PRESENCE OF AMERICAN MARTEN (*Martes americana*) IN SOUTH-WESTERN NOVA SCOTIA

by

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Introduction

The south-western mainland population of American marten (*Martes americanna*) is considered 'data deficient', as there is not enough information about this population. A reintroduction program was conducted at eleven sites in Kejimkujik National Park between 1987 and 1994, when 116 marten were moved from New Brunswick to the park. The objective of the project was to re-establish a viable self-sustaining population within the park, from which the species could eventually re-establish itself elsewhere. In 1976, the last reported marten trapped on the mainland was from this area, which suggests a remnant population may have existed prior to the Kejimkujik releases (Trappers Newsletter 2008). Recently there have been 6 to 10 sightings, tracks and accidentally trapped animals reported per year (NS DNR 2010).

Marten are found in a wide range of different forests across North America. The prominent forest type in Nova Scotia is the Acadian Forest, which is characterized by red spruce, yellow birch, balsam fir, sugar maple, red pine, eastern white pine, eastern hemlock and beech. Most of these trees live to an average of 150 years with shade tolerant old growth living as old as 400 years.

Objective

The objectives of the project are to enhance the knowledge base regarding the size, health and distribution of the south-western Nova Scotia (SW NS) marten population, develop an understanding of the different scale of habitat associations of the SW NS marten population, and at a later date review hair samples and run DNA analysis to determine health and size of the SW

NS marten population (TANS Research proposal 2007). Expected results will help fill the information gap on the 'data deficient' status of the SW NS population by understanding and assessing the habitat needs and preferences of the SW NS marten, and will provide information on the most appropriate release location for translocation if needed. Benefits from this project include determining the habitat needs of the SW NS marten population, which would allow the Trappers Association of Nova Scotia (TANS) and NS DNR to work closely with landowners and forest industry to ensure that marten habitat is identified and protected if deemed necessary (TANS Research proposal 2007).

Methods/Materials

To determine the extent of the SW NS marten population, the method chosen is the use of hair snags. This method allows both the determination of presence/absence of the species in an area and it can also be used to determine the health (size) of the population by using DNA analysis of the hair samples collected. (TANS Research proposal 2007)

Many different types of hair snags that have been developed to collect animal hair including PVC piping lined with adhesive tape and coils of barb wire, or carpet tape, velcro, and even rodent glue attached to wooden boards making 'cubbies' placed in a tree or on the ground, to snag hair from the animal as it attempts to get the bait (Krebs and Lewis 1998).

An Acadia University Honours student has looked a number of different combinations to test the efficiency of various designs. Tests were conducted at the Nova Scotia Provincial Wildlife Park in Shubenacadie, where animals are held in pens that were isolated from the general public, and steps have been taken to limit human contact. Hair snag testing was done on the captive marten, which determined the best design to use in the field. The student found the best hair snag for this project was a baited wooden structure trap with rodent glue patches for hair sampling. It consists of three pieces of rough-sawn wood (two pieces 6 inches x 24 inches

and the third piece 6 inches x 32 inches. Boards can be wired together at the edge of each board so they will lay flat during transport (figure 1). On the two short boards 4 rodent glue patches (1 inch x 3 inches) can be attached with the use of a staple gun about half way between the trap opening and the bait, so the animals are obligated to rub against the rodent glue as they try to take the bait.

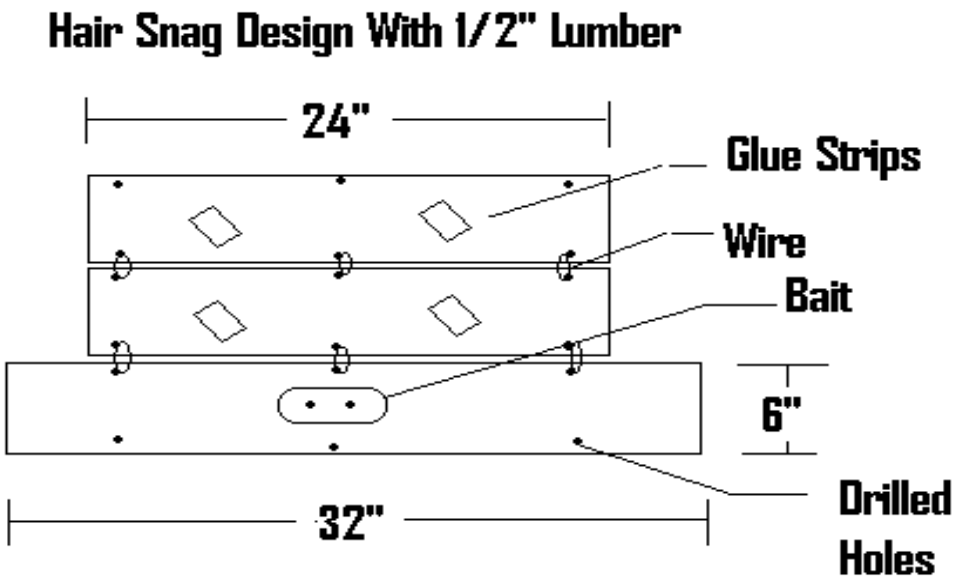


Figure 1. Hair snag design with three boards wired together

Rodent glue patches can be cut from mousetraps based on a cardboard-backed peanut butter-laced industrial adhesive. The plastic covering should be left over the glue patch until the trap is ready to be set. Note that while rodent glue patches are effective for grabbing hair, at least for marten, they are difficult to work with, both in the field and for analysis in the lab. Glues patches should be handled with care using latex gloves to avoid contamination. Bait (beaver, chicken, deer, jam, lard, sardines, and squirrels) is attached to the inside of the longer board, which will form the bottom of the hair snag. Bait should be fastened in a way that the animal will have to

work to get the bait off. Commercial marten lure (hullbaker)can be placed on a cotton ball and inserted in an old film canister, which will be placed above the trap. Alternatively lure can be placed under a limb or piece of bark to protect it from precipitation (TANS Research proposal 2007).

Placement of the hair snags is determined by the Nova Scotia DNR habitat model and access in the seven western counties (Annapolis, Digby, Kings, Lunenburg, Yarmouth, Shelburne, and Queens) in SW NS (figure 2.).

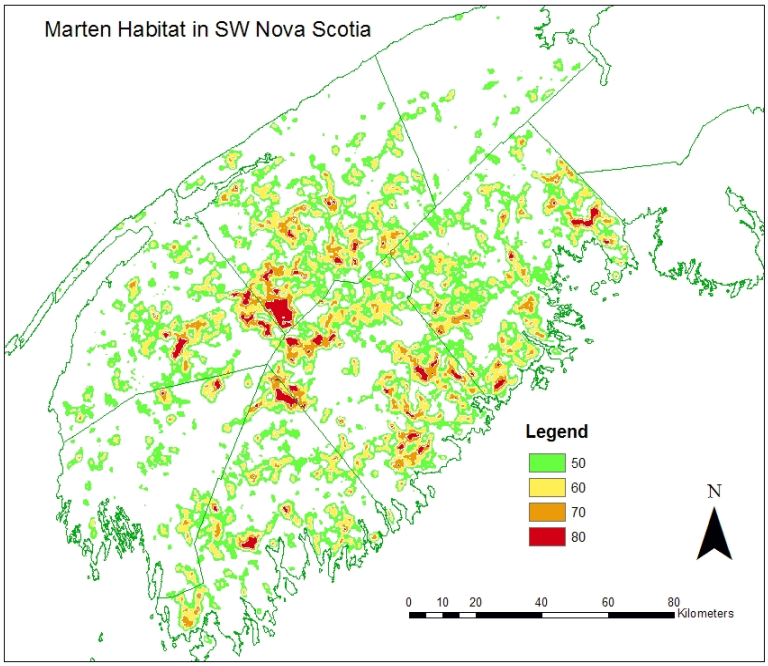


Figure 2. NS DNR habitat model of the seven counties in SW NS

The maps produced from this model are reviewed prior to any fieldwork to help determine areas (5 Km² units) where marten are likely to be found. Locations for snags are determined by habitat

quality, access, and natural funnels or ridges. If habitat appears equally suitable throughout the sample unit, an area closest to the center of the block with acceptable access will be chosen (TANS Research Proposal 2007).

An array of 4 to 8 snags is treated as a single sample, because individual snags are not considered to be independent sample. A minimum of 4 snags stations is required in each sample unit (detection success increases with an increase in number of stations in the survey). Hair snags should be distributed 0.5-km or greater from each station with the most appropriate habitat or where unconfirmed sightings have occurred. The long board (32 inch) and the top short board (24 inch) are wired together to form a 'cubby', which is then attached to a tree trunk (using wire or screw) at chest height (~1.5 m) above the snow-pack, with bait attached to the center of the long board. A leaning pole (log or branch) can be placed against the tree to allow additional access to the hair snag (TANS Research Proposal 2007).

Hair snags stations should be set for a minimum of 12 nights and checked every other day for a total of six visits (excluding setup) if looking for DNA samples from individual animals, less often if determining presence/absence. It may be convenient to just check after 4, 8 and 12 nights though fresh marten tracks in the snow near the stations may be missed. The survey is discontinued when either the target species (marten) is detected or after 12 nights have elapsed. If marten are not detected during the first 12-day session, run a second session at the same station locations during the alternate season (spring or fall) for a minimum of 12 days.

The cuticular pattern in hair is unique to individual species and can provide absolute confirmation. Guard hairs are required. Identifying species is a relatively simple procedure that involves examining the hair's cuticular pattern under a dissecting microscope. Although more complex than examining hair cuticles and requiring a specialized lab, DNA in hair roots can also

be used to indicate species and sex and identify individuals (Foran *et al.* 1997), which has application for determining relative or absolute densities. Polymerase chain reaction techniques are used to determine species and gender, and microsatellite DNA fingerprinting to identify individuals (Foran *et al.* 1997).

In order to more fully understand required marten habitat components, the project trappers are responsible for recording a Global Positioning Satellite (GPS) coordinate and specific habitat descriptions for each unit (hair snag) location and of a successful detection of marten (either hair, tracks in snow or scat).

When in the field, trappers are to first verify the existence and location of roads and trails that will be used to access the stations. Each station should be located at least 50 m perpendicular to a road (placement of stations closer to roads may reduce their attractiveness to target species and increase visibility to people). When possible, stations are marked with flagging and metal tape or rebar, and identify them using GPS. These locations may need to be revisited during a second survey. (TANS Research Proposal 2007).

Results

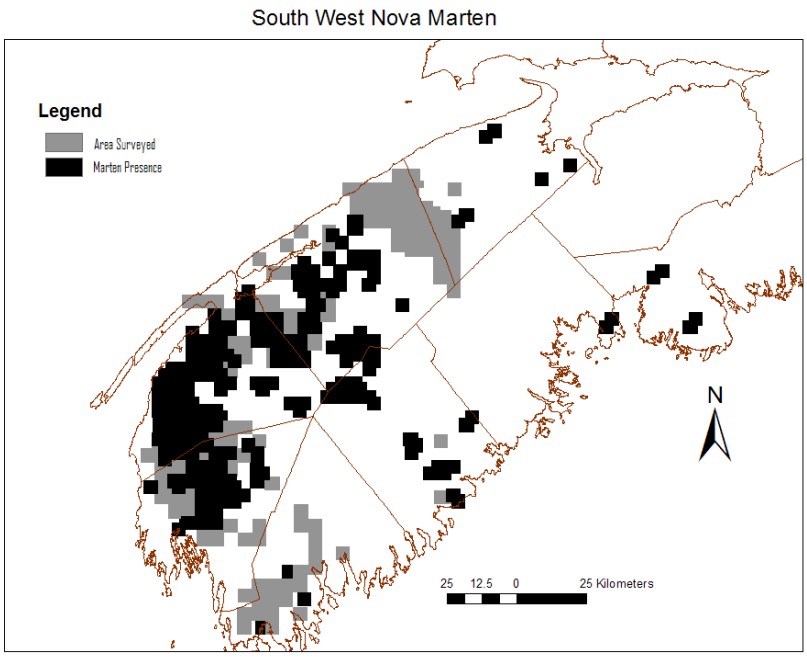
From 2007-2010 trappers placed hair snags in 193 locations throughout SW NS. Of the 193 locations, trappers recorded the quality of habitat at 25 sites. The majority of the confirmed marten presence were found in mature softwood forest stands, mixed wood forest stands, regenerating softwood thicket forest stands, old growth forest stands, and forest stands with lots of woody debris. Overall, the regenerating softwoods thicket forest stands had the most occurrence of marten presence. Marten prefer to live under dense tree canopies, because it provides protection from avian predators. Course woody debris and large-diameter trees found in old forests stands are needed for winter resting, denning and to provide access below the snow

surface to hunt small mammals during the winter. Marten also require an abundance of prey, which is typical of older growth forest stands (Steven et al. 1996).

The forest stands where marten were not observed were shrubby stunted softwood and hardwood forests, hardwood forests, under story shrub forests, black spruce bog forests, and clear-cut land covered with stunted softwood forests. Marten are less likely to be found in these types of forest stands because hardwood stands don't have dense cover all year, and black spruce bog stands are more open due to stunted trees. Studies show that marten generally avoid recent clear-cuts, "and some have suggested that marten will either not cross large areas with little canopy cover or will use direct-line travel between uncut edges" (Steven et al. 1996).

From the 193 surveyed blocks, 125had confirmed marten presence, 68 locations found no marten presence (Figure 3).

Figure 3. Map of SW Nova Scotia showing areas surveyed and marten presence.



From the 99 confirmed marten presence, researchers and trappers were able to give 26 precise GPS locations (Figure 4). The locations were found to be in hardwood stands, softwood stands, and mixed woods stands. The hardwood stands were dominated by red maple, white birch, beech, oak, sugar maple, yellow birch, and aspen. Softwood stands were dominated by red

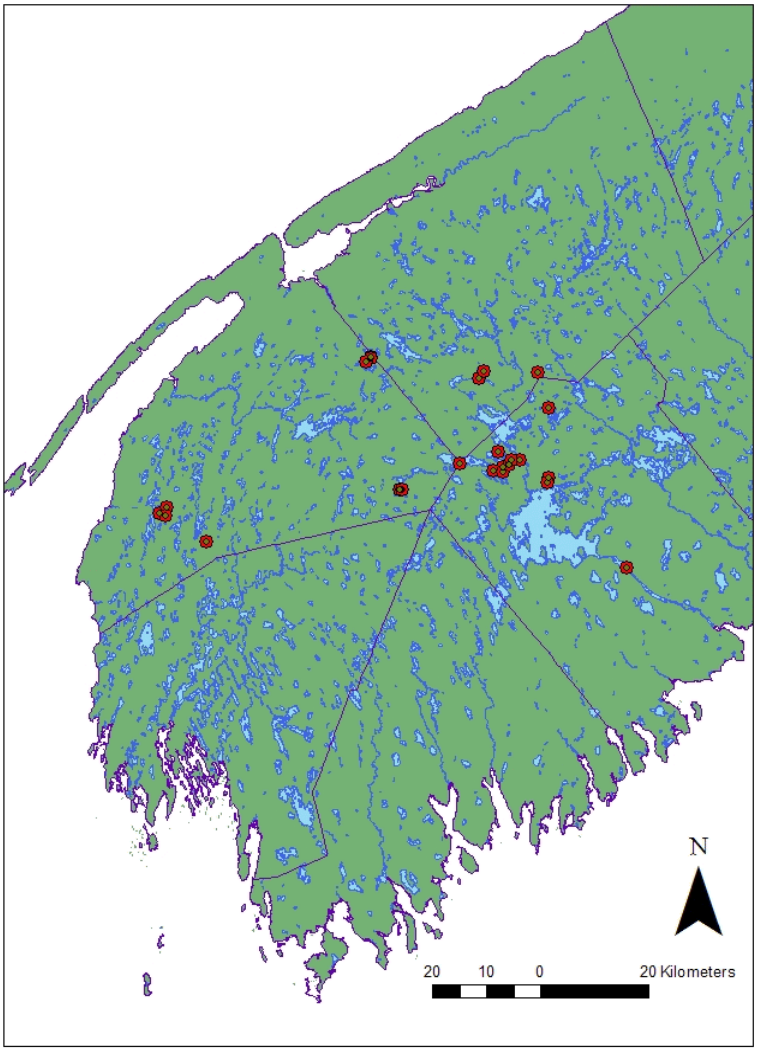


Figure 4. Marten presence GPS locations in SW NS

spruce, black spruce, balsam fir, eastern hemlock and white pine. Mixed wood stands had a mixture of both softwood and hardwood trees, with the dominate species being red spruce, black spruce, balsam fir, white pine, red pine, red maple, sugar maple, white birch, yellow birch, and beech. Most locations were found to be intolerant hardwood stands, which consists of mainly red maple and white birch. The secondary under story consisted of softwood species.

Crown closure, is the percentage of the ground covered by a vertical projection of the outermost perimeter of the crowns in a stand. Only the upper canopy is used to measure stand density (Wild Furbearer Management and Conservatation in North America 1987). All of the stands where marten were found had an average height of 15 meters. Stands adjacent to these locations were composed of mainly intolerant hardwood, white pine, and lakes and wetlands. The average for the crown closure for the adjacent stands was 9 meters, this is to be expected, as lakes and wetlands are associated with marten habitat. Arc view GIS software (ESRI) with a forest layer cover was used to help find these results.

Discussion

Marten may have chosen habitats with trees with larger diameters and habitats with large amounts of course woody debris, because it allows them to find food during the winter. It is much easer to dig through the snow near large trees and woody debris, because it makes a cavity in the snow. Marten prefer higher crown closure, because they spend most of there time in trees. Prey is more abundant in forest stands with larger tree diameters and height. This could be that prey can hide from predators and provide them with a greater food supply. Mature a forests produce a greater food supply than a young regenerating forest. Some marten were found in

hardwood forest stands this could have to do with the abundance of nuts and seeds for them to eat. It could also be providing food for prey, which would create a healthy population.

Recommendations

When trappers and researchers are setting up hair snags it is very important that each location a hair snag is placed has a detailed written record of the habitat and stand type. This is needed when trying to determine marten habitat. In the past trappers and researchers have failed to record detailed notes on the forest stands. However some did do as instructed and with their information it provided accurate and reliable data. It also made the results easier to come up with a sense of marten habitat. One recommendation would be to get trappers and researchers to record habitat and forest stand type for each location they visit.

The current NS DNR habitat model for marten in SW NS was very useful when determining the best habitat locations to set hair snags. It allows researcher to find the best habitat and then compare it to crown land to determine where the best habitat is on crown land. The second recommendation to be made is to review and update the current habitat model. One item that could be added to the current model is to incorporate course woody debris into the model. This would be useful, as most locations where marten have been located there has been course woody debris.

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