be detrimental yet the long-term effects of fire are variable" and that "the xeric stages of succession immediately following a fire may support high populations of rodents". However, marten may not take advantage of the abundant deer mice populations on these sites, especially if the habitat does not provide adequate cover for the marten. This is an important question that further research should address for both the marten and fisher.

Both of these Mustelid species are opportunistic feeders with great olfactory and vision capabilities. Marten feed primarily on squirrels and rodents and occasionally on birds, fruits, carrion, and insects (Koehler and Hornocker 1977). Although fisher tend to have a diet similar to the marten, fisher are larger and capable of taking larger prey such as hares, muskrat, beaver, porcupine, and raccoons (Jones 1991). Both of these species' diets vary during the summer and winter periods, with a wider range of food available in the summer. Home-range size for fisher averages about 15 km^2 among females and 40 km^2 among males in the western United States (Carroll et al. 1999). The home-range size for a marten is notably smaller and more variable than the fisher.

History and Management

The American marten is a relatively common furbearer game species whose harvest is regulated by Idaho Department of Fish and Game. Yet, the species is disappearing from much of its range, with the main forces being cited as logging and wildland fires (Koehler and Hornocker

1977). In some states, it has become threatened or a "species of special concern" (Zielinski and Kucera 1995).

The fisher is a less common species than the marten in Idaho. Its original range in Idaho was probably in the mountainous portions from the Snake River plains north to Canada (Williams 1963). By the 1920's, Idaho's fisher population had declined to very low levels and was believed by many to be extinct in the state (Williams 1963). A statewide survey of Idaho's fur resource conducted by Idaho Department of Fish and Game from 1953 to 1958 evaluated the range and distribution of all fur species but could find no concrete evidence that the fisher still occurred in the state (Williams 1963).

Over-harvest of fishers by the fur industry, loss of suitable habitat due to fire and logging, and nonselective predator control activities were likely the causes (Jones 1991; Williams 1963). In the early 1960's, when some believed that the fisher had become extinct in the state, Idaho Department of Fish and Game initiated a restocking effort. Thirty-nine fisher were captured in British Columbia and released in three, north-central Idaho sites. Eleven of these fisher were released in the Chamberlain Basin of the Idaho Primitive Area in 1962 (Williams 1963). Since then, information on the species in these areas has been limited to incidental sightings and capture and little has been found about the success of the restocking due to the elusive nature of the species and the remoteness of the reintroduction areas (Luque 1983). Currently, the fisher is classified as a protected nongame "species of special concern" in Idaho.

Study Area

This research was based out of the Taylor Ranch Field Station in the Big Creek Drainage of the Frank Church Wilderness. The forested plant communities in this area include Douglas

fir, ponderosa pine, lodgepole pine, spruce/subalpine fir, and whitebark pine forests. This area contains many patches of possible marten and fisher habitat and both species are known to occur here. The Big Creek Drainage is the primary focus due to an ecological disturbance of fire in 2000. The Diamond Point Fire burned more than 175,000 acres of the Frank Church Wilderness with most of the impact occurring in the Big Creek Drainage. Also, a 1988 fire burned much of the higher elevations surveyed.

The four locations that were surveyed were 1) Golden Meadows, 2) Black Butte, 3) lower Cabin Creek, and 4) Bear Trap Saddle/Whiskey Springs. Three of these sites could be classified as higher elevation, ranging from 5200 to 8500 ft, and one (lower Cabin Creek) a lower elevation site, ranging from 4200 to 4900 ft. The higher elevation sites were dominated by lodgepole pine, Englemann spruce, subapline fire, and whitebark pine and the lower elevation by Douglas fir and Ponderosa pine.

Research Objectives

The objectives of my research project were 1) to evaluate whether or not fisher still exist after translocation efforts, 2) to ascertain the presence and distribution of marten and fisher, 3) to assess marten and fisher habitat characteristics, and 4) to evaluate the feasibility of summer survey efforts.

My first hypothesis was that the presence of marten and fisher would be detected using summer sign surveys. The predictions related to this hypothesis were that 1) tracks of marten and fisher would be detected using the track plates and 2) hair of marten and fisher would be captured using the hair snares.

My second hypothesis was that the probability of detection would be higher in habitats characterized by greater vegetative structure because of selection for these habitat properties by marten and fisher. Thus, I predicted that 1) detection of marten and fisher sign would be positively associated with percent canopy cover, tree size/age, and downfall density and 2) detection would be negatively associated with percent bare ground.

METHODS

I assembled 20 enclosed trackplates according to an instruction guide presented by Zielinski and Kucera (1995) (see Appendix 3) and the advice of professional biologists. My sample unit sites were distributed around the Taylor Ranch Field Station and accessed using forest service trails. Survey camps and sites were often coordinated with a whitebark pine research crew and thus were placed were was logistically feasible.

Each route consisted of 4-5 track-plates with hair snares based on logistics. The stations were distributed at approximately 0.5-mile intervals using a GPS unit. The stations were placed off trail in the area of the sample unit with the most appropriate habitat and where detection was most likely. This was the expert sampling approach where professional judgment is used to select sample strata from a heterogeneous population (Zielinski and Kucera 1995).

For bait, I used canned chicken. For scent lure, I used commercial marten lure (Caven's Gusto). For visual attractants, I used pie pans hung by fishing line approximately 2 meters above the ground and within 5 meters of the station. I placed the bait near the back of the enclosed track-plate box. I nailed a hole-punched film canister containing the lure covered cotton ball into a tree near the bait. I used a minimal amount of flagging as well as a GPS to mark each of the stations.

I checked the sites every 2 to 7 days. If a marten or fisher visits the site, I planned to record the necessary data and remove the station. If a marten or fisher did not visit the site, I left the station (rebaiting as necessary) for 6-10 days. Previous analyses of trackplate methods indicate that increasing survey duration beyond 12 days had little additional effect on detection (Carroll et al. 1999). In the case that a bear visited a site, I removed the station prevent damage to property or loss of data since the bear it is likely to return.

I took a number of vegetation measurements using standard USFS timber inventory methods when possible at each site (USDA 1985). Canopy cover estimates were obtained using a densiometer at 4 points within 11.4-m radius plots. Percent ground coverage in 4 categories (bare ground, herbaceous plants, shrubs and trees < 2 m in height, and downfall) was estimated in 2-m radius plots as described by Coffin et al. (2002). Large downfall density was estimated using methods described by Brown (1974). One 8.2-m transect was ran on an easterly bearing from plot center at all bait sites. Intercepts of woody material ≥ 7.6 cm in diameter were recorded to the nearest 2.5 cm diameter at the point of intercept and rated as sound or rotten (Coffin et al. 2002).

I also measured tree species, diameter at breast height (dbh), and tree height for each tree ≥ 12.7 cm dbh, in a variable radius plot (Coffin et al. 2002). The variable radius plot technique was designed to insure that a minimum number of mature trees (6 or more) are sampled at individual sites to develop standardized estimates of tree basal area and density across a wide array of tree densities (Coffin et al. 2002). I used a 20 basal-area-factor (BAF) angle gauge, the sampling device most commonly used by Forest Service personnel in the forest types in the study area, to identify specific trees included in each variable radius plot (Coffin et al. 2002).

Maximum tree age was determined by coring the largest tree of every species in the plot (Coffin et al. 2002).

I recorded locations and vegetative characteristics for each station. I also planned to record visits by marten or fisher on a survey record form (see Appendix 1). If I had a positive fisher hit, I planned to fill out a "Rare Animal Observation Report Form" for the Idaho Conservation Data Center (see Appendix 2). I made note of visits by species other than marten or fisher (i.e. bear, bird, small mammal).

Since the track sizes of marten and fisher can overlap, I planned to use the discriminant function described by Zielinski and Truex (1995) to verify species. I planned to use Chi squared and logistic regression to model the habitat variables associated with detection of fisher and marten. I planned to analyze multiple models and use then selected the best model.

RESULTS

Due to injury early in the summer, I was unable to complete the planned field research. I had hoped to have ten routes completed by August and was only able to complete four (total of 20 stations). Out of these stations, I had no marten or fisher detections. I incidentally found one set of marten tracks in the snow near one of my Black Butte sites but this observation was not at my station and was not counted in my results.

I was able to collect vegetative measurements for two routes. Yet, since I had no detections, I was unable to compare attributes between areas with detections and areas lacking detections. I hoped to use GIS to identify possible areas where these species might be present but I was unable to find the necessary GIS layers. I am currently still trying to obtain more GIS information to provide for future research.

Once injured, I began to contact researchers and biologists to discuss suggestions for future research in this area. I also interviewed a man, Wilbur Wiles, who trapped for marten and other furbearers in the area in the 1930s. Though this is anecdotal information, it is useful to get an idea of possible densities and trapping efforts for that time period as well as suggestions from an accomplished trapper for baiting these animals.

DISCUSSION

Though I was unable to detect marten or fisher my results cannot be interpreted as proof of species absence. The animals may still be present and the inability to determine presence with my surveying techniques may be due to several factors. Lengthening the sampling period many have allowed for increased encounters. I was only able to leave my routes out for the suggested minimum of 12 days. Literature also suggested checking and rebaiting the routes every 2 days, which I was unable to do due to time constraints (Zielinski and Kucera 1995). This may have made a difference with several of the stations where bait was taken by a small mammal (i.e. weasel) or bird. Also, as I expected, there were several instances where bears and possibly lion were baited in and destroyed the site.

My methods for sampling may have been faulty and deterred the animals. I used a plastic garbage bag for the trackplate cover, which may have blown easily in the wind and frightened the animal from going in. Also, the bait I used was canned chicken when several studies suggest fresh or rotten chicken. I chose against these baits because of the difficulties of keeping chicken fresh for 10-day periods in the backcountry without refrigeration and due to health concerns. Although I used the lure most commonly suggested for a summer lure, multiple lures have been

suggested including beaver castor, fish oil, and anise oil. The use of these lures alone or in combination may have improved my success.

One of the prominent weaknesses of my research was the small sample size. An intense sampling effort is necessary for these species with large home ranges and populations at low densities. A study currently being conducted in the Sierra Nevada Mountains using similar methods to survey for marten and fisher has more than 25 people surveying a large area with vehicle access, and yet they still have few detections in a year. Also, the areas surveyed may have even lower densities of marten and fisher than is commonly found due to the fragmentation caused by fires. The patches of unburned forest in several of the areas were very small and had low connectivity.

Lastly, it has been noted that baiting in many species of animals is difficult in the summer periods. This is due to a wider range of foods available and an increase in available vegetative cover. Thus, the animals are required to move less, especially females with kits.

Trapper Interview

During his trapping years, Wilbur Wiles was able to trap approximately 40-50 marten in one season (November to February). This was over 100 trap days and covering a majority of the approximately 40-mile stretch of Big Creek. He focused his trapping efforts in and around saddles. He also noted that there were many trappers during the depression years and the price of marten pelts dropped drastically in the 1950's due to a change in American marten and European sable classification. Throughout his excursions in Big Creek since the 1920s, Mr. Wiles claims that he has only seen one fisher near his house at Big Creek in the 1970s.

Suggestions for Future Research

Though I encountered several problems with my research which resulted in little data, further research on this species is valuable and necessary. The Frank Church Wilderness provides a unique setting for this research, and in reviewing my project and utilizing suggestions from biologists and trappers, I have several idea that could improve this type of research.

My first suggestion is altering the trackplate set-up. A different type of lightweight cover that is sturdier could improve the methods. Also, the use of different types of bait may be necessary for summer surveys. Ultimately, a better understanding of the feeding behavior and food sources being utilized in an area might improve baiting methods.

A winter survey effort would likely have improved success for several reasons. First, marten and fisher will be easier to bait with lower food availability. Also, problems with bear encounters should decrease due to low bear activity in the winter. Ultimately, for a study like this to be successful, there needs to be a more intense survey effort covering larger areas, a wider range of habitat types, with more time, more stations, and more people to help with surveys. Incorporating GIS to identify habitat types and possible distributions could improve our understanding of where to survey.

Lastly, a better consideration of wilderness logistics is necessary. Often research in wilderness areas is avoided due to the difficult of logistical support. I had to use stock to carry my supplies as well as camp in very remote areas for up to ten days. Even weather played a role in how much I could accomplish in a day. I was forced to be adaptable and change my plans throughout the summer. Anyone considering research in a remote, wilderness setting should evaluate these constraints in-depth and have alternative plans to use in every situation.

ACKNOWLEDGEMENTS

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I also sought guidance from Fish and Wildlife Department Research Associate Professor, Dr. Wayne Melquist, who has a strong background in mustelid research as well as an association with Taylor Ranch. The Idaho Department of Fish and Game nongame biologists Joel Sauder, Diane Evans-Mack, and Sam Cushman have all offer suggests for my project.

Additionally, I would like to thank Janet Pope and the DeVlieg Foundation as well as supporters of the Hungerford Research Scholarship. They were generous enough to supplied the necessary financial support for my project.

APPENDICES

1. Marten and fisher survey data sheet
2. "Rare Animal Observation Report Form" from the Idaho Conservation Data Center
3. Instruction diagrams of trackplates (Fowler and Golightly 1993; Zielinski and Kucera 1995).

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MARTEN AND FISHER SURVEY RECORD FORM
MACKENZIE SHARDLOW

SURVEY TYPE:
CAMERA_____ TRACKPLATE_____

SAMPLE UNIT NUMBER_____ LOCATION DESCRIPTION____

_____

_____

STATION NUMBER_____ DATE_____ TIME____

UTM_____ ELEVATION (m)_____

SLOPE_____ ASPECT_____

DATE INSTALLED_____ SAMPLES COLLECT (Y/N)____

COLLECTION # & TYPE (TRACK/HAIR/PIC)_____

TYPE OF BAIT, LURE, AND VISUAL USED_____

SPECIES DETECTED_____

OTHER OBSERVATIONS (tree scratches, scat, etc.) _____

_____

_____

_____

_____

_____

OBSERVER_____

VEGETATIVE ATTRIBUTES

CANOPY COVER (%) (11.4 m radius plot)

1)_____ 2)_____ 3)_____ 4)_____

GROUND COVER (%) (2 m radius plot)

BARE GROUND_____ HERBACEOUS PLANTS_____

SHRUBS AND TREES < 2m IN HEIGHT____ DOWNFALL_____

INTERCEPTS OF WOODY MATERIAL (8.2 m transect)

1) DIAMETER_____ SOUND OR ROTTEN?_____

2) DIAMETER_____ SOUND OR ROTTEN?_____

3) DIAMETER_____ SOUND OR ROTTEN?_____

4) DIAMETER_____ SOUND OR ROTTEN?_____

5) DIAMETER_____ SOUND OR ROTTEN?_____

6) DIAMETER_____ SOUND OR ROTTEN?_____

7) DIAMETER_____ SOUND OR ROTTEN?_____

8) DIAMETER_____ SOUND OR ROTTEN?_____

VARIABLE RADIUS PLOTS

SPECIES_____ DBH_____ HEIGHT_____

SPECIES_____ DBH_____ HEIGHT_____

SPECIES_____ DBH_____ HEIGHT_____

SPECIES_____ DBH_____ HEIGHT_____

SPECIES_____ DBH_____ HEIGHT_____

SPECIES_____ DBH_____ HEIGHT_____

SPECIES_____ DBH_____ HEIGHT_____

SPECIES_____ DBH_____ HEIGHT_____

TREE AGE (CORE)

SPECIES_____ AGE_____

SPECIES_____ AGE_____

SPECIES_____ AGE_____

IDAHO CONSERVATION DATA CENTER

RARE ANIMAL OBSERVATION REPORT FORM

SPECIES: _____ **Date Observed:** _____

CONTACT INFORMATION

Observer(s): _____

Address: _____

Phone: (____)_____ Email address: _____

LOCATIONAL INFORMATION

County: _____ Elevation: _____ (ft) or _____ (m)

Location of Observation (be specific; use place names that can be located on a topographic map): _____

_____

_____

Township _____ Latitude _____N UTM Zone ___ _____ E

Range _____ Longitude _____W Datum _____ _____ N

Section ____ ___ ¼ of the ___ ¼ GPS latitude-longitude? Y or N GPS UTM coordinates? Y or N

*****Include a photocopy of a map (USFS, BLM, or USGS topo) with the location clearly marked*****

OBSERVATIONS

Type of Observation (tracks, nest, colony, sighting): _____

Total Number of Individuals _____ No. of Males (if identifiable) _____ No. of Females (if identifiable) _____

Habitat Description: _____

_____

_____

Other Comments About this Observation: _____

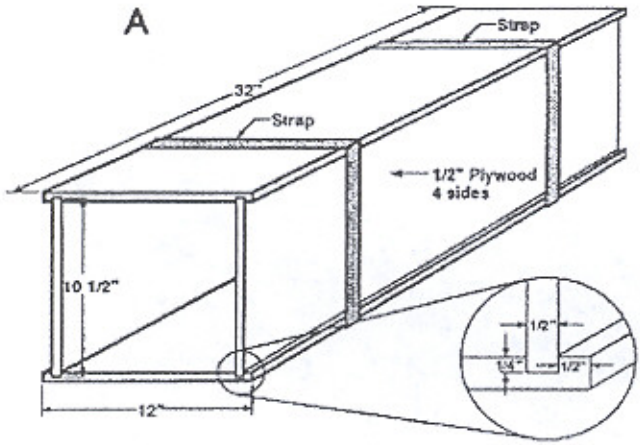
_____

_____

Photograph Taken ? Yes No **Specimen Collected? Yes No**

Return this form to:
Rita Dixon
Idaho Conservation Data Center
Idaho Dept. of Fish and Game
P.O. Box 25
Boise, ID 83707

Figure 1A--Schematic drawings of a track-plate box station and its components: A) wooden, plywood track box. (Based on original figure in Fowler and Golightly 1993).



TRACK PLATE BOX PARTS LIST
2@ 1/2 in. x 12 in. x 32 in. Plywood
2@ 1/2 in. x 10 1/2 in. x 32 in. Plywood
2@ 60 in. Strap
1@ 1/16 in. x 8 in. x 30 in Aluminum Flat Stock
1@ 9 in. x 12 in. Con-Tact Paper
Duct Tape

B.

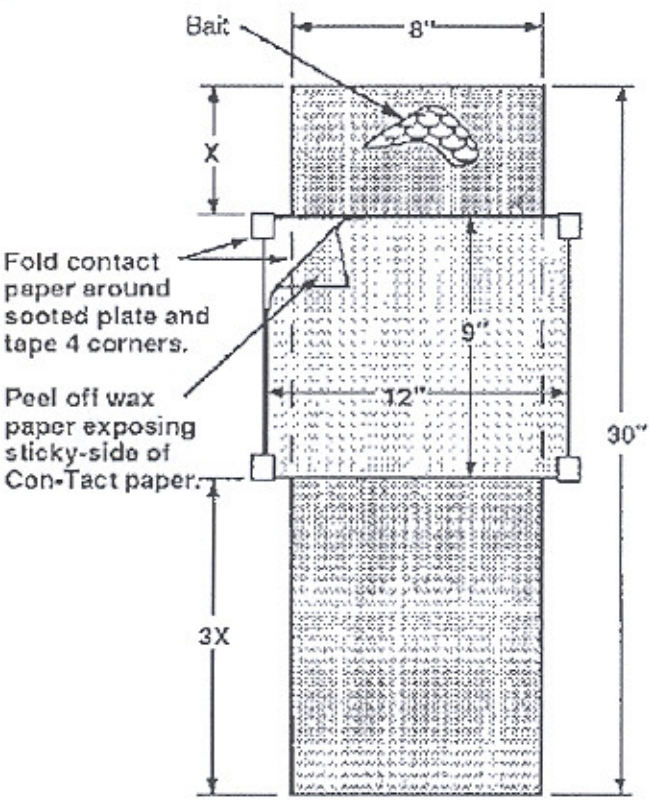


Figure 1B--Schematic drawings of a track-plate box station and its components: B) sooted aluminum plate with Con-Tact paper. (Based on original figure in Fowler and Golightly 1993).

Figure 1C-- Schematic drawings of a track-plate box station and its components: C) established station in field. (Based on original figure in Fowler and Golightly 1993).

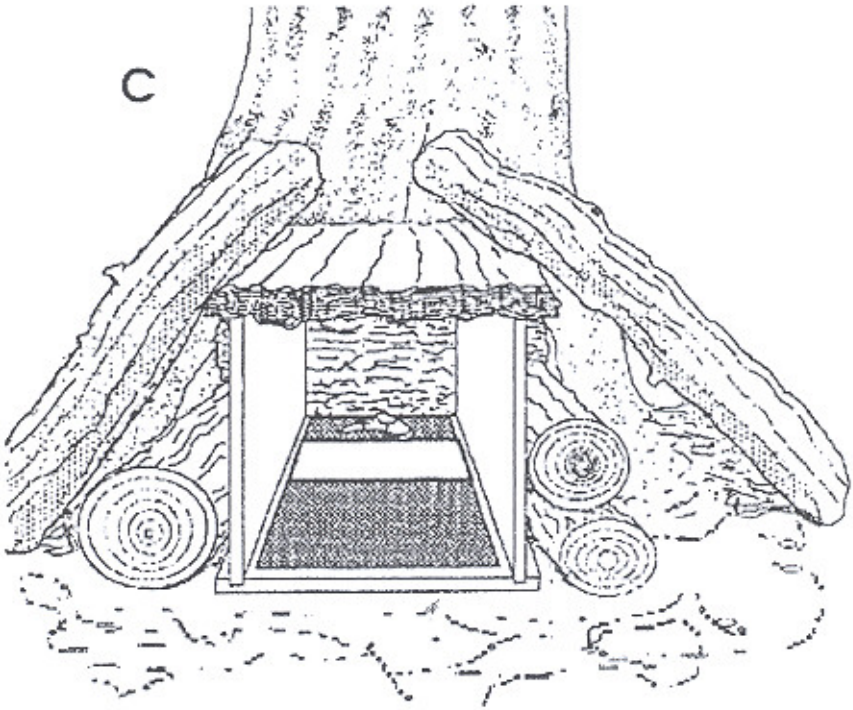


Figure 2--Track-plate box station in the field. Note how the back of the box is against the base of a tree and how the box is covered with debris to stabilize and camouflage it (Zielinski and Kucera 1995).